The Joint Determinants of Capital Structure and Stock Rate of Return: A LISREL Model Approach*

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Abstract

Titman and Wessels (1988) have used alternative debt instruments and factor analysis techniques (LISREL approach) to study the theories of optimal capital structure. Dittmar and Thakor (2007) developed a new theory called “managerial investment autonomy” to explain that a firm’s stock price and its capital structure are simultaneously decided.

The main purpose of this paper is to integrate the research results of Titman and Wessels (1988) and Dittmar and Thakor (2007) and to develop a simultaneous determination model of capital structure and stock returns. In this paper, we also use LISREL model to deal with the measurement error-in-variable problem. In addition, we also introduce managerial variables such as CEO tenure, CEO compensation, and other related variables.

Abstract

Furthermore, we introduce macroeconomic variables such as debt to GDP ratio, total public debt, and Excess return on the market. The empirical results from the structural equation modeling (SEM) with confirmatory factor analysis (CFA) show that stock returns, asset structure, growth, industry classification, uniqueness, volatility and financial rating, profitability, government financial policy, and managerial entrenchment are major factors for determining capital structure.

Keywords: LISREL, Structural Equation Modeling (SEM), Confirmatory Factor Analysis (CFA), Capital Structure

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There are three major findings in this paper which can be summarized as follows:

- We found that the interaction of a firm's leverage and its stock price should be explicitly considered in capital structure research. In other words, we found only significant theoretical attributes on the decision of capital structure if stock return is not incorporated into capital structure research.

- Our empirical results also confirm the endogenous supply relationship between public and private debts. The negative relation between firms' leverage ratio and the issue of total public debts is consistent with McDonald's (1983) theory. Our finding can be treated as an extension of Miller's (1977) capital structure theory.

- We also show the necessity and importance of the classifications of observable variables to describe the trade-off between the financial distress and agency costs in capital structure choice. Therefore, we conclude that SEM with CFA approach is preceded by adding latent attributes of capital structure and solving measurement error-in-variable problem.

Table 1 TW Attributes and Indicators

TW provides eight characteristics to determine the capital structure. These attributes are unobservable. The attributes as latent variables, their indicators as independent variables, and the indicators of capital structure as dependent variables are shown in Table 1. The parentheses in indicators are the notations used in LISREL system.

Attributes	Indicators
Asset structure	Intangible asset/total assets(INT_TA) Inventory plus gross plant and equipment /total assets(IGP_TA)
Non-debt tax shield	Investment tax credits/total asset (ITC_TA) Depreciation/total asset(D_TA) Non-debt tax shields/total asset(NDT_TA)
Growth	Capital expenditures/total asset (CE_TA) The growth of total asset (GTA) Research and development/Sales (RD_S)
Uniqueness	Research and development/Sales (RD_S) Selling expense/sales (SE_S) Quit Rates (QR)*
Industry Classification	SIC code (IDUM)
Size	Natural logarithm of sales (LnS)
Volatility	The standard deviation of the percentage change in operating income (SIGOI)
Profitability	Operating income/sales (OI_S) Operating income/total assets (OI_TA)
Capital Structure (dependent variables)	Long-term debt/market value of equity (LT_MVE) Short-term debt/market value of equity (ST_MVE) Convertible debt/market value of equity (C_MVE) Long-term debt/book value of equity (LT_BVE) Short-term debt/ book value of equity (ST_BVE) Convertible debt/ book value of equity (C_BVE)

Table 2 Additional Attributes and Indicators

Since we will use confirmatory factor analysis (CFA) approach to test whether observed variables are good proxies to measure attributes effectively, we add additional indicators and a financial rating attribute as shown in Table 2. These indicators can be alternative suitable proxies of attributes to replace TW indicators.

Attributes	Indicators
Growth	Research and development/ total assets (RD_TA)
Industry Classification	Quit Rates (QR)
Volatility	Coefficient of Variation of ROA (CV_ROA) Coefficient of Variation of ROE (CV_ROE) Coefficient of Variation of Operating Income (CV_OI)
Financial Rating	Altman's Z-score (Z_Score) S&P Domestic Long Term Issuer Credit Rating (SP_Rate) S&P Investment Credit Rating (SP_INV)
Capital Structure (dependent variables)	Long-term debt/market value of total assets (LT_MVA) Short-term debt/market value of total assets (ST_MVA) Convertible debt/market value of total assets (C_MVA) Long-term debt/book value of total assets (LT_BVA) Short-term debt/ book value of total assets (ST_BVA) Convertible debt/ book value of total assets (C_BVA)

Table 3 All Attributes and Indicators

The attributes of firm characteristics, growth and profitability, are expected to affect stock price directly. Therefore, we will set these two attributes as joint determinants of stock return and capital structure. The list of all indicators and attributes can be found in Table 3.

Attributes	Indicators
Asset structure (AtStruct)*	Intangible asset/total assets(INT_TA) Inventory plus gross plant and equipment /total assets(IGP_TA)
Non-debt tax shield (Nd_tax)	Investment tax credits/total asset (ITC_TA) Depreciation/total asset(D_TA) Non-debt tax shields/total asset(NDT_TA)
Growth (Growth)	Capital expenditures/total asset (CE_TA) The growth of total asset (GTA) Research and development/Sales (RD_S) Research and development/ total assets (RD_TA)
Uniqueness (Unique)	Research and development/Sales (RD_S) Selling expense/sales (SE_S) Quit Rates (QR)
Industry classification (Industry)	SIC code (IDUM) Quit Rates (QR)
Size (Size)	Natural logarithm of sales (LnS)
Volatility (Vol)	The standard deviation of the percentage change in operating income (SIGOI) Coefficient of Variation of ROA (CV_ROA) Coefficient of Variation of ROE (CV_ROE) Coefficient of Variation of Operating Income (CV_OI)
Profitability (Profit)	Operating income/sales (OI_S) Operating income/total assets (OI_TA)
Financial rating (Rate)	Altman's Z-score (Z_Score) S&P Domestic Long Term Issuer Credit Rating (SP_Rate) S&P Investment Credit Rating (SP_INV)
Macroeconomic factors (Macroeco)	Debt-to-GDP ratio (D_GDP) Corporate bond spread (Spread) Total public debt (TPD)

Table 3 All Attributes and Indicators

Manager character (Manager)	**CEO Tenure over CEO age (Tenu_age)** **log of CEO tenure (log_Tenu)** **log of CEO total compensation (log_TC)** **CEO bonus in millions (Bonus)** **log of number of directors (log_Dir)** **Percentage of outside directors (Out_Dir)**
Liquidity (Liquid)	Innovations in aggregate liquidity (PS_Innov) Level of aggregate liquidity (PS_Level) Traded liquidity factors (PS_Vwf)
Value (Value)	Small minus big (smb) High minus low (hml) Excess return on the market (mktrf) Risk-free interest rate (rf) Momentum (umd)
Capital structure (CapStruc)	Long-term debt/market value of equity (LT_MVE) Short-term debt/market value of equity (ST_MVE) Convertible debt/market value of equity (C_MVE) Long-term debt/book value of equity (LT_BVE) Short-term debt/ book value of equity (ST_BVE) Convertible debt/ book value of equity (C_BVE) Long-term debt/market value of total assets (LT_MVA) Short-term debt/market value of total assets (ST_MVA) Convertible debt/market value of total assets (C_MVA) Long-term debt/book value of total assets (LT_BVA) Short-term debt/ book value of total assets (ST_BVA) Convertible debt/ book value of total assets (C_BVA)
Stock rate of return (StReturn)	Annual stock return (SR)

SEM Approach

- The SEM incorporates three equations as follows:

$$Structural\,model\text{:}\ \eta = \beta\eta + \Phi\xi + \varsigma \qquad (1)$$

$$Measurement\,model\,for\,y\text{:}\,y = \Lambda_{\mathrm{y}}\eta + \upsilon \qquad (2)$$

$$Measurement\,model\,for\,x\text{:}\,x = \Lambda\xi + \delta \qquad (3)$$

- x is the matrix of observed independent variables as the indicators of attributes, y is the matrix of observed dependent variables as the indicators of capital structure, ξ is the matrix of latent variables as attributes, η is the latent variables that link determinants of capital structure (a linear function of attributes) to capital structure(y).

