Corporate Leverage Transmission under Information Asymmetry: Evidence from Non-financial Firms of Pakistan

Zeeshan Ahmed[1], Qasim Saleem[2]*, Abdul Qadir Bhatti[3], Bilal Ahmed[4]

[1]Department of Management Sciences, University of Lahore, Gujrat Campus, Pakistan, [2]GIFT Business School, GIFT University Gujranwala, Pakistan, [3]National Bank of Pakistan, Gujrat Region, Pakistan, [4]Department of Commerce, University of Gujrat, Pakistan. *Email: qasim.saleem@gift.edu.pk

ABSTRACT

The study aims to examine the relation between capital structure and information asymmetry. For this purpose, pooled OLS and fixed effect model regression techniques are used for empirical analysis of the study. The annual data has been taken from analysis of Pakistan Stock Exchange listed companies' balance sheet published by State Bank of Pakistan (SBP) from the period of 2006 to 2015.The result depicts a noticeable increase of debt in capital structure as a result of an increase in information asymmetry and it also shows the consistency with pecking order theory. Firm follows the hierarchical patterns of financing and the results are robust against different econometric techniques. The key findings also give some suggestions to increase the tendency of funds raising through debt financing when market has information asymmetry.

Keywords: Information Asymmetry, Corporate Leverage, Pecking Order Hypothesis
JEL Classification: G3

1. INTRODUCTION

Corporate capital structure is an intensively debated area of corporate finance in developing countries which is adversely affected by information asymmetry. This information asymmetry has a dramatic impact on capital structure decisions of firms (Riley, 2001). It creates the uncertainty in the market where firm's insiders, specifically the managers have better information about investment opportunities and assets of firm as compared to the market participants. Firms suffering from greater information asymmetric problems eventually pay high transaction cost and asymmetric information cost while accessing the external financing. Furthermore, this information asymmetry costs are supposed to be high among the firms operating in emerging markets (Khanna and Palepu, 2010; Balasubramanian et al., 2010).

The phenomenon about information asymmetry and capital structure can be better understood with the significant work of

Myers and Majluf (1984) in Pecking order theory. It is based on the argument that asymmetric information problems drive the capital structure of firms. Fama and French (2005) posit in pecking order theory that information asymmetry is a key driver among capital structure determinants. Myers (1984) argues that managers know more than market participants about firm's value i.e. information asymmetry; market penalizes the equity issuance where expected payoffs are crucially related to the assessment of firm value. Therefore, the pecking order theory predicts that financing deficit should be covered through equity issuance as a last resort. Firms bearing the financial deficit prefer to choose debt and later they will be considered at higher debt ratios and stock issuances should be used as a last resort to overcome the deficits of financing.

Based on this theory, firm prefers internal financing to external financing i.e debt and equity due to the association between asymmetric information and external finance. Managers tend to

use internal funds which are not affected by transaction cost and information asymmetry, while in external financing, debt issue is preferred to equity issue (Fama and French, 2005). Hence, firm develops a preferred ranking of financial resources due to the high external cost of capital association with information asymmetry. According to this, cost of debt is less volatile towards adverse selection problem where cost of equity is highly volatile towards information asymmetry. In such a situation, leverage increases with the increase in information asymmetry in the market (Myers and Majluf, 1984). Numerous studies stand in support of the pecking order theory (Shyam-Sunder and Myers, 1999; Autore and Kovacs, 2005; Mayer and Sussman 2005). Thus, this assesses that information asymmetry plays a central role to determine the capital structure (Dittmar and Thakor, 2007; Gomes and Phillips, 2012; Bharath et al., 2008; Bessler et al., 2011).

Moreover, in case of adverse selection problem, the external investors require a risk premium on equity investment instead of debt. Firms bearing high information asymmetry borrow more and wind up with excessive leverage. Equity issuances are associated with high transaction cost and high adverse selection cost under conditions of information asymmetry in market. Therefore, firm prefers the debt issuance in place of equity issuance and causes an increase in leverage (Fama and French, 2005). According to Todorović (2011), managers show resistance for issuance of equity because of transaction costs and high information asymmetry and the result is high cost of capital.

We attempt to identify the impact of information asymmetry on capital structure decisions of non-financial firms listed in Pakistan Stock Exchange. Specifically, we begin by examining the slope coefficient in a regression of change in debt against financing deficit as suggested by (Shyam-Sunder and Myers, 1999). This study investigates how firm's capital structure responds in an information asymmetric environment in the market and pecking order theory is followed by these firms. The study also aims to examine what happens to firms' capital structure specifically the change in capital structure when information asymmetry exists in the market. Pakistani firms are facing a fundamental issue that is the selection of debt and equity in capital structure. As Pakistan is an emerging market, it exhibits the inefficiencies that are common features of this emerging market. Information asymmetry is one of the common characteristics in emerging market (Manos et al., 2012), which affects market behavior. Every day, changes are occurring and for the sake of providing latest information to investors, the market should be analysed with the help of current data.

2. LITERATURE REVIEW

Information asymmetry plays a significant role in corporate capital structure decisions. It is one of the main implications of Myers and Majluf (1984) observation that shows how information asymmetry affects firm's financing decisions. It is associated with high transaction cost and information asymmetry cost, managers are resistant to issue equity due to these costs (Todorović, 2011). According to Myers and Mjluf (1984), under asymmetric information between insiders and outsider, firms follow the

hierarchical financing while using external financing, prefer to use debt financing as first resort instead of equity financing. This theory suggests that in the market, the equity is a very much sensitive security during information asymmetry in the market. It has the largest adverse selection cost and firms having intense information asymmetry supposed to have a bigger leverage ratio.

