

## Co-determination of capital structure and stock returns in banking industry using structural equation modeling

Mehdi Taghavi<sup>a</sup>, Mohammad Khodaei Valahzaghari<sup>b\*</sup> and Milad Alishahi<sup>c</sup>

<sup>a</sup>Professor, Department of Management, School of Management and Human Sciences, Tehran North Branch, Islamic Azad University (IAU), Tehran, Iran

<sup>b</sup>Assist. Prof. & Faculty Member, Department of Accounting, School of Management and Human Sciences, Tehran North Branch, Islamic Azad University (IAU), Tehran, Iran

<sup>c</sup>M.Sc. Student, Department of Management, School of Management and Human Sciences, Tehran North Branch, Islamic Azad University (IAU), Tehran, Iran

### CHRONICLE

*Article history:*  
Received May 12, 2013  
Received in revised format  
25 June 2013  
Accepted 27 June 2013  
Available online  
July 1 2013

*Keywords:*  
Capital structure  
Stock return  
Structural equation modelling  
Tehran Stock Exchange

### ABSTRACT

Capital structure plays essential role on financial strength of business units and there are literally many studies to confirm the relationship between capital structure and return growth. In this paper, we re-examine this relationship by investigating on 12 Iranian private banks using structural equation modelling over the period 2005-2011. The proposed study of this paper designs a questionnaire and distributes it among experts and analyse it use LISREL software package. The result indicates that there is a positive and meaningful relationship, when the level of significance is five percent between capital structure and stock return in private banking industry in Iran. The implementation of Pearson and Spearman correlation tests also validate the findings.

© 2013 Growing Science Ltd. All rights reserved.

## 1. Introduction

For years, there were tremendous efforts on learning the effects of capital structure on various stock exchanges and finding the optimum level of capital structure (Bradley et al., 1984; Fama & French, 1992, 2004, 2005; Harris & Raviv, 1991). Bancel and Mittoo (2004), for instance, surveyed managers in 16 European countries on the determinants of capital structure. In their survey, financial flexibility and earnings per share dilution were important issues among them in issuing debt and common stock, respectively. They also valued hedging considerations and used "windows of opportunity" when raising capital. The survey reported that although a country's legal environment was an important determinant of debt policy, it played a minimal effect in common stock policy. They also reported that firms' financing policies were affected by both their institutional environment and their

\*Corresponding author. Tel: +98-912-3443139  
E-mail address: m\_khodaei@iaui-nb.ac.ir (M. Khodaei Valahzaghari)

international operations. Corporates determine their optimal capital structures by trading off costs and advantages of financing.

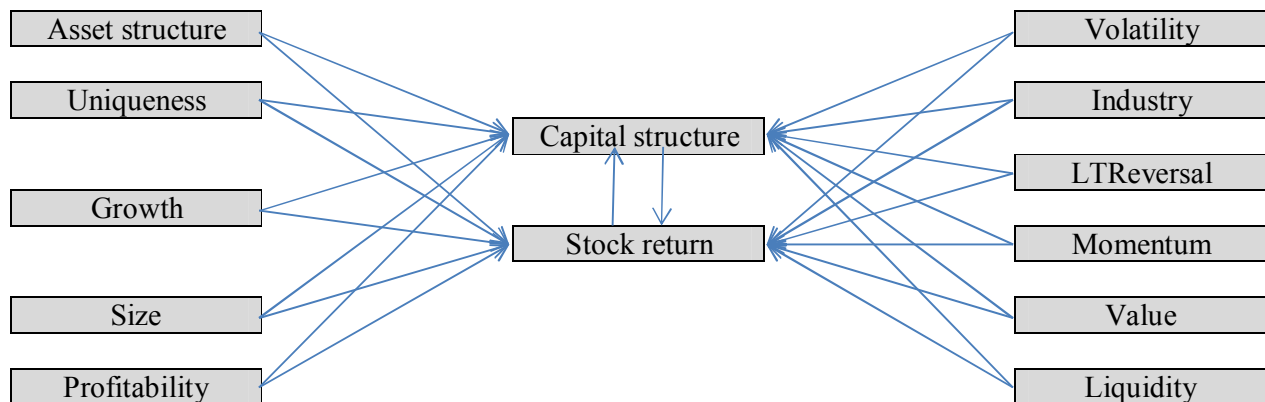
Titman and Wessels (1988) implemented a structural-equations model (LISREL) to determine the latent determinants of capital structure. Maddala and Nimalendran (1996) reported that the problematic model specification could create the poor results in Titman and Wessels' research. Chang et al. (2009) implemented a Multiple Indicators and Multiple Causes (MIMIC) model to re-examine the same problem as Titman and Wessels specified but reported more promising results. Yang et al. (2010) extended Titman and Wessels' investigation by using a single-equation technique to a multi-equations method. They considered stock return in addition to the determinants of firms' capital structure in their investigations.