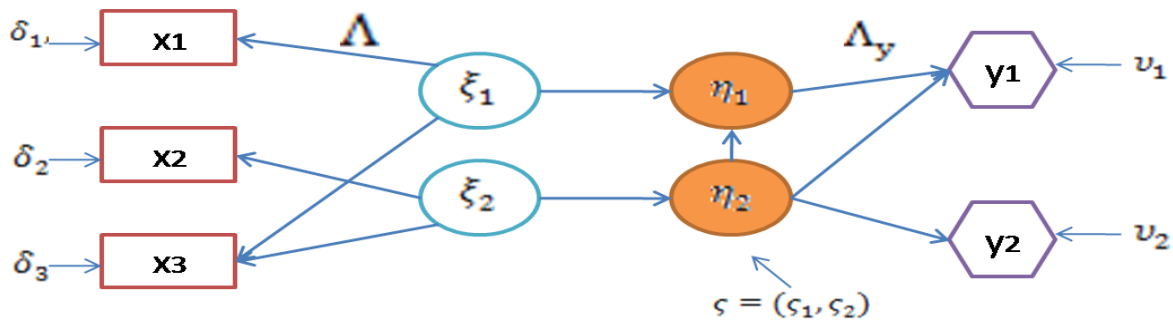
Figure 1 Path Diagram of SEM Approach

In this path diagram, the SEM formulas (2.1), (2.2) and (2.3) are specified as follows:

$$\beta = \begin{bmatrix} 0 & \beta_1 \\ 0 & 0 \end{bmatrix}, \Phi = \begin{bmatrix} \Phi_1 & 0 \\ 0 & \Phi_2 \end{bmatrix}, \Lambda_y = \begin{bmatrix} \Lambda_{y_1} & \Lambda_{y_2} \\ 0 & \Lambda_{y_3} \end{bmatrix}, \Lambda = \begin{bmatrix} \Lambda_1 & 0 \\ 0 & \Lambda_2 \\ \Lambda_3 & \Lambda_4 \end{bmatrix}$$

where $\Lambda_{y_1}, \Lambda_{y_2}, \Lambda_{y_3}, \Lambda_1, \Lambda_2, \Lambda_3, and\ \Lambda_4$ denote unknown factor loadings, $\beta_1, \Phi_1, and\ \Phi_2$ denote unknown regression weights, $\upsilon_1, \upsilon_2, \delta_1, \delta_2, and\ \delta_3$ denote measurement errors, and $\varsigma_1, and\ \varsigma_2$ denote error terms.

Figure 1 Path Diagram of SEM Approach



The structural model can be specified as the system of equations which combines equations (1) and (2), and then we can obtain the structural model in TW's paper as follows:

$$y = \Gamma\xi + \varepsilon \qquad (4)$$

The fitting function for maximum likelihood estimation method for SEM approach is:

$$F = log|\Sigma| + tr\left(S\Sigma^{-1}\right) - log|S| - (p + q) \qquad (5)$$

Figure 2a Matrices of Observed Variables and Their Attributes

Figures 2a and 2b illustrate the measurement model as indicated in equation (3) and Figure 2c shows the measurement model as indicated in equation (2). The elements of *x* vector are listed on Table below in detailed.

$$x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ . \\ . \\ . \\ x_{36} \\ x_{37} \\ x_{38} \\ x_{39} \end{bmatrix}, \qquad \xi = \begin{bmatrix} Atstruct \\ Nd_tax \\ Growth \\ Unique \\ Industry \\ Size \\ Vol \\ Profit \\ Rate \\ Macroeco \\ Manager \\ Liquidity \\ Value \end{bmatrix}$$

Figure 2a Matrices of Observed Variables and Their Attributes

x_1	x_2	x_3	x_4	x_5	x_6
INT_TA	*NDT_TA*	*RD_TA*	*LnS*	*CV_OI*	*SP_Rate*
x_7	x_8	x_9	x_{10}	x_{11}	x_{12}
IGP_TA	*CE_TA*	*SE_S*	*SIGOI*	*OI_S*	*SP_INV*
x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}
ITC_TA	*GTA*	*QR*	*CV_ROA*	*OI_TA*	*D_GDP*
x_{19}	x_{20}	x_{21}	x_{22}	x_{23}	x_{24}
D_TA	*RD_S*	*IDUM*	*CV_ROE*	*Z_Score*	*Spread*
x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
TPD	*Tenu_Age*	log_Tenu	*log_TC*	*Bonus*	*log_Dir*
x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}
Out_Dir	*PS_Innov*	*PS_Level*	*PS_Vwf*	*smb*	*hml*
x_{37}	x_{38}	x_{39}			
mktrf	*rf*	*umd*			

Figure 2b Matrices of Factor Loadings and Their Measurement Errors

$$\Lambda = \begin{bmatrix}
\Lambda_1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\Lambda_2 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \Lambda_3 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \Lambda_4 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \Lambda_5 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \Lambda_6 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \Lambda_7 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \Lambda_8 & \Lambda_{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \Lambda_9 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & \Lambda_{11} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & \Lambda_{12} & \Lambda_{13} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \Lambda_{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{15} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{16} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{17} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{18} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{19} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{20} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{21} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{22} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{23} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{24} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{25} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{26} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{27} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{28} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{29} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{30} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{31} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{32} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{33} & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{34} & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{35} & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{36} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{37} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{38} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{39} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Lambda_{40} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0
\end{bmatrix}, \delta = \begin{bmatrix}
\delta_1 \\ \delta_2 \\ \delta_3 \\ \delta_4 \\ \delta_5 \\ 0 \\ \delta_6 \\ \delta_7 \\ \delta_8 \\ \delta_9 \\ \delta_{10} \\ \delta_{11} \\ \delta_{12} \\ \delta_{13}
\end{bmatrix}$$

Figure 2c Matrices of Capital Structure and Stock Return

$$\eta = \begin{bmatrix} CapStruc \\ StReturn \end{bmatrix}, y = \begin{bmatrix} LT_MVA \\ ST_MVA \\ C_MVA \\ SR \end{bmatrix}, \Lambda_y = \begin{bmatrix} \lambda_1 & 0 \\ \lambda_2 & 0 \\ \lambda_3 & 0 \\ 0 & 1 \end{bmatrix}, \upsilon = \begin{bmatrix} \upsilon_1 & 0 \\ \upsilon_2 & 0 \\ \upsilon_3 & 0 \\ 0 & 0 \end{bmatrix}$$