Investors take new equity as a signal of overpricing and therefore they pay lower share price which in return decreases the firm's value. This is the reason why managers prefer to use internal financing sources and these internal sources are not affected by high transaction costs and information asymmetry whereas debt issuance is more preferable to issuance of equity (Fama and French, 2005). In contrast to developed financial markets, the developing financial markets have features of high transaction costs and illiquidity due to information asymmetry in the market and limited external finance sources (Manos et al., 2012).

Another significant factor is debt cost association with information asymmetry and debt cost increases due to this asymmetrical information (Gaud et al., 2005; Bharath et al., 2008; Halov and Heider, 2011). Moreover, adverse selection cost arises due to information asymmetry, the result is in the form of priority of debt financing over equity financing (Myers and Majluf, 1984). A high level of adverse selection cost has association with equity financing in the context of higher information asymmetry in the market (Gao and Zhu, 2015). Information asymmetry established a link to high equity financial cost that results in a high level of leverage (He et al., 2013). Andres et al. (2014) examine how capital structure decisions are influenced by information asymmetry. They demonstrate that when (target leverage changes) debt ratios are increased expectedly then a noticeable decrease in information asymmetry. Their study provide a detailed analysis of the interplay between information asymmetry and capital structure decisions, using stock market indices that order flow's price impact, trading costs and activity of capture trading. Capital structure is designed to overcome the remiss of firm's investment which are affected by information asymmetry.

Shyam-Sunder and Myers (1999) and Fama and French (2002) findings are in support of this theory and they argue that for some instances, it is a good approximation of reality. While some researchers like Frank and Goyal (2003) and Leary and Roberts (2010) show contradiction to the argument that information asymmetry is a determinant of capital structure. However, some of the literature supports the evidence about the relation between information asymmetry and debt maturity (Johnson and Mitton, 2003; Berger et al., 2005). According to Easley and O'Hara (2004) and Lambert et al. (2007), a firm's equity cost is affected adversely by information asymmetry. The suboptimal investments occur at that time (Ryen, Vasconcellos and Kish, 1997) when more information is in the hands of corporate insiders and less on the part of outside investors and the issuance of new equity tends to be undervalued.

Shen (2014), identify that a firm substitutes equity with debt when asymmetric information increases in the market. Prior literature has tested the influence of information asymmetry on capital structure.

For example, Bharath et al. (2008) find that degree of firm specific information asymmetry is positively linked to debt financing. They tested the assumption of pecking order theory by having investigation to that extent in which information asymmetry directs the capital structure choices. Gao and Zhu (2015) observed firms use more debt in capital structure while facing high information asymmetry but avoid to use less long term debt.

3. METHODOLOGY

To analyse the empirical relation between information asymmetry, financing deficit and capital structure. We use the quantitative research approach for which ratio data of non-financial firms is collected over the period 2005-2014. Panel data technique is applied for the empirical analysis and for testing of the hypothesis. For this purpose, the following research models are used.

3.1. Debt Issuance and Financing Deficit

The pecking order theory as suggested by Myer (1984) and Myers and Majluf (1984) that firms 5 prefer debt financing 5 over equity financing. They go for external financing only when internal funds are not sufficient to meet their financing needs. For external financing, firms prefer debt and equity as a last resort. To test pecking order theory, Shayam-Sunder and Myers (1999) suggested to regress the net debt against financing deficit. The study therefore, develops the following model:

$$\Delta D_{it} = \beta_0 + \beta_1 DEF_{it} + \varepsilon_{it} \qquad (1)$$

Where, ΔD_{it} = Long term debt issuance less long term debt reduction of firm i over the period of time t.

$DEF_{it} = \Delta d + \Delta e$

DEF_{it} = Change in debt of firm i in time t plus change in equity of firm i in time t.

The regression coefficient close to one is an indication of pecking order theory, since firms prefers equity financing as a last resort (Shayam-Sunder and Myers, 1999). Myers and Majluf (1984) and Myers (1984) recognize in modified pecking order theory that firm trade off adverse selection cost and financial distress cost, when too much debt is used in capital structure. Firm issue equity to maintain their debt capacity and liquidity position for investments in future. Thus, in equation 1, there must be a positive estimated coefficient that is lower than one. Pecking order theory has a key assumption of information asymmetry that restrains firms to go for external financing (Myers, 2001). According to modified version of pecking order theory, the firms having high information asymmetry have positive regression coefficient (Korajczyk et al., 1991).

Information asymmetry is a key driver of capital structure and it shows a note able positive impact on capital structure. Moreover, cross sectional variation in capital structure is associated with variation in adverse selection cost which is consistent with pecking order theory. Firm meet their financing needs through debt issuance in case of higher information asymmetry in the market. The greater information asymmetry in the market, the more debt a firm employs in its capital structure. Whereas, a positive relationship exists between higher financing deficit and capital structure and firm meet its financing needs through debt issuance. The study starts to examine the coefficient in equation (1) and to see the impact of information asymmetry on capital structure.

$$\Delta D_{it} = \beta_0 + \beta_1 DEF_{it} + \beta_2 DEF_{it} * ASY_{it} + \varepsilon_{it} \qquad (2)$$

Where, ΔD_{it} is the long term debt issuance less long-term debt reduction of firm i over the period of time t. DEF_{it} is the change in debt of firm i in time t plus change in equity of firm i in time t. Moreover, ASY_{it} is the information asymmetry of firm i in time t.

