

Analyzing the Validity of Working Capital Determinant Factors of Enterprise 50 (E50) Firms in Malaysia using Partial Least Square-Structural Equation Modeling

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ABSTRACT

The purpose of this paper is to examine the validity of factors that determine the Working Capital using Partial Least Square method. The analysis is done on Enterprise 50 (E50) firms in Malaysia. E50 is an annual awards program initiated by government and organized by SME Corporation & Deloitte Malaysia since 1997 to recognize the 50 best SMEs based on their performances and potential to succeed. Working Capital is important area in financial management because it reflects the management of short-term assets and liabilities of the firms with the maturities of less than a year, represent the main share of items on a firm's balance sheet. While the Working Capital was used as dependent variable, other factors such as growth of the firm, profitability, debt, size and industry were used as Independent Variable (determining factors) of the Working Capital. The analysis on 285 E50 firms based on accounting data of three years from 2006 to 2008 using Structural Equation Modeling (SEM) technique of Partial Least Squares will focus on the validity of the factors.

Keywords: Working Capital, Determining Factors, Structural Equation Modeling, Partial Least Squares

INTRODUCTION

Working capital refers to the availability of the net current assets of the business for its operations. Typically, the most known components of working capital are inventory, accounts receivable and accounts payable. Basically, the working capital is defined as current asset less current liabilities (Damodaran, 2001). The main objective of working capital management is to maintain an optimal balance between each of the working capital components.

Working Capital is important area in financial management because it reflects the management of short-term assets and liabilities of the firms with the maturities of less than a year, represent the main component of items on a firm's balance sheet. Furthermore, the management of working capital will affect the profitability and liquidity of the firm (Deloof, 2003). The efficient management of working capital is a fundamental part of the overall corporate strategy to create shareholders' value (Nazir & Afza, 2008). Therefore, firms try to keep an optimal level of working capital that maximizes their value. Working capital management is vital for the survival of the business no matter what is the size of the business.

The scope of analysis in this study is Enterprise 50 (E50) firms in Malaysia which comprise various size of companies. To date approximately 450 companies have won the award. Over the last 14 years, 56 companies are now listed on stock exchange comprising of 43 companies listed on the Main Market, while 13 are on the ACE Market, of Bursa Malaysia. The E50 award programme has been recognized by industries as a prominent award that symbolizes achievements in business and entrepreneurship. Therefore it is imperative to look at the working capital management of these companies.

This study extends the empirical work on working capital management in two ways. First, it focus on Enterprise 50 which comprises various size of the companies including Small Medium Enterprise (SMEs). Generally, most of SME assets are in the form of current assets (Teruel & Solano, 2007). Second, the study uses a partial least square structural equation modeling technique that have the ability to mitigate the measurement problems encountered when working with proxy variables.

LITERATURE REVIEW

Based on an overview on corporate finance literature, Nakamura and Palombini (2011) concluded that there are no robust and widely accepted theories explaining the working capital management. Possibly, the nearest relevant theory is the Pecking Order Theory (Myers and Majluf 1984) which normally cited to explain internal and external factors that influence the company's optimal capital structure. According to this theory, the firms have a particular preference of order for capital used to finance their businesses. The firm will prefer retained earnings to debt, short-term debt over long-term debt and debt over equity.

On the other hand, some researchers have recently been involved in testing the relationship between working capital requirements and its determining factors. They seek to identify and test various factors theorized to affect working capital in order to find evidence of either positive or negative relationship between these factors and working capital. These studies include Chiou, Cheng and Wu (2006); Nazir and Afza (2008); Appuhami (2008); Zariyawati et al. (2010); Mohamad & Saad (2010); and Gill (2011).

In order to examine the relationship, some components have been used as a proxy to working capital. Among others Chiou et al. (2006) and Appuhami (2008) used net liquid balance and the most widely used proxy is cash conversion cycle (Mongrut et al. 2007; Zariyawati et al. 2010; Mohamad & Saad 2010; Vallipour 2012). Another commonly used indicator for working capital is net working capital deflated by total assets (Nazir & Afza 2008; Gill 2011).