Figure 3 Path Diagram of Structural Model for Joint Determinants of Capital Structure and Stock Returns

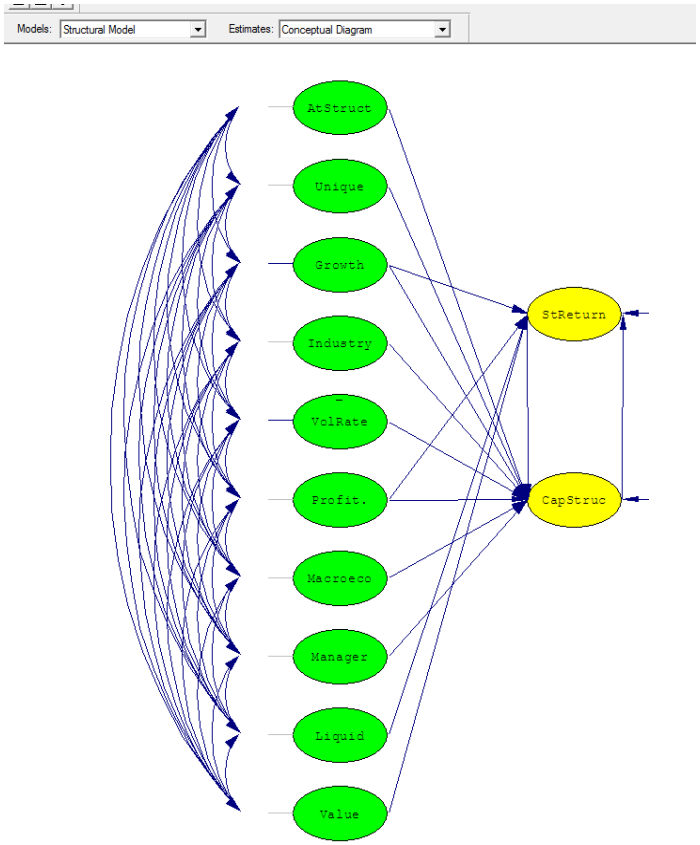


Figure 4 Path Diagram of MIMIC Model

In this path diagram, the MIMIC model formulas (5) and (6) are specified as follows:

$$\gamma = \begin{bmatrix} \gamma_1 & 0 & \gamma_2 \\ \gamma_3 & \gamma_4 & \gamma_5 \end{bmatrix}, \lambda = \begin{bmatrix} \lambda_1 & \lambda_2 \\ 0 & \lambda_3 \end{bmatrix}$$

where $\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5, \lambda_1, \lambda_2$ and λ_3 denote unknown factor loadings, υ_1 and υ_2 denote measurement errors, and ς_1 and ς_2 denote error terms.

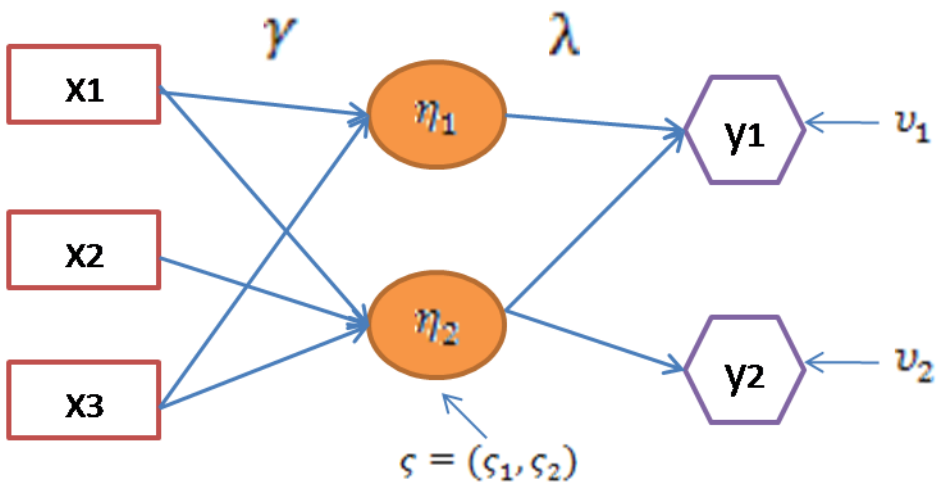


Figure 5 Matrices for Determinants of Capital Structure and Stock Rate of Return in MIMIC model

Figure 5 illustrates the equations of MIMIC model as indicated in equations (5) and (6). The elements of *x* vector are listed on the table below in details.

$$x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ \cdot \\ \cdot \\ \cdot \\ x_{36} \\ x_{37} \\ x_{38} \\ x_{39} \end{bmatrix}, \eta = \begin{bmatrix} CapStruc \\ StReturn \end{bmatrix},$$

$$\gamma = \begin{bmatrix} \gamma_1 & \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots & \gamma_{39} \\ 0 \cdots 0 \; \gamma_6 \gamma_7 \gamma_8 \gamma_9 \; 0 \cdots 0 \; \gamma_{18} \gamma_{19} \; 0 \cdots 0 \; \gamma_{32} \; \gamma_{33} \gamma_{34} \gamma_{35} \; \gamma_{36} \gamma_{37} \gamma_{38} & \gamma_{39} \end{bmatrix}, \varsigma = [\varsigma_1, \varsigma_2]$$

$$y = \begin{bmatrix} LT_MVA \\ ST_MVA \\ C_MVA \\ SR \end{bmatrix}, \lambda = \begin{bmatrix} \lambda_1 & 0 \\ \lambda_2 & 0 \\ \lambda_3 & 0 \\ 0 & 1 \end{bmatrix}, \upsilon = \begin{bmatrix} \upsilon_1 & 0 \\ \upsilon_2 & 0 \\ \upsilon_3 & 0 \\ 0 & 0 \end{bmatrix}$$

Figure 5 Matrices for Determinants of Capital Structure and Stock Rate of Return in MIMIC model

x_1	x_2	x_3	x_4	x_5	x_6
INT_TA	*NDT_TA*	*RD_TA*	*LnS*	*CV_OI*	*SP_Rate*
x_7	x_8	x_9	x_{10}	x_{11}	x_{12}
IGP_TA	*CE_TA*	*SE_S*	*SIGOI*	*OI_S*	*SP_INV*
x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}
ITC_TA	*GTA*	*QR*	*CV_ROA*	*OI_TA*	*D_GDP*
x_{19}	x_{20}	x_{21}	x_{22}	x_{23}	x_{24}
D_TA	*RD_S*	*IDUM*	*CV_ROE*	*Z_Score*	*Spread*
x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
TPD	*Tenu_Age*	log_Tenu	*log_TC*	*Bonus*	*log_Dir*
x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}
Out_Dir	*PS_Innov*	*PS_Level*	*PS_Vwf*	*smb*	*hml*
x_{37}	x_{38}	x_{39}			
mktrf	*rf*	*umd*			

Table 4 The Compustat Code of Observable Data

Accounting	Code	Accounting	Code
Total Asset	AT	R&D expense	RDIP
Intangible Asset	INTAN	Sales	SALE
Invenstory	INVT	Selling expense	XSGA
Gorss plant & equipment	PPEGT	SIC code	SIC
Investment tax credits	ITCB	Short-term debt	DLC
Depreciation	DPACT	Long-term debt	DLTT
Income tax	TXT	Convertible debt	DCVT
Operating income	EBIT	Book value of equity	SEQ
Interest payment	XINT	Outstanding shares	CSHO
Capital expenditures	CAPX	Book value per share	BKVLPS
Net income	NI	Market Value of Equity	MKVALT
Working Capital	WCAP	Price Close-Fiscal Annual	PRCC_F
Retained Earnings	RE	NAICS code*	NAICS

*NAICS code is used to combine data with quit rates obtained from Bureau of Labor Statistics of United States Department of Labor.