3.2. Conventional Leverage Regression

The regression equation (1) was introduced by Shayam-Sunder and Myers (1999) for the purpose to test the strict pecking order theory. Chirinko and Singha (2000) question this interpretation that equity issuance can have negative bias in testing. In the next step, the study examines the effect of information asymmetry on capital structure along with other control variables. This can decrease the potential bias in capital structure decisions. Rajan and Zingales (1995) surveyed the extant literature on factors affecting the capital structure and their implications on capital structure. These factors are size, tangibility, profitability and market to book ratios of firms and are used as control variables in this study. The study augment develop the following regression model.

$$Lev_{it} = \beta_0 + \beta_1 ASY_{it} + \beta_2 Tang_{it} + \beta_3 MB_{it}$$
$$+ \beta_4 Prof_{it} + \beta_5 Log\ (S)_{it} + \varepsilon_{it} \qquad (3)$$

Lev_{it} is the leverage of firm I in time t and ASY_{it} is the information asymmetry of firm i in time t. $Tang_{it}$ is the asset tangibility of firm i in time t and is represented by property plan equipment divided by total assets of the firm. MB_{it} is the market to book ratios of firm i in time t and $Prof_{it}$ is profitability of firm i in time t and represented by EBIT divided by total assets. $Log\ (S)_{it}$ represents firm size and is calculated as log of sales.

In the above equation, information asymmetry is a significant capital structure determinant regarding debt issuance and shows a valuable implication for strict pecking order theory (Frank and Goyal, 2003). The study expected a higher information asymmetry in the market leads to a higher leverage in capital structure of Pakistani firm. For this purpose, the study develops another regression equation by including the lag value of leverage.

$$Lev_{it} = \beta_0 + \beta_1 ASY_{it} + \beta_2 Tang_{it} + \beta_3 MB_{it}$$
$$+ \beta_4 Prof_{it} + \beta_5 Log(S)_{it} + \beta_6 Lev_{i\,t-1} + \varepsilon_{i\,t-1} \qquad (4)$$

Lev_{it} is the leverage of firm I in time t and ASY_{it} is information asymmetry of firm i in time t. $Tang_{it}$ is the asset tangibility of firm i in time t and is represented by property plan equipment divided by total assets of the firm. MB_{it} is market to book ratios of firm i at time t while $Prof_{it}$ is the profitability of firm i in time t and represented by EBIT divided by total assets. $Log\ (S)_{it}$ represents the firm size and is calculated as log of sales and $Lev_{i\,t-1}$ is lag value

of leverage. In the above regression equation (4), we include lag value of leverage as independent variable to account for mean reversion in capital structure (Taggart, 1977; Marsh, 1982). This lag value of leverage is expected to have a significant negative effect on current leverage, suggestion mean reversion in leverage of Pakistani firms.

3.3. VARIABLES DISCUSSION

The definition of capital structure is actually dependent on the aim of analysis (Rajan and Zingales, 1995). However, it's difficult to choose the leverage measures because of various definitions of leverage give quite different results (Harris and Raviv, 1991, Bevan and Danbolt, 2000). Long term debt divided by total assets is used as capital structure measurement (Pandey and Chotigeat, 2004, Fama and French, 2002, Zou and Xiao, 2006; Rajagopal, 2011) calculate this ratio as Long-term debt divided by the book value of total assets. Information asymmetry set forth by the comprehensive theoretical literature that account for transaction cost as well as adverse section cost (bid-ask spread) due to market liquidity. In this sample, adverse selection components (firm-level) i.e. effective bid-spreads of Roll's (1984) and proportional quotes are extracted over each fiscal year. Recently, Frieder and Martell (2005) and Lipson and Mortal (2006) used is bid-ask spread as information asymmetry and its effect on capital structure.

Pecking order theory affirms that it is more preferable to use debt rather than equity because of information asymmetry (Myers, 1984; Myers and Majluf 1984). Firm meet their funding needs through debt issuance while facing the issue of financing deficit. The financing deficit is calculated as change in debt plus change in equity and its effect on debt financing (Shyam-Sunder and Myers, 1999). Where the change in debt is the difference between current and previous year long term debt and change in equity is the difference between current and last year share capital. Asset tangibility is basically a percentage of total assets (fixed assets) and it is used as a ratio of fixed assets to total assets (Shah and Khan, 2007; Kayo and Kimura, 2011). This proxy is taken as fixed asset's collateral ability and has an association with leverage.

Earnings before interest and tax (EBIT) over total asset are taken as profitability's proxy (Rajan and Zingales, 1995; Kayo and Kimura, 2011). Firms who have high profit tend to have lower ratios of debt because enough funds are there to meet their needs of financing. Growth opportunities indicate the investment opportunities and literature depicts a negative relationship between firm's leverage and growth opportunities (Deesomsak et al., 2004; Frank and Goyal, 2009; De Jong et al., 2008). Fama and French (2002) calculate growth opportunities as market value of equity over book value of equity. The log of total sales is used as a proxy of firm size and is consistent with (Chakraborty, 2010; Guney et al., 2011).