In term of the explanatory variable, debt has been widely tested (Chiou et al. 2006; Nazir & Afza 2008). They found that the negative relationship with debt level is consistent with the Pecking Order Theory where the business first preference of internal funding, suggesting that companies with more debt aim to work with low level of current assets, to avoid incurring new debt or issuing equity. However in term of growth, performance and size, the authors did not find consistent empirical result on the relationship to working capital requirement.

In the Malaysia context, Zariyawati et al. (2010) investigated the determinants of working capital management of listed firms in Malaysia for the period 2000-2006. Results indicated that firm size, debt, firm growth, economic growth and inflation associates with firm's working capital. In another study, Mohamad & Saad (2010) obtained a sample of 172 firms listed on the Bursa Malaysia exchange over the time period of 2003-2007 and found significant negative relationship between working capital and a firm's profitability.

In general, previous studies on working capital management have provided some insights to support the fact that there are factors which will affect the working capital requirements and ultimately will give impact to the value of the firms. The summary of variable used by the previous authors are listed in Appendix II. It is interesting to note that all of these studies focused on large listed companies. In reality, efficient management of working capital is very essential in any type and size of the firms since it will reflect the overall corporate strategy in creating shareholder value. Another critical point to be addressed here is the methodological aspects, where all of these studies used Ordinary Least Square (OLS) regression for analysis.

Regression analysis has been commonly used in finance and economics. According to Titman and Wessels (1988), it has limitation of recognizing and mitigating measurement errors and other econometric problems that arise in studies involving estimation of latent variables. Such problems include: ignoring measurement errors in exogenous variables; failing to accommodate models that include latent variables; reciprocal causation among variables; interdependence among variables; and failing to include more than one indicators for a latent variable (Titman and Wessels 1988).

The following latent variables were hypothesized for testing:

Hypotheses

- H₁ : Growth is negatively related to working capital requirements.
- H₂ : Profitability is positively related to working capital requirements.
- H₃ : Debt is negatively related to working capital requirements.
- H₄ : Size is positively related to working capital requirements.
- H₅ : Industry is positively related to working capital requirements.

METHODOLOGY

Contrary to the previous researcher, this paper used Partial Least Square-Structural Equation Modeling (PLS-SEM) approach which has been widely applied in psychology, sociology, education, and marketing but not in finance and economics. PLS has been frequently used in survey-based research. However, PLS is not methodologically fixed to surveys only and can be used with data collected via other medium including secondary data (Ittner et al., 1997; Papadopoulos & Amemiya 2005; Lee et al. 2011). Titman and Wessels (1988) and Maddala and Nimalendran (1995) are notable exceptions to apply SEM in corporate finance. Titman and Wessels (1988) employ it to study the determinants of capital structure, while Maddala and Nimalendran (1995) examine the effect of earnings on stock prices.

Similar to Titman & Wessels (1988) approach, Chiarella et al. (1992) adopting SEM technique in analyzing the capital structure determinant in the Australian context. Then, Jairo (2008) and Chang et al. (2009) replicate the studies in different context in UK and USA respectively. All the studies claimed that SEM estimation technique has a number of advantages over the traditional regression models particularly its ability to recognize and mitigate measurement and specification errors, which have overwhelmed previous similar studies.