Figure 6 Conceptual Diagram of Structure Model for Determinants of Capital Structure

The conceptual diagram of structure model for determinants of capital structure is illustrated in Figure 2.6.

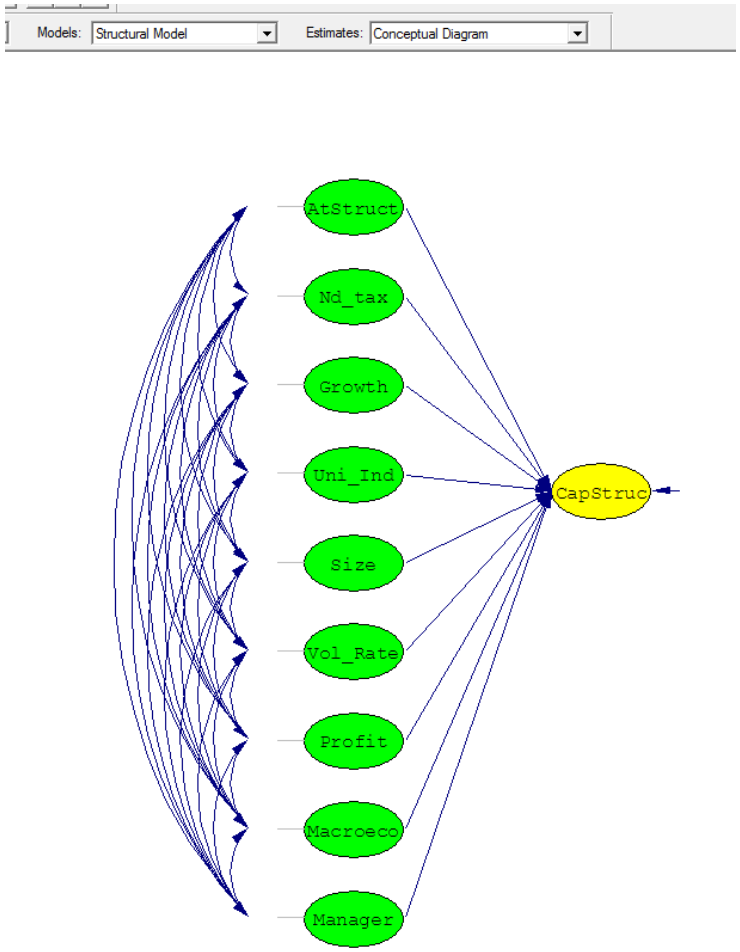


Table 2.5 Measurement Model: Factor Loadings of Indicators for Independent Variables (x)

The bold numbers are significant at 1% level where the t-statistics are in parentheses. The variables and attributes are referred to Table 2.3.

	Attributes (The Latent Variables)									
Variable(x)	**AtStruct**	**Nd_tax**	**Growth**	**Uni_Ind**	**Size**	**Vol_Rate**	**Profit**	**Macroeco**	**Manager**	σ_δ^2
INT_TA	**0.11** (32.81)									0.03
IGP_TA	**-0.41** (-82.35)									-0.03
ITC_TA		**0.00** (-4.46)								0.00
D_TA		**-0.17** (-23.73)								0.02
NDT_TA		**0.01** (6.40)								0.00
CE_TA			-0.02 (-1.49)							0.00
GTA			0.01 (1.22)		-0.01 (-0.57)					0.09
RD_TA			0.00 (1.23)							0.00
SE_S				**0.05** (19.30)						0.01
QR				**-0.03** (-18.61)						0.01
IDUM				**0.18** (18.95)						0.16
LnS					-0.31 (-0.63)				0.33 (1.41)	1.72

Attributes (The Latent Variables)										
Variable(x)	**AtStruct**	**Nd_tax**	**Growth**	**Uni_Ind**	**Size**	**Vol_Rate**	**Profit**	**Macroeco**	**Manager**	σ_δ^2
OI_S							**0.07** (31.00)			0.01
OI_TA							**0.07** (52.73)			0.00
D_GDP								**0.15** (60.78)		0.00
TPD								**0.35** (71.13)		-0.01
Tenu_Age									**-0.13** (-49.73)	0.00
Log_Tenu									**-0.33** (-41.63)	0.05
Out_Dir									**0.02** (11.15)	0.01
Log_Dir									**0.01** (4.50)	0.01
CV_ROE						**-1.62** (-22.64)				13.93
SP_Rate						**2.18** (40.47)				5.52
Z_Score						**-1.40** (-40.81)				2.23

Table 2.6 The Estimated Covariance Matrix of Attributes

The bold numbers are significant at 1% level where the t-statistics are in parentheses. Because it is standardized covariance matrix, the elements can be viewed as correlation coefficients. The attributes are referred to Table 2.3.

	Attributes (The Latent Variables)								
	AtStruct	Nd_tax	Growth	Uni_Ind	Size	Vol_Rate	Profit	Macroeco	Manager
AtStruct	1.00								
Nd_tax	**0.98** (25.28)	1.00							
Growth	-0.29 (-0.45)	-0.48 (-0.45)	1.00						
Uni_Ind	**0.55** (22.04)	**0.36** (9.54)	-0.03 (-0.45)	1.00					
Size	-0.35 (-0.44)	-0.83 (-0.45)	0.35 (0.31)	0.52 (0.45)	1.00				
Vol_Rate	**-0.14** (-7.18)	**-0.19** (-6.87)	0.32 (0.44)	**-0.18** (-4.97)	0.57 (0.45)	1.00			
Profit	**0.08** (5.42)	**0.12** (5.99)	-0.26 (-0.45)	-0.01 (-0.29)	-0.22 (-0.45)	**-0.68** (-36.57)	1.00		
Macroeco	-0.01 (-1.04)	**-0.05** (-3.05)	-0.23 (-0.45)	**0.18** (8.41)	-0.01 (-0.16)	**0.04** (2.74)	-0.02 (-2.03)	1.00	
Manager	**-0.05** (-3.36)	-0.04 (-1.84)	0.67 (0.45)	-0.06 (-2.26)	-0.35 (-0.33)	**0.11** (5.68)	**-0.05** (-3.48)	**-0.06** (-5.59)	1.00

Table 2.7 Estimates of Structural Coefficients

The bold numbers are significant at 5% level where the t-statistics are in parentheses. The indicators and attributes are referred to Table 2.3. Here we use long-term, short-term, and convertible leverage ratios as indicators of capital structure. CapStru_MV is the latent variable, capital structure, constructed by market-value base leverage ratios (market value of total assets as denominator), and CapStru_BV is constructed by book-value base leverage ratios (book value of total assets as denominator).