3.4. Data Source and Sampling Method
The annual data computed values are taken from the balance sheet of firms listed in Pakistan stock exchange from the period of 2005 to 2014 and these data are used as dependent and independent variables. The data relevant to independent variable i.e. information asymmetry is taken from daily stock prices over

the period (2005 to 2014). Non-financial sector's companies listed in Pakistan stock exchange (KSE) are the sample size of this study. Financial sector is excluded from the sample of this study due to capital reserve requirements. They are regulated by central bank and must comply with regularity requirements. Panel data technique is applied for the empirical analysis of data. Panel data refers to the pooling of observations on cross sectional basis over the time (Bruderl, 2005). The panel data estimation considers explicitly into heterogeneity for individual specific variables. It increases the degree of freedom and reduces the collinearity among explanatory variables as well as increase the efficiency. Panel5data can better5detect and5measure effects5that are simply5not possible in5simple cross sectional analysis or time series analysis. It also reduces the unobserved heterogeneity and minimizes the bias.

4. RESULTS AND DISCUSSION

Here in Table 1 we present the results related to descriptive statistics of the variables used in this study. It is observed from the descriptive statistics that leverage has an average value of 0.2488 with standard deviation of 25.43%. However, the change in leverage identifies a mean value of 0.0061 and the standard deviation is 15.05%. The findings indicate that leverage has more dispersion as compared to the change in debt. Moving to another variable, financing deficit shows an average value of 0.0657 and the standard deviation of this financing deficit is 17.62% in the overall sample period. Information asymmetry is the main consideration of the study that is likely to induce the capital structure significantly. This information asymmetry shows the average value of 0.0400 with standard deviation of 24.62%. The interaction term of information asymmetry and financing deficit displays an average or mean value of 0.0069 with standard deviation 4.83%.

4.1. Correlation Analysis
Table 2 shows the correlation analysis and the results indicate that there is no multicollinearity between the independent variables. The correlation analysis indicates that all the independent variables are partially correlated with each other. Therefore, the problem of multicollinearity does not arise in the data. Leverage and change in debt has positive correlation with each other while financing deficit shows a positive correlation with leverage and change in debt.

Table 1: Descriptive statistics

Variable	Obs.	Mean	SD	Min	Max
Lev	1200	0.2488	0.2543	0.0000	0.9514
ΔD	1200	0.0061	0.1505	-0.3931	0.4017
Def	1200	0.0657	0.1762	-0.3972	0.3947
Def*Asy	1200	0.0069	0.0483	-0.3676	0.4355
Asy	1200	0.0400	0.2462	-1.2563	1.7936
Tang	1200	0.5133	0.1164	0.1153	0.7245
MTB	1200	1.0726	0.8994	-0.3231	4.3196
Prof	1200	0.1004	0.1238	-0.3909	0.5681
Log (S)	1200	8.8282	0.8816	6.5416	11.3924

This table reports the results related to the descriptive statistics of firm specific variables of non-financial firms listed in Pakistan Stock Exchange over the period 2005-2014. Mean, standard deviation, minimum and maximum values of the variables are reported in separate column. The values in those columns are leverage, change in debt, deficit, information asymmetry, tangibility, market to book ratio, profitability and firm size

Besides, the interactive term of financing deficit with information asymmetry shows a negative correlation with leverage but it has a positive correlation with change in debt and financing deficit. Information asymmetry shows a significant negative correlation with leverage and change in debt. Conversely, this information asymmetry shows a positive correlation with financing deficit and the interaction term. The correlation between control variables shows that they are partially correlated and are not perfectly correlated.

4.2. Debt Issuance and Financing Deficit

Here, we regress the financing deficit with the change in debt and report the results in Table 3. The results in pooled OLS indicate that all the cross sections are same and financing deficit has a significant positive impact to the change in debt. Financing deficit has the regression coefficient near 1, which indicates that firms in Pakistan follow the Pecking order behavior to meet their financing needs. Those firms who face financial deficit would use debt financing and report as firms having higher debt ratios in capital structure. The results are witnessed with (Bharath et al., 2008; Shyam-Sunder and Myers, 1999).

Moreover, pecking order theory suggests a hierarchical pattern of financing with internal financing and then external financing. In accessing the external financing, debt financing is first and equity financing as last option. This happens only when firms trade off the adverse selection with financial distress cost when too much debt is used in capital structure. In such a situation, firm maintain the liquidity position through equity issuance and debt for future investments.

Furthermore, to control the unobserved heterogeneity problem, we use fixed effect technique to overcome the potential bias in estimation results. In this way, the constant is removed by taking the first difference, which removes the time invariant components from the model. In fixed effects, we impose time independent effects for each entity that are possibly correlated with the regressors. The results indicate in this fixed effect model that financing deficit has a significant direct relationship with the change in debt.

The coefficient of this financing deficit is quite near to 1 indicating that firms in Pakistan follow the pecking order behaviour and follows the hierarchical pattern of financing. They go for internal financing and goes for external financing only when the investment needs exceeds from those internal available funds (Myers, 1984; Myers and Majluf, 1984). Thus, for actual debt ratios, this theory has restrictive interpretation which gives a first order approximation to the time-series which shows consistency with the extant literature (Shyam-Sunder and Myers, 1999; Frank and Goyal, 2003).

4.3. Debt Issuance and Information Asymmetry

Table 4 shows the relationship between the change in debt as dependent variable and financing deficit as well as interaction term of financing deficit with information asymmetry. The results show that financing deficit has a significant positive relationship with the change in debt, which indicates that firms follow the hierarchical patterns of financing as suggested by pecking order theory (Bharath et al., 2008).

