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Capital Structure Speed of Adjustment and Shari'ah Compliance: Empirical Evidence from Malaysia

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Abstract: The study empirically tests the speed of adjustment of a sample of Malaysian firms. We find that Shari'ah compliance influences the speed of adjustment implying that cost of capital for Shari'ah compliant firms differ from non-compliant firms. Our tests further show that Shari'ah compliant companies whose leverage leves are above target tend to adjust more rapidly to target levels than non-compliant firms. The evidence provides an opposite conclusion on firms below target levels. The findings provide a notion of debt versus equity choice for Shari'ah compliant firms versus non-compliant firms indicating that preference is guided by implied cost of capital which differs based on the extent of current leverage levels.

Key words: Capital structure, speed of adjustment, Shari'ah compliance, Islamic finance, notion, firms

INTRODUCTION

The study tests the speed of adjusmtnet of a sample of Malaysian firms. We test the velocity of adjustment based on firms which are above and below target levels (Iqbal-Hussain *et al*., 2015). However, in view of our motivation, we distinguish speed of adjust for firms based on the Shari'ah compliance given that the literature documents firms cost of capital is affected by compliance (Hussain *et al*., 2017).

In line with the literature, we find that firms below target adjust at lower speeds relative to firms above target (Hussain *et al*., 2016a, b). In addition, we find that firms which are Shari'ah compliant adjust more rapidly when they are above target levels whilst non-compliant firms adjust at more rapid rates when below target levels. Thus, our findings imply that firms which are non-compliant are better able to access the debt market due to lack of restrictions imposed on the funding sources. Contrastingly, the ability of Shari'ah compliant firms to adjust at more rapid rates suggest that they have better access to equity markets which lowers their adjustment costs.

The study next reviews the relevant literature briefly to motivate the notion of the study which is followed by a description of the data, variables as well as methodology utilised. We next discuss our findings and conclude the study.

Literature review: The literature on studies of capital structure provide contention on the dynamic trade-off theory of capital structure which motivates the study to study the extent firms deviate from target levels as well as the rate of adjustment.

Previous studies document that firms frequently deviate from target levels and cost of adjustment differs depending on the nature of deviation from target levels (Abdeljawad and Nor, 2017). Firms tend to deviate due to adjustment costs as well as the extent of analyst coverage which act as an impediment for firms to adjust to target levels (Leary and Roberts, 2005; Chang *et al*., 2008). Furthermore, firms above target levels tend to adjust at a more rapid speed than firms below target levels (Binsbergen *et al*., 2010; Byoun, 2008).

MATERIALS AND METHODS

We select all firms based on the datastream database for the years 2007-2016 and include dead firms to avoid survivorship bias. Drawing from the literature (Thabet *et al*., 2017), we exclude all financial firms.

In order to obtain improved levels of inference of the model parameters, we utilise unbalanced panel data. This would allows us to capture issuing behaviour in a more accurate manner given that we expected gains in efficiency from an econometric point of view. In addition, we are able to limit the biasness in our results arising from

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variables which are unobservable or missing from our model. Our variables are defined based on the literature (Haron *et al*., 2013; Hussain *et al*., 2016b).

Guided by the literature on capital structure, we eliminate outliers by eliminating observations where net equity issues, book value of debt and net debt issues are over 100%. The model utilises two-step system GMM approach in order to estimate baseline speed of adjustment to target levels and inherently leads to a bias of a minimum continuous observation of 4 years in our sample and thus, reduces the sample size. We additionally drop observations where the firm-year data are missing, leaving a final sample of 787 firms with 6,896 firm-year observations. The summary statistics of our sample for variables incorporated into the model is presented in Table 1.