Total Effects of Attributes on Capital Structure									
CapStruc	**AtStruct**	**Nd_tax**	**Growth**	**Uni_Ind**	**Size**	**Vol_Rate**	**Profit**	**Macroeco**	**Manager**
CapStruc_MV	-3.55	3.10	0.19	0.23	0.13	**1.25**	**0.28**	-0.01	-0.10
	(-0.41)	(0.46)	(0.28)	(0.19)	(0.51)	(2.34)	(2.28)	(-0.09)	(-0.73)
LT_MVA	-0.30	0.26	0.02	0.02	0.01	0.11	**0.02**	0.00	-0.01
	(-0.41)	(0.46)	(0.28)	(0.19)	(0.51)	(0.51)	(2.28)	(-0.09)	(-0.73)
ST_MVA	-0.01	0.01	0.00	0.00	0.00	**0.00**	**0.00**	0.00	0.00
	(-0.41)	(0.46)	(0.28)	(0.19)	(0.51)	(2.13)	(2.09)	(-0.09)	(-0.72)
C_MVA	-0.04	0.03	0.00	0.00	0.00	0.01	**0.00**	0.00	0.00
	(-0.41)	(0.46)	(0.28)	(0.19)	(0.51)	(0.30)	(2.25)	(-0.09)	(-0.73)
CapStruc_BV	-4.18	3.42	-0.16	0.53	0.04	1.27	**0.54**	-0.04	0.05
	(-0.27)	(0.28)	(-0.22)	(0.23)	(0.36)	(1.33)	(2.33)	(-0.19)	(0.29)
LT_BVA	-0.45	0.37	-0.02	0.06	0.00	0.14	**0.06**	0.00	0.01
	(-0.27)	(0.28)	(-0.22)	(0.23)	(0.36)	(1.33)	(2.33)	(-0.19)	(0.29)
ST_BVA	0.02	-0.01	0.00	0.01	0.00	0.02	**0.00**	0.00	0.00
	(0.27)	(-0.28)	(0.22)	(0.23)	(0.36)	(1.31)	(-2.04)	(0.19)	(-0.29)
C_BVA	-0.05	0.04	0.00	0.01	0.00	0.02	**0.01**	0.00	0.00
	(-0.27)	(0.28)	(-0.22)	(0.23)	(0.36)	(1.31)	(2.24)	(-0.19)	(0.29)

Figure 7 Path Diagram of Results in MIMIC Model

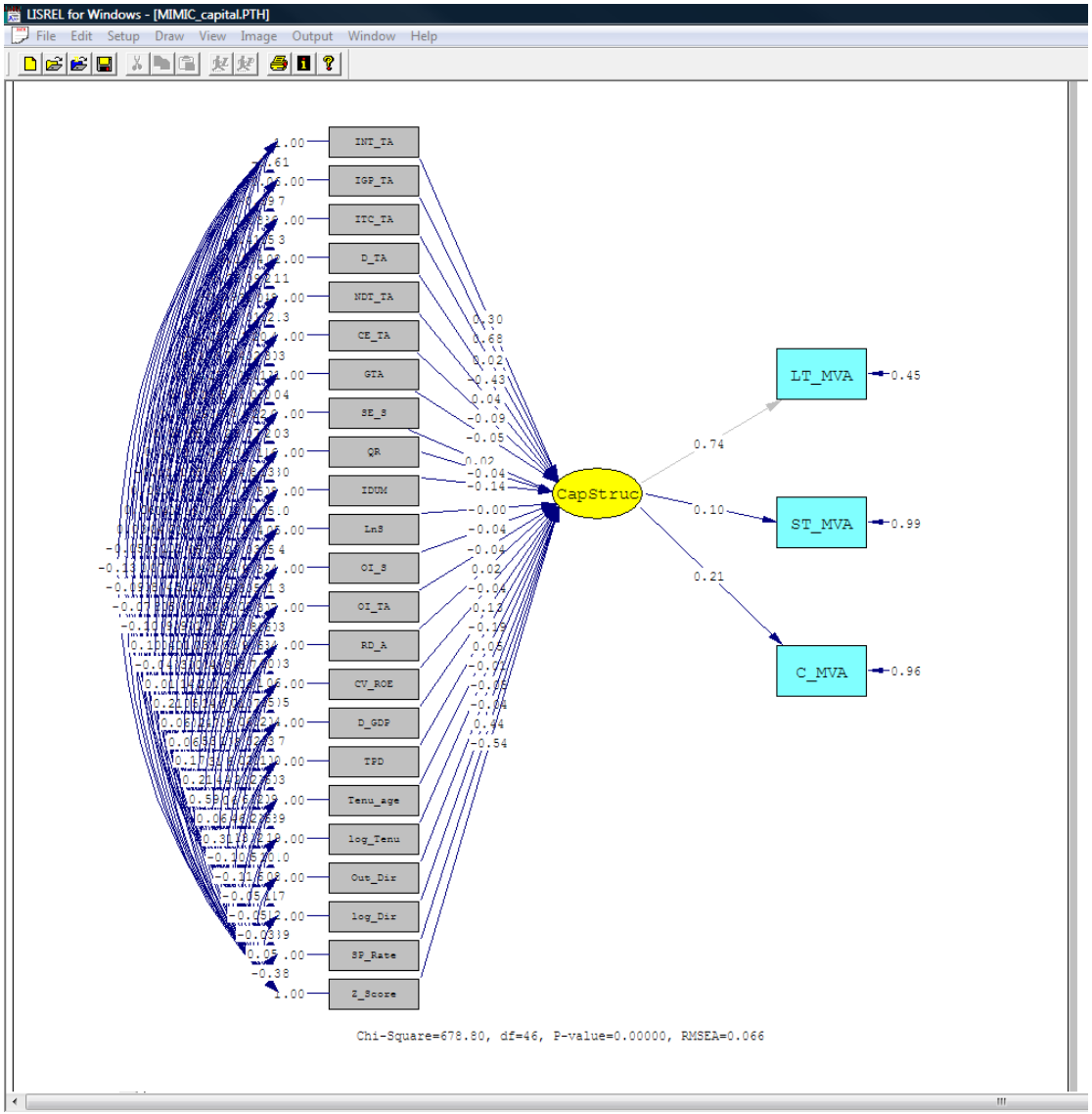
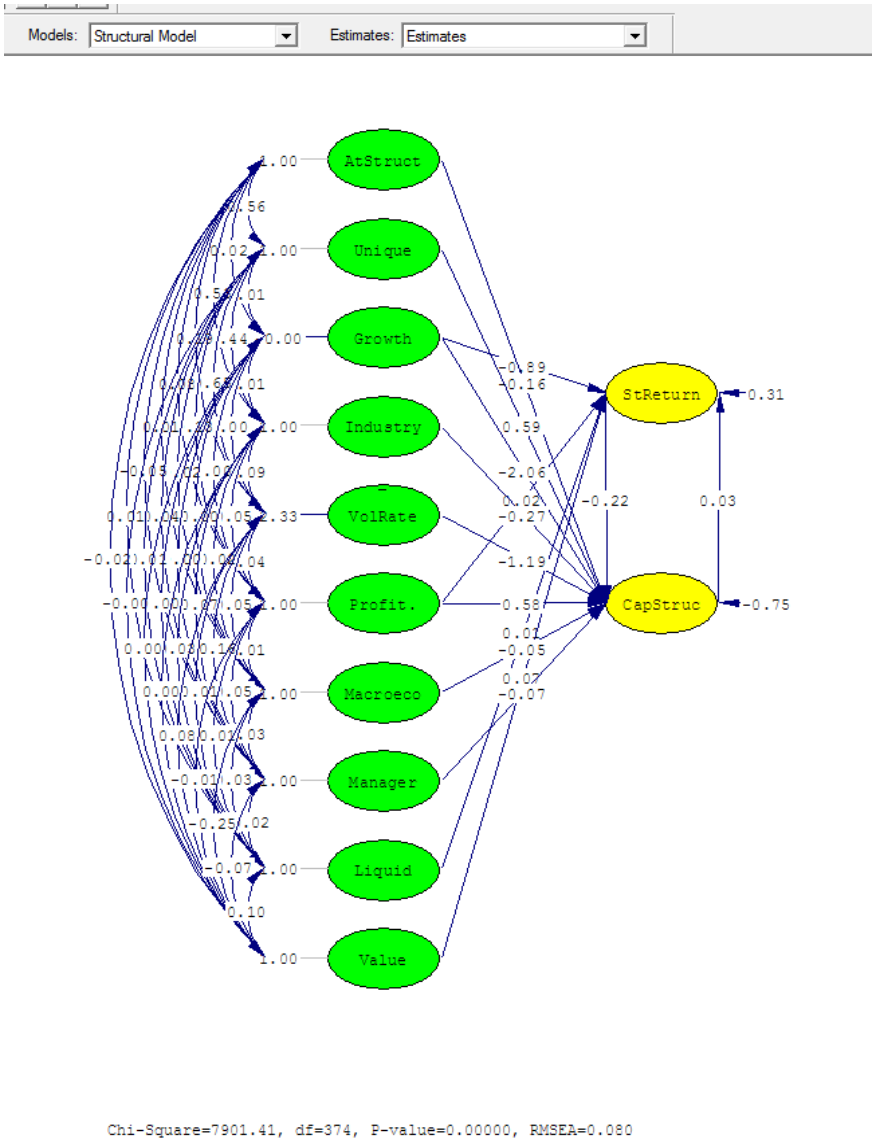