Furthermore, to see the sensitivity of this financing deficit with information asymmetry, we create the interaction term and its impact on debt issuance. The regression coefficient of this interaction term shows a significant positive impact on debt financing. Financial deficit is highly sensitive due to information asymmetry in the market and firms go for debt financing in such a situation (Bharath et al., 2008). Information asymmetry is the

Table 2: Correlation analysis

	Lev	ΔD	Def	Def*Asy	Asy	Tang	MTB	Prof	Log (S)
Le	1.0000								
ΔD	0.2212	1.0000							
Def	0.0131	0.5954	1.0000						
Def*Asy	−0.0494	0.0362	0.1448	1.0000					
Asy	−0.1115	−0.0120	0.0994	0.6021					
Tang	0.2178	0.0281	−0.0180	−0.0060	−0.0240	1.0000			
MTB	−0.2141	0.0503	0.1355	0.1787	0.2994	−0.0575	1.0000		
Prof	−0.2882	0.0073	0.2435	0.1601	0.2151	−0.1058	0.4524	1.0000	
Log (S)	−0.1682	0.1019	0.2426	0.1446	0.2011	−0.0268	0.5353	0.4433	1.0000

The correlation between dependent and independent variables is presented in this table. The correlation among leverage, change in debt, financing deficit, information asymmetry, Tangibility, market to book ratios, profitability, and firm size shows partial correlation and non multicollinearity

Table 3: Estimation results of debt issuance and financing deficit

	Dependent variable is the change in long term debt							
	Pooled OLS				Fixed effect model			
	Co-efficient	SE	t stats	Sig.	Co-efficient	SE	t stats	Sig.
Def	0.809	0.230	3.520	0.000	0.846	0.310	2.730	0.000
Cons	−0.027	0.004	−7.110	0.000	−0.030	0.002	−14.440	0.000
Number of observations			1200				1200	
Number of groups			120				120	
R square			0.35				0.35	

This table report the results related to the change in long term debt and financing deficit. The difference between t and t-1 value of long term debt is the change in debt and financing deficit is calculated as change in debt and change in equity. The results related to pooled and fixed effect model are presented in Table 3

Table 4: Estimation results of debt issuance and information asymmetry

	Dependent variable is the change in long term debt							
	Pooled OLS				Fixed effect model			
	Co-Efficient	SE	t stats	Sig.	Co-Efficient	SE	t stats	Sig.
Def	0.815	0.230	3.540	0.000	0.848	0.260	3.260	0.000
Def*Asy	0.159	0.075	2.130	0.033	0.161	0.072	2.240	0.020
Cons	−0.027	0.004	−6.870	0.000	−0.029	0.002	−14.420	0.000
Number of observations			1200				1200	
Number of groups			120				120	
R square			0.357				0.357	

Table 4 present the results related to pooled OLS and fixed effect model. The dependent variable is change in long term debt which is calculated as the difference between t and t-1 long term debt. Def is the financing deficit and is calculated as change in debt plus change in equity. Def*asy is the interaction term of financing deficit with information asymmetry

key assumption of Pecking order theory that firm goes for internal financing first and then goes for external financing. As information asymmetry is higher, the financing needs are satisfied by debt issuance (Bharath et al., 2008; Todorović, 2011). Moreover, information asymmetry is associated with higher equity issuance cost and a firm that goes for debt financing is due to low cost of capital (He et al., 2013; Gao and Zhu, 2015).

For the robustness of results, fixed effect model is used to control the unobserved heterogeneity and it removes the time invariant effects. Individual has unique features of time invariant and there is no connection with features of other individuals. Financing deficit in this fixed effect shows a significant positive relationship with the change in debt. This coefficient of financing deficit is close to one, indicating that firms in Pakistan follow the pecking order behavior. They cover their financing deficit through debt financing that enlarge the debt portion in capital structure (Bharath et al., 2008). However, the interaction term of financing deficit with information asymmetry indicates a significant positive relationship with the change in debt. Information asymmetry is the basic assumption of pecking order theory and firms facing asymmetric information problems cover their financing deficit through debt financing. A high information asymmetry creates uncertainty in the market and it leads to high cost of equity. Consequently, firms prefer to go for debt financing due to low cost of debt and it results in high leverage ratio (Bharath et al., 2008; Gao and Zhu, 2015).

4.4. Conventional Leverage Regression
Here, we regress the information asymmetry and control variables with leverage and present the results in Table 5. The coefficient of information asymmetry shows a significant positive impact on leverage decisions of firms listed in Pakistan Stock Exchange. Information asymmetry is linked with high cost of equity financing and firms prefer debt financing (Botosan, 1997; He et al., 2013) this leads to a high level of leverage (Bharath et al., 2008). In a related study, Gao and Zhu (2015) observed that firms having high information asymmetry use more debt in capital structure but less long-term debt.