Bhandari (1988) reported that a firm's capital structure could influence its stock returns and the reverse hold as well. Therefore, a firm's determinants of its capital structure and those of its stock returns need to be considered, simultaneously. Yang et al. (2010) solved the simultaneous equations and investigated the empirical relationship between the two endogenous variables including capital structure and stock returns and reported some common determinants. Their results demonstrated that stock returns, expected growth, uniqueness, asset structure, profitability, and industry classification were the important factors of capital structure, while the primary determinants of stock returns are leverage, expected growth, profitability, value and liquidity. The level of debt ratios and stock returns were mutually determined by the aforementioned factors and themselves.

Chen et al. (2001) examined the dynamic relationship between returns, volume, and volatility of stock indexes using some data from nine national markets over the period 1973-2000. They reported a positive correlation between trading volume and the absolute value of the stock price change. Granger causality tests also demonstrated that for some countries, returns could cause volume and volume causes returns. Their results indicated that trading volume contributed some information to the returns process. The results also demonstrated persistence in volatility even after they incorporated the impact of contemporaneous and lagged volume. Margaritis and Psillaki (2010) investigated capital structure, equity ownership and firm performance. Graham (2000) considered the effect of debt on tax reduction purposes.

## 2. The proposed study

This paper investigates the relationship between capital structure and stock return on 12 selected private Iranian banks. The study uses structural equation modelling and adopts the recently published work by Yang et al. (2010). Fig. 1 demonstrates the proposed study of this paper.



**Fig. 1.** The proposed study

The proposed study of this paper considers the relationship between capital structure and stock return by considering the effects of different factors. These factors include asset structure, uniqueness, growth, size and profitability, stock volatility, industry, momentum, value and liquidity and stock shares. The main hypothesis of this survey is as follows,

Main hypothesis: There is a meaningful relationship between capital structure and stock return among private Iranian banks.

The proposed study of this paper uses structural equation modeling to study the effects of two factors and the implementation has been implemented using LISREL software package.

### 3. The results

We have performed structural equation modeling on model 1 presented in Fig. 1. There are two models for the proposed study of this paper. The first model investigates the effects of various factors on capital structure and the second model investigates the effects of different variables on stock return.

#### 3.1. The effect of different factors on capital structure

Table 1 demonstrates the results of our findings on the first model

**Table 1**

The summary of the results of the survey on the first model

Indicator	Index	Symbol	Coefficient	Standard value	t value
Capital structure	Stock return	SR	0.4324	0.1258	3.4356
	Asset growth	EG	0.5287	0.1214	4.3547
	Research and development	UNIQ	0.1614	0.1108	1.4565
	Asset structure	AS	0.475	0.2239	2.1576
	Firm size	SIZE	0.6571	0.1801	3.648
	Profitability	PROF	-0.6686	0.2024	4.2918
	Stock share volatility	VOL	-0.0601	0.0889	0.6756

CS= 0.4324\* SR +0.5287\* EG +0.1614\* UNIQ+0.4750\* AS +0.6571\* SIZE 0.6686-\* PROF 0.0601-\* VOL

The results of Table 1 indicate that t-student values of third and the last items, research and development as well as stock share volatility, are not statistically significant. However, the other components including stock return, asset growth, asset structure, firm size and profitability are statistically significance and we can conclude that these components influence capital structure, significantly. The positive signs of four variables indicate the positive impacts of these variables while the negative sign of profitability means that this variable has negative impact on capital structure.

#### 3.2. The effect of different factors on stock return

The second model investigates the effects of various factors on stock return and Table 2 summarizes the results of our survey. The results of Table show that three variables of bank size, long term return, sequence and banks' book value do not have any meaningful impact on stock return. However, the remaining four variables including capital structure, percentage growth of assets, firm's profitability and firms' book value do not have meaningful impact on stock return. We also see that stock return and capital structure both have meaningful impacts on each other and we can confirm the main hypothesis of the survey.