Our empirical model of the lead variable (Target $leverage_{t+1}$) is intended to measure the rate at which firms adjust to target levels and thus, determined by the degree of each individual firm deviates from their intended targets (Blundell and Bond, 1998; Fama and French, 2002). We utilize the following model to measure speed of adjustment as follows (Flannery and Rangan, 2006):

$$\text{Leverage}_{it+1}\text{-leverage}_{it} = \gamma[\text{Target leverage}_{it+1}\text{-leverage}_{it}]+e_{t+1} \quad (1)$$

Where:

Leverage_{it+1} = The debt ratio in period t+1 for firm i

$\text{Target leverage}_{it+1}$ = The target leverage ratio in period t+1 for firm i

The quantity of amount which the two variables differ captures the extent or degree of changes that must occur in the levereage levels in order to allow managers to move firms back to target leverage. Similar to our empirical priors, we utilise a 2-stage model in order to estimate the speed of adjustment which allows econometric gains over a simple baseline speed of adjustment model (Warr *et al*., 2012; Hussain *et al*., 2017). Furthermore, our empirical results are robust as we utilise both the linear and dynamic panel data method in order to overcome the potential data bias arising from the use of panel data (Flannery and Rangan, 2006).

In the second stage of the model, we utilise target debt ratios which are bifurcated from the results of the regressions of Eq. 2. The model is able to control the impact of firm specific factors which determine leverage which is then used to estimate target leverage_{it+1}. We further estimate both book and market ratios for the debt, i.e., Book Leverage (BL) as well as Market Leverage (ML). The control variables are further lagged by one period. This allows us to control for endogeneity issues arising from the deterministic nature of the model (Hovakimian *et al*., 2001; Hovakimian and Li, 2011). In order to estimate target leverage_{it+1}, we utilise the following model which includes industry dummy variables (1, 0) (Iqbal-Hussain, 2014) and is expressed as follows:

$$\text{Target leverage}_{it+1} = \beta_1\text{CONST}_{it}+\beta_2\text{SIZE}_{it}+\beta_3\text{MTB}_{it}+\beta_4\text{TANG}_{it}+\beta_5\text{R\&D}_{it}+\beta_6\text{RDD}_{it}+\beta_7\text{INDL}_{it}+\varepsilon_{it+1} \quad (2)$$

In addition, we include a RDD dummy variable which takes the value of 0 when firms research and development expenses are not available (Alti, 2006). To further control for specific target levels at industry level, we include the INDL_{it} variables which is the industry median leverage at time t for firm i. The second method utilizes a 2-step system GMM estimator (Blundell and Bond, 1998). In addition the standard errors used to measure significance levels are robust to heteroscedasticity whilst for correcting for finite sample errors (Windemeijer, 2005).

Table 1: Summary statistics of sample

Variables	BL	ML	SIZE	MTB	TANG	R&D	INDL
Mean	0.1883	0.2451	5.0108	1.8845	0.5284	-0.0108	0.2109
Median	0.2196	0.2565	4.8896	2.0462	0.5566	0.0099	0.2404
Maximum	0.9790	0.9844	6.4081	6.9982	0.8201	0.0406	0.9344
SD	0.1585	0.2108	1.0335	2.4506	0.1028	0.0218	0.3106

RESULTS AND DISCUSSION

The results for estimating Eq. 1 are reported in Table 2 which reports the coefficients and standard errors in parenthesis (Fama and French, 2002; Fama and MacBeth, 1973). In column 1, book leverage is the dependent variable whilst in column 2 market leverage is the dependent variable.

The results are in line with the literature (Haron *et al*., 2013; Abdeljawab and Mat Nor, 2017). The results from regressing the model in Eq. 2 are reported in Table 3 and consistent with our empirical priors (Haron and Ibrahim, 2012).

Results reported in Table 3, confirms the hypothesis that firms adjust towards target leverage given that the lagged leverage levels is statistically and economically significant. Next, we simulate values from the regressed resutsl in Table 2 and 3 which are then fed into the following model in order to estimate the speed of adjustment based on the distance from target leverage (Warr *et al*., 2012):

$$\text{Leverage}_{it+1}\text{-leverage}_{it} = \beta_1\text{CONST}_{it}+\beta_2(\text{Target leverage}_{it+1}\text{-leverage}_{it})+\gamma[\text{Explanatory variables}]+\varepsilon_{it+1} \quad (3)$$