Information asymmetry indicates the uncertainty about the firm's stocks in the market and investor in the market discount the new equity issuance. This information asymmetry is the basic assumption of pecking order theory which suggests hierarchical patterns of financing. Firms meet their financing needs through internal financing like retained earnings, which is an easy source and is available at low cost. If internal financing is not sufficient to

Table 5: Estimation results of leverage with information asymmetry

Leverage is the dependent variable				
	Co-efficient	SE	t stats	Sig.
Asy	0.170	0.032	5.300	0.000
Tang	0.196	0.057	3.440	0.000
MTB	0.029	0.015	1.930	0.056
Prof	−0.147	0.071	−2.070	0.041
Log (S)	−0.048	0.023	−2.070	0.041
Cons	0.611	0.196	3.110	0.002
Number of observations			1200	
Number of groups			120	
R square			0.439	

Table 5 present the results between capital structure and information asymmetry along with control variables, for which fixed affect technique is applied to control for heterogeneity. Leverage is the dependent variable in this fixed effect technique. Asy is the information asymmetry (Bid-ask spread), tang is the asset tangibility and is calculated as property plant equipment divided by total assets. MTB is the market to book ratio, which is calculated as market value of equity divided by book value of equity. Prof is calculated as earnings before interest and taxes divided by total assets and Log (S) is the firm size

cover the financing needs then the firm goes for external financing. In accessing the external financing, debt is given the preference over equity financing. Overall, the study indicates that a high information asymmetry would induce the firm to go for debt financing and it has a positive impact on debt financing.

Moreover, tangibility is a control variable, which has a significant positive impact on debt financing. It is a key element of capital structure and it has a positive impact on capital structure (Cole and Sokolyk, 2016; Mittoo and Zhang, 2008; Frank and Goyal, 2009). Firms use tangible assets as collateral for the purpose of taking loans from financial institutions. They require these tangible assets for improved guarantee of repayment of loans and can use those tangible assets in case of default of the firm. Market to book ratios identifies the growth opportunities and the coefficient shows a significant positive relationship with the leverage ratios. Firms having growth opportunities like to go for debt financing to maintain optimal capital structure (Chang et al., 2009; Chung et al., 2013; Loncan and Caldeira, 2014).

However, the coefficient of profitability shows a significant negative relationship with leverage ratios. High profitability means that firms have sufficient amount of funds and can meet their financing needs through those profits as suggested by pecking order theory (De Bie and De Haan, 2007; Tudose, 2012; Hovakimian and Li, 2011). Firm size shows a significant negative relationship with leverage and large size firms maintains a low

Table 6: Estimation results between capital structure and information asymmetry

	Dependent variable is the change in long term debt							
	Pooled OLS				Fixed effect model			
	Co-efficient	SE	t stats	Sig	Co-efficient	SE	t stats	Sig.
Asy	0.310	0.055	5.640	0.000	0.260	0.080	3.250	0.000
Tang	0.158	0.046	3.410	0.001	0.174	0.051	3.410	0.000
MTB	−0.007	0.008	−0.860	0.390	0.021	0.013	1.610	0.111
Prof	−0.123	0.055	−2.240	0.027	−0.161	0.070	−2.230	0.020
Log (S)	−0.005	0.007	−0.700	0.486	−0.024	0.022	−1.100	0.273
Lev i t-1	−0.643	0.027	−23.580	0.000	−0.298	0.040	−7.440	0.000
Cons	0.078	0.068	1.160	0.250	0.342	0.187	1.830	0.069
Number of observations		1200				1200		
Number of groups		120				120		
R square		0.485				0.458		

Table 6 present the results related to pooled OLS and fixed effect model. Capital structure is the dependent variable, which is calculated as long term debt and is scaled by total assets. Independent variables are; Asy is the information asymmetry (Bid-ask spread), tang is the asset tangibility and is calculated as property plant equipment divided by total assets. MTB is the market to book ratio, which is calculated as market value of equity divided by book value of equity, Prof is calculated as earnings before interest and taxes divided by total assets and Log (S) is the firm size

level of leverage in their capital structure. Moreover, they have less chances of undervaluation of shares traded in the market. In such a situation, they prefer to issue the equity in the market or use profits to meet their financing needs (Rajan and Zingales, 1995). Overall, the results support the pecking order theory that suggests a negative impact of firm size on leverage ratios.

4.5. Information Asymmetry and Capital Structure

Here, we regress the capital structure with information asymmetry along with other control variables and reported the results in Table 6. Also, we included the lag value of leverage in the model to see the historical pattern of financing. Information asymmetry is an important element of capital structure that significantly affects the capital structure decisions. The coefficient of information asymmetry shows a significant positive impact on leverage in pooled OLS. Gao and Zhu (2015) observed that firms having high information asymmetry use more debt in capital structure but use less long-term debt. It indicates the uncertainty in the market and firms in the market prohibits going in the market. Moreover, investors in the market requires risk premium for new equity issuance. Information asymmetry causes a high cost of equity financing (He et al., 2013) which results in a high level of leverage (Bharath et al., 2008).

Tangibility is another control variable which significantly and positively affects the leverage decisions. Firm use the tangible asset as collateral for taking loans and the results are high leverage in capital structure (Shah and Khan, 2007; Cole and Sokolyk, 2016; Mittoo and Zhang, 2008). Market to book ratios shows an insignificant relationship with leverage decisions. Firms in Pakistan do not consider the market to book ratios while taking the loans. Moreover, the coefficient of profitability recommends a decline in leverage ratios of firms listed in Pakistan Stock Exchange. More profitable firms have enough funds to meet their financing needs and it is likely to induce the leverage ratios negatively as suggested by pecking order theory (Brav, 2009; Sbeiti, 2010; Hovakimian and Li, 2011). Firm size is insignificantly related with the leverage of firms listed in Pakistan Stock Exchange. The lag value of leverage shows a significant negative relationship with current leverage decisions. Current leverage decisions are affected negatively by the previous leverage decisions and its results is a decline in current leverage decisions (Bharath et al., 2008).