**Table 2**

The summary of the results of the survey on the second model

Index	Index	Symbol	Estimate	Standard error	t-student
Stock return SR	Capital structure	CS	0.4463	0.1512	2.9501
	Percentage growth of assets	EG	0.239	0.0986	2.425
	Bank size	SIZE	0.0865	0.2896	0.2986
	Firm's profitability	PROF	0.122	0.0447	2.7276
	Long term return	LTR	0.2239	0.5336	0.4196
	Sequence	MOM	-0.0930	0.0629	-1.4785
	Firms' book value	VAL	0.66	0.2237	2.9501
	Liquidity	LIQ	-0.3730	0.125	-2.9839
SR=0.4463* CS +0.2390* EG +0.0865* SIZE +0.1220* PROF +0.2239* LTR 0.0930-* MOM +					0.6600* VAL

### 3.3. The first sub-hypothesis: The relationship between capital structure and asset growth

According to the results of Table 1, there is a positive and meaningful relationship between capital structure and asset growth with  $\beta_{CS,EG} = 0.5287$ ,  $t_{ob} = 4.3547 > t_c = 1.96 \rightarrow p < .05$  and we can confirm the first sub-hypothesis of this survey.

### 3.4. The second sub-hypothesis: The relationship between stock return and asset growth

According to the results of Table 1, there is a positive and meaningful relationship between stock return and asset growth with  $\beta_{SR,EG} = 0.2390$ ,  $t_{ob} = 2.4250 > t_c = 1.96 \rightarrow p < .05$  and we can confirm the second sub-hypothesis of this survey.

### 3.5. The third sub-hypothesis: The relationship between research and development and capital structure

According to the results of Table 1, there is a weak and somewhat meaningful relationship between research & development and capital structure with  $\beta_{CS,EG} = 0.1614$ ,  $t_{ob} = 1.4565 < t_c = 1.96 \rightarrow p > .05$  and we can cautiously confirm the second sub-hypothesis of this survey.

### 3.6. The fourth sub-hypothesis: The relationship between capital structure and asset structure

According to the results of Table 1, there is a positive and meaningful relationship between capital structure and asset structure with  $\beta_{CS,EG} = 0.5287$ ,  $t_{ob} = 4.3547 > t_c = 1.96 \rightarrow p < .05$  and we can confirm the fourth sub-hypothesis of this survey.

### 3.7. The fifth sub-hypothesis: The relationship between capital structure and bank size

According to the results of Table 2, there is a positive and meaningful relationship between capital structure and asset structure with  $\beta_{CS,EG} = 0.6571$ ,  $t_{ob} = 3.6480 > t_c = 1.96 \rightarrow p < .05$  and we can confirm the fifth sub-hypothesis of this survey.

### 3.8. The sixth sub-hypothesis: The relationship between stock return and bank size

According to the results of Table 2, there is a positive and meaningful relationship between capital structure and bank size with  $\beta_{CS,EG} = 0.0865$ ,  $t_{ob} = 0.2986 < t_c = 1.96 \rightarrow p > .05$  and we can confirm the sixth sub-hypothesis of this survey.

### 3.9. The seventh sub-hypothesis: The relationship between capital structure and bank's profitability

According to the results of Table 1, there is a positive and meaningful relationship between capital structure and banks' profitability with  $\beta_{CS,EG} = -0.6686$ ,  $t_{ob} = -4.2918 > t_c = 1.96 \rightarrow p < .05$  and we can confirm the seventh sub-hypothesis of this survey.

### 3.10. The eighth sub-hypothesis: The relationship between stock return and bank's profitability

According to the results of Table 2, there is a positive and meaningful relationship between firms' return and banks' profitability with  $\beta_{CS,EG} = 0.1220$ ,  $t_{ob} = 2.7276 > t_c = 1.96 \rightarrow p < .05$  and we can confirm the eighth sub-hypothesis of this survey.

### 3.11. The ninth sub-hypothesis: The relationship between stock price fluctuation and capital structure

According to the results of Table 1, there is a positive and meaningful relationship between stock price fluctuation and banks' profitability with  $\beta_{CS,EG} = -0.0601$ ,  $t_{ob} = -0.6756 < t_c = 1.96 \rightarrow p > .05$  and we can confirm the ninth sub-hypothesis of this survey.