Table 8 The Standardized Estimates of Determinants of Capital Structure in MIMIC Model

The bold numbers are significant at 5% level where the t-statistics are in parentheses. The indicators and attributes are referred to Table 3.

Standardized Factor Loadings in MIMIC Model			
Attributes	Indicators	Market Value Basis	Book Value Basis
AtStruct	INT_TA	0.30 (12.99)	0.24 (15.24)
AtStruct	IGP_TA	0.68 (14.26)	0.42 (12.72)
Nd_tax	ITC_TA	0.02 (1.41)	0.01 (0.77)
Nd_tax	D_TA	-0.43 (-11.51)	-0.22 (-8.51)
Nd_tax	NDT_TA	0.04 (2.37)	0.03 (2.15)
Growth	CE_TA	-0.09 (-4.00)	-0.03 (-2.11)
Growth	GTA	-0.05 (-3.04)	-0.02 (-1.75)
Growth	RD_TA	0.02 (1.09)	0.02 (1.71)
Uni_Ind	SE_S	0.02(1.23)	0.03 (2.11)
Uni_Ind	QR	-0.04 (-1.80)	0.00 (0.22)
Uni_Ind	IDUM	-0.14 (-7.45)	-0.08 (-6.67)
Size	LnS	0.00 (-0.20)	-0.07 (-4.37)
Profit	OI_S	-0.04 (-1.89)	-0.04 (-2.78)
Profit	OI_TA	-0.04 (-1.50)	0.20 (10.49)
Macroeco	D_GDP	0.13 (1.95)	0.31 (6.72)
Macroeco	TPD	-0.19 (-2.75)	-0.36 (-7.73)
Manager	Tenu_Age	0.05 (1.50)	0.00 (-0.01)
Manager	Log_Tenu	-0.01 (-0.40)	0.01 (0.46)
Manager	Out_Di r	-0.05 (-2.54)	0.01 (0.56)
Manager	Log_Dir	-0.04 (-1.89)	0.00 (0.13)
Vol_Rate	CV_ROE	-0.04 (-2.02)	-0.02 (-1.28)
Vol_Rate	SP_Rate	0.44 (17.00)	0.20 (11.36)
Vol_Rate	Z_Score	-0.54 (-23.29)	-0.39 (-24.28)

Figure 8 Conceptual Diagram and Estimates of Structure Model for Joint Determinants of Capital Structure and Stock Returns



The conceptual diagram and the estimates of structure model for joint determinants of capital structure and stock returns are illustrated in Figure 8.

Joint Determinants of Capital Structure and Stock Returns by SEM with CFA

The estimates of the parameters in SEM with CFA are presented in Table 9 and Table 11. There are 27 indicators and 10 attributes in SEM with CFA model for joint determinants of capital structure and stock returns. To confirm the theories in corporate finance, we analyze the simultaneous results of Table 11 in accordance with capital structure theories in Table 12.

Table 2.9 Measurement Model: Factor Loadings of Indicators for Independent Variables (x)

The bold numbers are significant at 1% level where the t-statistics are in parentheses. The variables and attributes are referred to Table 2.3.

	Attributes (The Latent Variables)										
Variable(x)	**AtStruct**	**Growth**	**Industry**	**Unique**	**Vol_Rate**	**Profit**	**Macroeco**	**Manager**	**Value**	**Liquid**	σ_δ^2
INT_TA	**0.12** (36.78)										0.02
IGP_TA	**-0.36** (-56.12)										0.01
CE_TA		**-1.64** (-4.39)									0.00
GTA		1.00									0.09
RD_TA		0.01 (1.88)									0.00
SE_S				**0.08** (10.75)							0.01
QR			**-0.05** (-14.20)	**0.02** (5.19)							0.00
IDUM			**0.27** (22.41)								0.12
CV_ROE					**1.08** (22.39)						13.83
SP_Rate					**-1.26** (-33.85)						1.86
Z_Score					1.00						
OI_S						**0.06** (28.48)					0.01
OI_TA						**0.08** (50.24)					0.00
D_GDP							**0.11** (23.10)				0.01
TPD							**0.48** (27.42)				-0.12
Tenu_Age								**0.13** (48.16)			0.00

Attributes (The Latent Variables)											
Variable(x)	**AtStruct**	**Growth**	**Industry**	**Unique**	**Vol_Rate**	**Profit**	**Macroeco**	**Manager**	**Value**	**Liquid**	σ_δ^2
Log_Tenu								**0.32** (39.34)			0.05
Bonus								0.00 (-0.02)			2.91
Out_Dir								**-0.02** (-11.37)			0.01
Log_Dir								**-0.01** (-4.57)			0.01
PS_Innov										**0.19** (4.39)	-0.03
PS_Level										**0.02** (4.23)	0.00
PS_Vwf										**0.00** (-3.17)	0.00
Mktrf							**0.00** (8.02)		**0.05** (63.70)		0.00
Smb									**0.01** (31.78)		0.00
Hml									**0.01** (23.08)		0.00
Umd									**-0.03** (-33.68)		6.55

Table 2.10 The Estimated Covariance Matrix of Attributes

The bold numbers are significant at 1% level where the t-statistics are in parentheses. Because it is standardized covariance matrix, the elements can be viewed as correlation coefficients. The attributes are referred to Table 2.3.