For the robustness of the results, the study runs the fixed effect model on the same model. Furthermore, to control the unobserved heterogeneity problem, we use fixed effect technique to overcome the potential bias in estimation results. In this way, the constant is removed by taking the first difference, which removes the time invariant components from the model. The results indicate in this fixed effect model that information asymmetry has a significant direct relationship with the debt ratios of firms listed in Pakistan stock exchange. Myers and Majluf (1984) suggest in pecking order theory that information asymmetry results in an increase in debt ratios. The results are robust across pooled OLS and fixed effect model.

5. CONCLUSION

The study investigates the effect of information asymmetry on capital structure of firms listed in Pakistan Stock Exchange. First, the study explores this relationship between financing deficit and capital structure. We find the significant positive coefficient of financing deficit which indicates that firms in Pakistan follow the pecking order behavior or hierarchical pattern of financing for capital structure. The results indicate that firms meet their financing needs through debt in case of financing deficit. Moreover, under asymmetric information, the financing deficit leads the firms to meet their financing needs thorough debt financing. Firms go for debt financing in case of financing deficit under the conditions of asymmetric information in the market. In an uncertain environment as well as inefficient markets, investors in the market require risk premium and it leads to high cost of capital.

Moreover, a significance positive relation exists between capital structure and information asymmetry in Pakistani firms. Hence, the firm goes for debt financing under asymmetric information in the market. Investors in the market require risk premium upon equity issuance, which increase cost of capital and thus firms prefer debt financing. Therefore, firms like to follow the hierarchical patterns of financing due to low cost associated with those patterns of financing. So, the alternative hypothesis is accepted whereas null hypothesis is rejected.

REFERENCES

Andres, C., Cumming, D., Karabiber, T., Schweizer, D. (2014), Do markets anticipate capital structure decisions? Feedback effects in equity liquidity. Journal of Corporate Finance, 27, 133-156.

Autore, D., Kovacs, T. (2005), The Pecking Order Theory and Time-varying Adverse Selection Costs, Unpublished Manuscript. Virginia: Virginia Tech University.

Balasubramanian, N., Black, B.S., Khanna, V. (2010), The relation between firm-level corporate governance and market value: A case study of India. Emerging Markets Review, 11(4), 319-340.

Berger, A.N., Espinosa-Vega, M.A., Frame, W.S., Miller, N.H. (2005), Debt maturity, risk, and asymmetric information. The Journal of Finance, 60(6), 2895-2923.

Bessler, W., Drobetz, W., Grüninger, M.C. (2011), Information asymmetry and financing decisions. International Review of Finance, 11(1), 123-154.

Bevan, A.A., Danbolt, J. (2002), Capital structure and its determinants in the UK-a decompositional analysis. Applied Financial Economics, 12(3), 159-170.

Bharath, S.T., Pasquariello, P., Wu, G. (2008), Does asymmetric information drive capital structure decisions? The Review of Financial Studies, 22(8), 3211-3243.

Botosan, C.A. (1997), Disclosure level and the cost of equity capital. Accounting Review, 72(3), 323-349.

Brav, O. (2009), Access to capital, capital structure, and the funding of the firm. The Journal of Finance, 64(1), 263-308.

Bruderl, J. (2005), Panel Data Analysis. Germany: University of Mannheim.

Chakraborty, I. (2010), Capital structure in an emerging stock market: The case of India. Research in International Business and Finance, 24(3), 295-314.

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.

Chirinko, R.S., Singha, A.R. (2000), Testing static trade off against pecking order models of capital structure: A critical comment. Journal of Financial Economics, 58(3), 417-425.

Chung, Y.P., Na, H.S., Smith, R. (2013), How important is capital structure policy to firm survival? Journal of Corporate Finance, 22, 83-103.

Cole, R., Sokolyk, T. (2016), Who needs credit and who gets credit? Evidence from the surveys of small business finances. Journal of Financial Stability, 24, 40-60.

De Bie, T., De Haan, L. (2007), Market timing and capital structure: Evidence for Dutch firms. De Economist, 155(2), 183.

De Jong, A., Kabir, R., Nguyen, T.T. (2008), Capital structure around the world: The roles of firm-and country-specific determinants. Journal of Banking and Finance, 32(9), 1954-1969.

Deesomsak, R., Paudyal, K., Pescetto, G. (2004), The determinants of capital structure: Evidence from the Asia Pacific region. Journal of Multinational Financial Management, 14(4), 387-405.

Dittmar, A., Thakor, A. (2007), Why do firms issue equity? The Journal of Finance, 62(1), 1-54.

Easley, D., O'Hara, M. (2004), Information and the cost of capital. The Journal of Finance, 59(4), 1553-1583.

Fama, E.F., French, K.R. (2002), Testing trade-off and pecking order predictions about dividends and debt. The Review of Financial Studies, 15(1), 1-33.

Fama, E.F., French, K.R. (2005), Financing decisions: Who issues stock? Journal of Financial Economics, 76(3), 549-582.

Frank, M.Z., Goyal, V.K. (2003), Testing the pecking order theory of capital structure. Journal of Financial Economics, 67(2), 217-248.

Frank, M.Z., Goyal, V.K. (2009), Capital structure decisions: Which factors are reliably important? Financial Management, 38(1), 1-37.

Frieder, L., Martell, R. (2006), On Capital Structure and the Liquidity of a Firm's Stock. Available from: https://www.ssrn.com/abstract=880421.

Gao, W., Zhu, F. (2015), Information asymmetry and capital structure around the world. Pacific Basin Finance Journal, 32, 131-159.