### 3.12. The tenth sub-hypothesis: The relationship between stock return and long term return

According to the results of Table 2, there is a positive and meaningful relationship between firms' return and banks' profitability with  $\beta_{CS,EG} = 0.2239$ ,  $t_{ob} = 0.4196 < t_c = 1.96 \rightarrow p > .05$ . Therefore, we cannot confirm the tenth sub-hypothesis of this survey. We also did not find any significance relationship between stock return and sequence.

### 3.13. The eleventh sub-hypothesis: The relationship between stock return and firm value

According to the results of Table 2, there is a positive and meaningful relationship between firms' return and banks' profitability with  $\beta_{CS,EG} = 0.6600$ ,  $t_{ob} = 2.9501 > t_c = 1.96 \rightarrow p < .05$ . Therefore, we can confirm the eleventh sub-hypothesis of this survey.

### 3.14. The eleventh sub-hypothesis: The relationship between stock return and firm liquidity

According to the results of Table 2, there is a positive and meaningful relationship between firms' return and banks' liquidity with  $\beta_{CS,EG} = -0.3730$ ,  $t_{ob} = -2.9839 > t_c = 1.96 \rightarrow p < .05$ . Therefore, we can confirm the eleventh sub-hypothesis of this survey.

We have also used Spearman and Pearson correlation ratios between capital structure and stock return and Table 3 summarizes the results of our investigation.

**Table 3**  
The results of Spearman and Pearson correlation ratios

Correlation ratio between SR and CS		SR	CS
SR	Coefficient		0.929
	Sig.		0.000
CS	Coefficient	0.692	
	Sig.	0.000	

The results of Table 3 clearly show that there were some strong and positive relationship between capital structure and stock return when the level of significance is five percent. This confirms the results of the main hypothesis of this survey, which have previously been obtained through structural equation modelling.

#### 4. Conclusion

In this paper, we have performed an empirical investigation to find the relationship between capital structure and stock return using structural equation modeling. The proposed study has adopted the framework proposed earlier by Yang et al. (2010) and using LISREL software package, we have examined different hypotheses. The results of our investigation have confirmed the relationship between capital structure and stock return and this relationship was also validated by Pearson as well as Spearman correlation tests. The results of this study are consistent with the findings reported by Yang et al. (2010). As a future study, we recommend the proposed model of this paper for insurance firms as well as other financial firms.

#### References

- Bancel, F., & Mittoo, U. R. (2004). Cross-country determinants of capital structure choice: a survey of European firms. *Financial Management*, 33(4), 103-132.
- Bhandari, L. C. (1988). Debt/equity ratio and expected common stock returns: Empirical evidence. *The Journal of Finance*, 43(2), 507-528.
- Bradley, M., Jarrell, G. A., & Kim, E. (1984). On the existence of an optimal capital structure: Theory and evidence. *The Journal of Finance*, 39(3), 857-878.
- Chang, C., Lee, A. C., & Lee, C. F. (2009). Determinants of capital structure choice: A structural equation modeling approach. *The quarterly review of economics and finance*, 49(2), 197-213.
- Chen, G. M., Firth, M., & Rui, O. M. (2001). The dynamic relation between stock returns, trading volume, and volatility. *Financial Review*, 36(3), 153-174.
- Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *the Journal of Finance*, 47(2), 427-465.
- Fama, E. F., & French, K. R. (2004). The capital asset pricing model: theory and evidence. *The Journal of Economic Perspectives*, 18(3), 25-46.
- Fama, E. F., & French, K. R. (2005). Financing decisions: who issues stock?. *Journal of Financial Economics*, 76(3), 549-582.
- Graham, J. R. (2000). How big are the tax benefits of debt?. *The Journal of Finance*, 55(5), 1901-1941.
- Harris, M., & Raviv, A. (1991). The theory of capital structure. *the Journal of Finance*, 46(1), 297-355.
- Maddala, G. S., & Nimalendran, M. (1996). 17 Errors-in-variables problems in financial models. *Handbook of Statistics*, 14, 507-528.
- Margaritis, D., & Psillaki, M. (2010). Capital structure, equity ownership and firm performance. *Journal of Banking & Finance*, 34(3), 621-632.
- Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of finance*, 43(1), 1-19.
- Yang, C. C., Lee, C. F., Gu, Y. X., & Lee, Y. W. (2010). Co-determination of capital structure and stock returns—A LISREL approach: An empirical test of Taiwan stock markets. *The Quarterly Review of Economics and Finance*, 50(2), 222-233.