	Attributes (The Latent Variables)									
	AtStruct	**Growth**	**Industry**	**Unique**	**Vol_Rate**	**Profit**	**Macroeco**	**Manager**	**Value**	**Liquid**
AtStruct	1.00									
Growth	**0.02** (4.45)	1.00								
Industry	**0.53** (19.40)	**0.01** (4.30)	1.00							
Unique	**0.56** (10.27)	**0.01** (3.93)	**0.44** (8.19)	1.00						
Vol_Rate	**0.19** (5.30)	**0.00** (2.37)	0.09 (1.71)	**0.65** (8.74)	1.00					
Profit	**0.08** (4.78)	**0.00** (2.58)	-0.05 (-2.25)	**0.13** (4.91)	**0.94** (27.85)	1.00				
Macroeco	0.01 (1.45)	0.00 (-2.19)	-0.02 (-2.26)	-0.02 (-1.68)	**-0.05** (-4.21)	0.01 (2.28)	1.00			
Manager	**-0.05** (-3.25)	**0.00** (-3.78)	**-0.07** (-2.96)	0.01 (1.70)	**-0.16** (-5.22)	**-0.05** (-3.45)	**0.03** (5.21)	1.00		
Value	-0.02 (-1.25)	0.00 (1.89)	0.00 (0.23)	0.00 (-0.14)	**0.08** (3.22)	-0.01 (-0.95)	**-0.25** (-10.36)	**-0.07** (-4.94)	1.00	
Liquid	0.01 (1.21)	0.00 (1.68)	**0.03** (2.85)	-0.01 (-1.04)	-0.01 (-1.01)	-0.01 (-1.64)	**-0.03** (-3.49)	**-0.02** (-2.97)	**0.10** (3.74)	1.00

Table 2.11 Estimates of Structural Coefficients

The bold numbers are significant at 5% level where the t-statistics are in parentheses. The indicators and attributes are referred to Table 2.3. Here we use long-term, short-term, and convertible leverage ratios as indicators of capital structure. (MV) and (BV) are represented market-value basis and book-value basis leverage ratios used in capital structure attribute, respectively.

Total Effects of Attributes on Capital Structure and Stock Returns												
	CapStruc	StReturn	AtStruct	Growth	Industry	Unique	Vol_Rate	Profit	Macroeco	Manager	Value	Liquid
CapStruc (MV)		**-0.22** (-6.60)	-0.16 (-1.55)	**-2.06** (-2.51)	**-0.27** (-4.91)	**0.59** (3.62)	**-1.19** (-12.08)	**0.58** (6.59)	**-0.05** (-5.53)	-0.07 (-1.89)		
StReturn	**0.03** (2.60)			**-0.89** (-3.33)				0.02 (1.70)			**0.07** (8.64)	0.01 (1.81)
LT_MVA		**-0.02** (-6.65)	-0.01 (-1.55)	**-0.16** (-2.28)	**-0.02** (-4.90)	**0.05** (3.62)	**-0.10** (-12.07)	**0.05** (6.55)	**0.00** (-5.53)	-0.01 (-1.89)		
ST_MVA		**0.00** (-4.69)	0.00 (-1.51)	**-0.01** (-2.16)	**0.00** (-3.95)	**0.00** (3.18)	**0.00** (-5.82)	**0.00** (4.66)	**0.00** (-4.25)	0.00 (-1.82)		
C_MVA		**0.00** (-5.95)	0.00 (-1.54)	**-0.02** (-2.25)	**0.00** (-4.61)	**0.01** (3.49)	**-0.01** (-8.97)	**0.01** (5.89)	**0.00** (-5.11)	0.00 (-1.87)		
CapStruc (BV)		-0.04 (-1.02)	**-0.20** (-2.10)	-0.83 (-1.26)	**-0.23** (-4.81)	**0.57** (3.68)	**-0.87** (-9.95)	**0.61** (7.65)	**-0.05** (-5.68)	**-0.07** (-2.19)		
StReturn	**0.03** (2.12)			**-0.92** (-3.55)				0.01 (0.82)			**0.07** (8.41)	0.01 (1.81)
LT_BVA		0.00 (-1.02)	**-0.02** (-2.10)	-0.09 (-1.20)	**-0.03** (-4.81)	**0.07** (3.68)	**-0.10** (-9.96)	**0.07** (7.65)	**-0.01** (-5.68)	**-0.01** (-2.19)		
ST_BVA		0.00 (0.99)	0.00 (1.78)	0.00 (1.13)	**0.00** (2.76)	**0.00** (-2.48)	**0.00** (3.19)	**0.00** (-3.08)	**0.00** (2.90)	0.00 (1.84)		
C_BVA		0.00 (-1.03)	**0.00** (-2.03)	-0.01 (-1.18)	**0.00** (-4.07)	**0.01** (3.32)	**-0.01** (-6.07)	**0.01** (5.41)	**0.00** (-4.58)	**0.00** (-2.11)		

Table 2.12 Relationship between Attributes and Capital Structure Theories

The attributes are referred to Table 2.3.

Total Effects of Attributes on Capital Structure and Stock Returns									
	StReturn	AtStruct	Growth	Industry	Unique	Vol_Rate	Profit	Macroeco	Manager
CapStruc	–	–	–	–	–	–	-	–	–
Theories in Capital Structure									
Managerial investment autonomy	√								
Agency cost		√	√				√		√
Pecking order theory							√		
Government financial policy								√	
Convenience to leverage		√	√				√		
Financial distress cost		√	√	√	√	√			

Conclusion

This paper utilizes the structure equation modeling (SEM) with CFA approach estimate the impacts of unobservable attributes on capital structure. The main contribution of this paper is the comprehensive confirmation on theories in corporate finance. First, we use the sample period from 2001 to 2012 to test whether the influences of important factors related to accounting information, macroeconomic and manager characters on capital structure are consistent with the literature theories. Then, we investigate the joint determinants of capital structure and stock rates of returns where we add two attributes, value and liquidity, to stock returns.

Our empirical work shows only “Profitability” and “Volatility & Financial Rating” are significant attributes on the decision of capital structure. However, all attributes become significant determinants of capital structure and stock returns in either market- or book- value basis.

Conclusion

The evidence shows that the interaction of a firm's leverage and its stock price should be necessarily considered in capital structure research. Besides the proof of trade-off between financial distress and agency costs in previous theories, our results confirm the endogenous supply relationship between public and private debts. Moreover, the interrelation between leverage ratios and stock returns verifies the signal theory under the assumption of asymmetric information between managers and investors. Only significantly negative influences of stock returns on market-value based leverage ratios supports Welch's (2004) statement. That is, although stock price is of importance in dynamic capital structure, a firm would not readjust its capital structure in response to the changes in stock prices.

Conclusion

In sum, our results show the advantage of setting latent attributes for clarification and confirmation of theories in capital structure. Therefore, I would suggest using the structural equation modeling (SEM) with confirmatory factor analysis (CFA) to capture the appropriate factors of firms' leverage decisions.

In future research, the personal taxes (Lin and Flannery, 2013) and the differences in beliefs between the manager and outside investors (Yang, 2013) can be taken into account in the investigation of joint determinants of capital structure and stock return if the related information is available.