Gaud, P., Jani, E., Hoesli, M., Bender, A. (2005), The capital structure of Swiss companies: An empirical analysis using dynamic panel data. European Financial Management, 11(1), 51-69.

Gomes, A., Phillips, G. (2012), Why do public firms issue private and public securities? Journal of Financial Intermediation, 21(4), 619-658.

Guney, Y., Li, L., Fairchild, R. (2011), The relationship between product market competition and capital structure in Chinese listed firms. International Review of Financial Analysis, 20(1), 41-51.

Halov, N., Heider, F. (2011), Capital structure, risk and asymmetric information. The Quarterly Journal of Finance, 1(4), 767-809.

Harris, M., Raviv, A. (1991), The theory of capital structure. The Journal of Finance, 46(1), 297-355.

He, W.P., Lepone, A., Leung, H. (2013), Information asymmetry and the cost of equity capital. International Review of Economics and Finance, 27, 611-620.

Hovakimian, A., Li, G. (2011), In search of conclusive evidence: How to test for adjustment to target capital structure? Journal of Corporate Finance, 17(1), 33-44.

Johnson, S., Mitton, T. (2003), Cronyism and capital controls: Evidence from Malaysia. Journal of Financial Economics, 67(2), 351-382.

Kayo, E.K., Kimura, H. (2011), Hierarchical determinants of capital structure. Journal of Banking and Finance, 35(2), 358-371.

Khanna, T., Palepu, K.G. (2010), Winning in Emerging Markets: A Road Map for Strategy and Execution. United States: Harvard Business Press.

Korajczyk, R.A., Lucas, D.J., McDonald, R.L. (1991), The effect of information releases on the pricing and timing of equity issues. The Review of Financial Studies, 4(4), 685-708.

Lambert, R., Leuz, C., Verrecchia, R.E. (2007), Accounting information, disclosure, and the cost of capital. Journal of Accounting Research, 45(2), 385-420.

Leary, M.T., Roberts, M.R. (2010), The pecking order, debt capacity, and information asymmetry. Journal of Financial Economics, 95(3), 332-355.

Lipson, M.L., Mortal, S. (2006), The effect of stock splits on clientele: Is tick size relevant? Journal of Corporate Finance, 12(5), 878-896.

Loncan, T.R., Caldeira, J.F. (2014), Capital structure, cash holdings and firm value: A study of Brazilian listed firms. Revista Contabilidade and Finanças, 25(64), 46-59.

Manos, R., Murinde, V., Green, C.J. (2012), Dividend policy and business groups: Evidence from Indian firms. International Review of Economics and Finance, 21(1), 42-56.

Marsh, P. (1982), The choice between equity and debt: An empirical study. The Journal of Finance, 37(1), 121-144.

Mayer, C., Sussman, O. (2005), Financing Investment: A New Test of Capital Structure, Unpublished Working Paper. England: University of Oxford.

Mittoo, U.R., Zhang, Z. (2008), The capital structure of multinational corporations: Canadian versus US evidence. Journal of Corporate Finance, 14(5), 706-720.

Myers, S.C. (1984), The capital structure puzzle. The Journal of Finance, 39(3), 574-592.

Myers, S.C. (2001), Capital structure. The Journal of Economic Perspectives, 15(2), 81-102.

Myers, S.C., Majluf, N.S. (1984), Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics, 13(2), 187-221.

Pandey, I.M., Chotigeat, T. (2004), Theories of capital structure: Evidence from an emerging market. Studies in Economics and Finance, 22(2), 1-19.

Rajagopal, S. (2011), The portability of capital structure theory: Do traditional models fit in an emerging economy? Journal of Finance and Accountancy, 5, 1.

Rajan, R.G., Zingales, L. (1995), What do we know about capital structure? Some evidence from international data. The Journal of Finance, 50(5), 1421-1460.

Riley, J.G. (2001), Silver signals: Twenty-five years of screening and signaling. Journal of Economic Literature, 39(2), 432-478.

Roll's, R. (1984), A simple implicit measure of the effective bid-ask spread in an efficient market. Journal of Finance, 39(4), 1127-1139.

Ryen, G.T., Vasconcellos, G.M., Kish, R.J. (1997), Capital structure decisions: What have we learned? Business Horizons, 40(5), 41-50.

Sbeiti, W. (2010), The determinants of capital structure: Evidence from the GCC countries. International Research Journal of Finance and Economics, 47(2), 56-82.

Shah, A., Khan, S. (2007), Determinants of capital structure: Evidence from Pakistani panel data. International Review of Business Research Papers, 3(4), 265-282.

Shen, C.H.H. (2014), Pecking order, access to public debt market, and information asymmetry. International Review of Economics and Finance, 29, 291-306.

Shyam-Sunder, L., Myers, S.C. (1999), Testing static trade off against pecking order models of capital structure. Journal of Financial Economics, 51(2), 219-244.

Taggart, R.A. (1977), A model of corporate financing decisions. The Journal of Finance, 32(5), 1467-1484.

Todorović, M. (2011), Psychology and financial management-behavioral corporate finance. Ekonomika preduzeća, 59(5-6), 275-287.

Tudose, M.B. (2012), Capital structure and firm performance. Economy Transdisciplinarity Cognition, 15(2), 76.

Zou, H., Xiao, J.Z. (2006), The financing behaviour of listed Chinese firms. The British Accounting Review, 38(3), 239-258.