Operationally, all the previous researchers divided their sampling period into three sub-periods as per Table 1:

TABLE 1: Sampling Period of Previous Research

Authors	Data Period	Sub-Period for Dependant Variable
Titman & Wessels (1988)	1974-82 (9 years)	1977-79 (3 years)
Chiarella <i>et al</i> (1992)	1977-85 (9 years)	1980-82 (3 years)
Jairo (2008)	1985-99 (15 years)	1990-94 (5 years)
Chang (2009)	1988-02 (15 years)	1993-97 (5 years)

Then the sub-period were averaged according to the sub-period years. Averaging the sub-period reduces the measurement error due to random year-to-year fluctuations in the variables (Titman & Wessels 1988). However, for this study, only 3 years data (2006-2008) is available, therefore averaging is not applicable and 2007 will be used as the observed year (dependant variable). Indicator of growth were measured for the period of 2008. By doing this, the realized values as proxies of the value expected when the working capital decision was made. The variables used to measure debt were measured in parallel with the dependent variable year, i.e. year 2007. The variables used as indicators of size and profitability were taken from the year 2006. Measuring the profitability attribute during the earlier period will determine whether profitability has a short-term effect on observed working capital. Measuring size in the earlier periods avoids creating a false relation between size and working capital that arises because of the relation between size and past profitability since profitable firms will become larger and the short-term relation between profitability and working capital where profitable firms increase their net worth. Measurement of the proxies for the variables is listed in Appendix I.

This study extend the previous researchers approach by adopting Partial Least Square-Structural Equation Modeling (PLS-SEM) technique. PLS-SEM is a causal modeling approach aimed at maximizing the explained variance of the dependent latent constructs. This is contrary to covariance-based SEM (CB-SEM) objective of reproducing the theoretical covariance matrix, without focusing on explained variance (Hair, Ringle & Sarstedt 2011). The data was tested using SmartPLS[®] software version 2.0. developed by Ringle, Wende and Will (2005).

RESULT

For reporting, two stages of analysis are typically conducted in SEM approach (Anderson & Gerbing 1988): analysis of measurement and analysis of structural model. The measurement model was estimated using confirmatory factor analysis to test reliability and validity of the measurement model, whilst the structural model was analyzed to assess magnitude of relationships among the constructs. This study focus on the first stage.

Analysis of measurement model reliability and validity

According to Gefen & Straub (2005), two elements of factorial validity need to be examined in PLS i.e. convergent validity and discriminant validity, because these are the components of a larger

scientific measurement concept known as construct validity. Construct reliability will indicate adequate measurement of all construct (Bagozzi & Edwards 1998). This can be assessed by means of the construct reliability which requires indicators assigned to the same construct to show a strong mutual association. Therefore, the Composite Reliability (CR) can be used to check how well a construct is measured by its assigned indicators. A commonly acceptable threshold value for CR is 0.7 or more, however values below 0.7 also have been considered acceptable (Hair et al. 2009). For example Sridharan et al. (2010) use value of 0.5 as a minimum cut-off for CR. Following Bagozzi and Yi (1988) this study set 0.6 as a minimum cut-off for CR.

TABLE 2: Results of Measurement Model

Constructs	Items	Convergent Validity		
		Loading	CR ^a	AVE ^b
Working Capital	WC1	0.98	0.96	0.92
	WC2	0.94		
Growth	GR1	0.63	0.63	0.46
	GR3	0.72		
Profitability	P1	0.75	0.77	0.62
	P2	0.82		
Debt	D1	0.69	0.73	0.48
	D2	0.69		
	D3	0.69		
Size	SZ1	0.92	0.94	0.89
	SZ2	0.96		
Industry	IND	1.00	1.00	1.00

Note: ^a Composite Reliability (CR) = (square of the summation of the factor loadings)/[(square of the summation of the factor loadings) + (summation of error variances)].

^b Average Variance Extracted (AVE) = (summation of the square of the factor loadings)/[(summation of the square of the factor loadings) + (summation of error variances)].

The results of measurement model are shown in Table 2. The factor loading for all items exceeds the recommended level of 0.6 (Chin 1998) except for one item i.e. GR2 for Growth construct. The item has been excluded.