Appendix A

Theoretical and Policy Framework of Finance

I: Theoretical Framework of Finance

1. Classical Theory
2. New Classical Theory (M&M propositions and Markowitz Portfolio Theory)
3. CAPM and APT
4. Options and Futures

II: Policy Framework of Finance

1. Investment Policy
2. Financing Policy
   i. Theory: Pecking order theory and Optimal capital structure
   ii. Practice

a) Peer firm effect (Leary and Roberts,2014,Journal of Finance, Vol. 69,139-178,see Appendix C)
b) Timing and time-varying adverse selection hypotheses predict equity issue (see Appendix B)

3. Dividend Policy
4. Production Policy

III: Cash Flow Statement

1. Cash Flow associated with Operation Activity
2. Cash Flow associated with Investment Activity
3. Cash Flow associated with Financing Activity

Appendix B

- Testable predictions of Dittmar and Thakor(2007) model and the timing and time-varying adverse selection hypotheses

	High Stock Price	Low Stock Price
High ρ	◆ Disagreement model predicts equity issue ◆ Timing and time-varying adverse selection hypotheses predict equity issue	◆Disagreement model predicts equity issue ◆Timing and time-varying adverse selection hypotheses predict no issue
Low ρ	◆Disagreement model predicts no equity issue ◆Timing and time-varying adverse selection hypotheses predict equity issue	◆Disagreement model predicts no equity issue ◆Timing and time-varying adverse selection hypotheses predict no equity issue

Source from page 15 of Amy Dittmar and Anjan Thakor, 2007, Why do firms issue equity, The Journal of Finance 62, 1-54

Appendix C : Do Peer Firms Affect Corporate Financial Policy?

Mark T. Leary and Michael R. Roberts

Abstract

- We show that peer firms play an important role in determining corporate capital structures and financial policies. In large part, firm's financing decisions are responses to the financing decisions and, to a lesser extent, the characteristics of peer firms. These peer effects are more important for capital structure determination than most previously identified determinations. Furthermore, smaller, less successful firms are highly sensitive to their larger, more successful peer, but not vice versa. We also quantify the externalities generated by peer effects, which can amplify the impact of changes in exogenous determinants on leverage by over 70%.

1. Introduction

- The goal of this paper is to identify whether, how and why peer firm behavior matters for corporate capital structures.
- We find that any correlation between firm's financial policies and the actions or characteristics of their peers can be attributed to two broad explanations.

a) based on the endogenous selection of firms into peer groups or an omitted common factor.

b) firm's financial policies are partly given by a response to their peers.

2. Data and Summary Statistics

- Merged Center for Research in Security Prices (CRSP) – Compustat database for the period 1965 to 2008.

3. The Empirical Model

- Generalization used throughout the empirical capital structure literature (e.g., Rajan and Zingales (1995) and Frank and Goyal (2009)),

$$y_{ijt} = \alpha + \beta \bar{y}_{-ijt} + \gamma' \bar{X}_{-ijt-1} + \lambda' X_{ijt-1} + \delta' \mu_j + \phi' \nu_t + \varepsilon_{ijt}, \qquad (1)$$

where the indices *i, j* and *t* correspond to firm, industry, and year, respectively. We focus on a linear specification to emphasize the intuition and highlight the salient econometric issues.

- The outcome variable, y_{ijt} ,is a measure of corporate financial policy, such as leverage.
- The covariate $\bar{y}_{-ijt}$ denotes peer firm average outcome (excluding firm *i*).
- The K-dimensional vectors $\bar{X}_{-ijt}$ and X_{ijt-1} contain peer firm average and firm-specific characteristics, respectively. Industry and year fixed effects are represented by the error components μ_j and ν_t ,respectively.
- ε_{ijt} is the firm-year specific error term that is assumed to be correlated within firms and heteroskedastic.

4. Identification

- The empirical goal is to disentangle the various explanations for industry commonality in capital structure by statistically identifying the structural parameters.

a) The identification problem

- Ignoring the year fixed effects for notational convenience, consider the population version of equation

$$y = \alpha + \beta\ \mathrm{E}(y \mid \mu_j) + \gamma' \mathrm{E}(X \mid \mu_j) + \lambda' X + \delta' \mu_j + \varepsilon. \tag{2}$$

- The corresponding mean regression of y on X and μ_j is

$$\mathrm{E}(y \mid X, \mu_j) = \alpha + \beta \mathrm{E}(y \mid \mu_j) + \gamma' \mathrm{E}(X \mid \mu_j) + \lambda' X + \delta' \mu_j. \tag{3}$$

- Taking expectations of this equation with respect to the firm characteristics, X, conditional on μ_j yields this equilibrium condition

$$\mathrm{E}(y \mid \mu_j) = \alpha + \beta \mathrm{E}(y \mid \mu_j) + \lambda' \mathrm{E}(X \mid \mu_j) + \gamma' \mathrm{E}(X \mid \mu_j) + \delta' \mu_j. \tag{4}$$

4. Identification

- Assuming that $\beta \neq 1$, this equilibrium has a unique solution

$$\mathrm{E}(y \mid \mu_j) = \frac{\alpha}{1-\beta} + \left(\frac{\gamma+\lambda}{1-\beta}\right)' \mathrm{E}(X \mid \mu_j) + \left(\frac{\delta}{1-\beta}\right)' \mu_j. \tag{5}$$

- Plugging the equilibrium solution into equation (3) yields the reduced-form model

$$\mathrm{E}(y \mid X, \mu_j) = \alpha^* + \gamma^{*\prime} \mathrm{E}(X \mid \mu_j) + \delta^{*\prime} \mu_j + \lambda^{*\prime} X, \tag{6}$$

where the superscript "*"refers to reduced-from or composite parameters that are functions of the underlying structural parameters. Specifically,

$$\alpha^* = \frac{\alpha}{1-\beta}; \quad \gamma^{*\prime} = \left(\frac{\beta\lambda+\gamma}{1-\beta}\right)'; \quad \delta^{*\prime} = \left(\frac{\delta}{1-\beta}\right)'; \quad \lambda^{*\prime} = \lambda'.$$

- Immediately apparent is that the structural parameters cannot be removed from the composite parameters since there are fewer equations than unknowns.

4. Identification

b) The identification strategy

c) Construction of the return shock

$$r_{ijt} = \alpha_{ijt} + \beta_{ijt}^{M}(rm_t - rf_t) + \beta_{ijt}^{IND}(\bar{r}_{-ijt} - rf_t) + \eta_{ijt}, \qquad (7)$$

where r_{ijt} is the refers to the total return for firm i in industry j over month t, $(rm_t - rf_t)$ is the excess market return, and $(\bar{r}_{-ijt} - rf_t)$ is the excess return on an equal-weighted industry portfolio excluding firm i's return.

d) Identification threat

5. The Role and Implications of Peer Effects

A. Reduced-Form Results
B. Robustness Test: Peer Effects versus Omitted and Mismeasured Common Factors
C. Customer-Supplier Links
D. Peer Effects Channels: Actions versus Characteristics
E. The Economic Importance of Peer Effects
   E.1. Instrumental Variables Results
   E.2. Amplification, Spillover, and Marginal Effects

6. Why Do Firms Mimic One Another?

A. Theoretical Motivation

B. Empirical Results

7. Conclusions

- This study has shown that firms do not make financing decisions in isolation. Rather, the financing decisions and ,to a lesser extent, the characteristics of peer firms are important determinants of corporate capital structures and financial policies.
- Interdependencies among debt and equity issuances drive interdependencies among leverage ratios.
- Indeed, peer firm behavior has a remarkably robust and large impact on corporate capital structure, large than any other observable determinant, on average.