Convergent validity is the degree to which multiple items measuring the same construct under the study. A common approach to examine convergent validity is the factor loadings and Average Variance Extracted (AVE). The estimates of AVE for growth and debt constructs were below the 0.50 threshold suggested by Bagozzi and Yi (1988). More specifically, the AVE for the growth construct was 0.46, and for the debt construct, the AVE was 0.48.

Therefore in order to establish the evidence for the discriminant validity, where the degree to which the measures of different concepts are distinct, the shared variance have been compared to AVE as shown in Table 3. The discriminant validity is established between two constructs if the AVE of each one is higher than the shared variance. Since the AVE values of the two constructs are higher than the squared correlation, discriminant validity among the latent variables was supported (Oliver et al. 2010).

TABLE 3: Discriminant Validity of Constructs

Constructs	Debt	Growth	Industry	Profitability	Size	Working Capital
Debt	0.48					
Growth	0.01	0.46				
Industry	0.01	0.00	1.00			
Profitability	0.00	0.00	0.02	0.62		
Size	0.05	0.01	0.00	0.00	0.89	
Working Capital	0.00	0.00	0.00	0.00	0.00	0.92

Note: Diagonals represent the AVE, while the other matrix entries represent the squared correlations.

GENERAL CONCLUSION

This research aimed to analyze the validity of working capital determinants factors using partial least square structural equation approach. Validity is a form of construct validity that uses statistical tools

that work with factor loadings. The purpose of factorial validity is to show that the constructs which are considered to be made up of certain measurement items are, indeed, made up of those items, and not made up of items posited to be part of another construct. Generally, these tests show the convergent and discriminant validity of the constructs and it seems that the developed model represent the data adequately. Therefore it can be concluded that the identified latent variables i.e. the determinant factors of working capital is valid for testing. The future research will examine the structural model.

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Appendix I

Measurement of the Variables

Variables	Code	Measurement	Year
Working Capital	WC1	Current Assets less Current Liabilities/Revenues (Damodaran 2001)	2007
	WC2	Current Assets less Current Liabilities/ Expenses (Damodaran 2001)	
Growth	GR1	Investment/ Total Assets (TA)	2008
	GR2	Investment/ Sales	
	GR3	Capital Expenditure/ TA	
Profitability	P1	Return on TA	2006
	P2	Return on Equity	
Debt	D1	Total Debt (TD) Ratio = Total Debt/TA	2007
	D2	Long Term Debt (LTD) Ratio= LTD/TA	
	D3	Short Term Debt (STD) Ratio= STD/TA	
Size	S1	Log of Sales	2006
	S2	Log of Assets	
Industry	IND	Dummy variable equal to 1 for manufacturing firms.	

Appendix II

Summary of Working Capital determinants used by Previous Researchers

AUTHORS	ATTRIBUTES																																				
	(CA-CL)/Revenue	(CA-CL)/Expenses	(CA-CL)/TA	Net Liquid Balance	WCR	CCC	CA/CL	Future Sales	Operating Cycle	Cash Flow/TA	Fixed Asset/TA	TD/TA	LTD	STD	Sales	Economics	Inflation	Recession	GDP	Recycle	Gross Profit	ROA	ROI	Tobins Q	Log Sales	Log Assets	No of Director	No of External Director	Multinational	Manufacturing	Services	Operating	Financial	Capital	Age		
	Working Capital						Business/Tangibility				Leverage			Growth		Economics			Performance			Size			Industry			Expenditure									
Chiou, Cheng and Wu (2006)				1	1							1			1			1	1		1	0			0											0	
Mongrut et al (2007)						1		1			1							1																			
Nazir and Afza (2008)			1						1	0		1			0				0			1		1		0			1								
Appuhami (2008)				1	1					1		1			0							0														1	
Zariyawati et al. (2010)						1						1			1			1	1						1	1	1										
Mohamad & Saad (2010)							1					1										1	1	1													
Gill (2011)			1			1					0	0										0				0											
Valipour (2012)						1				1		1			1										1												

Note: 1 =significant, 0 =not significant