Table 2: Estimating target leverage (t+1) based on the Fama and French framework

Variables	1	2
CONST	-0.1088*** (0.0280)	-0.0386 (0.0618)
SIZE	0.0508*** (0.0104)	0.0818*** (0.0109)
MTB	-0.0058 (0.0040)	-0.0108 (0.0099)
TANG	0.1298*** (0.0386)	0.1956*** (0.0193)
R&D	0.0015 (0.0200)	0.0064 (0.0306)
RDD	0.0737*** (0.0208)	0.1022*** (0.0302)
INDL	0.2845*** (0.0689)	0.3466*** (0.0886)
Average R^2	0.1998	0.2844
F-test (p-values)	0.0000	0.000
Observations	6,896	6,896
Period	2007-2016	2007-2016

This table provides the results for our initial analysis for target leverage based on a static framework. ***, ** and * indicates significance at 1, 5 and 10%, respectively. The dependent variable is target leverage (t+1). Column 1 reports results for book leverage while column 2 reports results for market leverage. The mean slope coefficient is the average of the slopes for the 10 annual regressions. Time-series standard error is the time-series standard deviation of the regression coefficient divided by (10)1/2 as in Fama and French (2002). All regressions include industry dummies [0, 1]. SIZE is the natural logarithm of net sales in millions of 2007 ringgit. MTB, market-to-book ratio is defined as the ratio of book value of total assets less book value of equity plus market value of equity (M) to book value of total assets (B). TANG, asset tangibility is net plant, property and equipment over total assets. R&D (research and development expenses) are scaled by total assets. RDD is a dummy variable which takes the value of 1 if R&D expenses are not reported in Datastream and zero otherwise. INDL is the median industry leverage of the firm

Table 3: Estimating target leverage$_{(t+1)}$ based on the Blundell and Bond framework

Variables	1	2
LEVERAGE	0.7338*** (0.0204)	0.8189*** (0.0309)
SIZE	0.0408*** (0.0069)	0.0526*** (0.0084)
MTB	-0.0028 (0.0035)	-0.0036 (0.0090)
TANG	0.1689*** (0.0207)	0.2455*** (0.0388)
R&D	0.0009 (0.0366)	0.0018 (0.0281)
RDD	0.0304 (0.0288)	0.0401 (0.0313)
INDL	0.4515*** (0.1991)	0.5898*** (0.2004)
Adjusted R^2	0.6234	0.7807
Wald test (p-values)	0.00	0.00
Sargan test (p-values)	0.24	0.19
Observations	6,896	6,896
Period	2007-2016	2007-2016

This table provides the results for our initial analysis for target leverage based on a dynamic framework. ***, ** and * indicates significance at 1, 5 and 10%, respectively. The dependent variable is target leverage (t+1). Column 1 reports results for book leverage while column 2 reports results for market leverage. The coefficients are reported based on estimation for the lead variable as the dependent variable and includes a lag measure of leverage as the independent variable. Standard errors robust to heteroscedasticity and based on Windmeijer (2005) finite sample correction. All regressions include ndustry dummies [0, 1] as well as year dummies. SIZE is the natural logarithm of net sales in millions of 2007 ringgit. MTB, market-to-book ratio is defined as the ratio of book value of total assets less book value of equity plus market value of equity (M) to book value of total assets (B). TANG, asset tangibility is net plant, property and equipment over total assets. R&D (research and development expenses) are scaled by total assets. RDD is a dummy variable which takes the value of 1 if R&D expenses are not reported in Datastream and zero otherwise. INDL is the median industry leverage of the firm

We measure the distance target levarage$_{it+1}$+leverage$_{it}$ firms deviate from target leverage as a measure of the rate of adjustment givne that it captures the degree leverage must move in order for firms to reach the desired target debt ratio. Therefore, given the nature of the measurement, firms the distance becomes negative for firms which are above target and positive for firms which are below target debt. In the event that firms are able to fully adjust to target levels in the following year, then the expected value of the β_2 coefficient would be 1. In order to test the main hypothesis of the study, we dissect the sample into two distinct groups based on the positive and negative distance measures and further run the following model:

$$\text{Leverage}_{it+1}\text{-leverage}_{it} = \beta_1\text{CONST}_{it}+\beta_2(\text{DIST})\times\text{SCD or NSCD}+\gamma[\text{Explanatory variables}]_{it}+\varepsilon_{it+1} \quad (4)$$

We report the results for the regression from Eq. 4 in Table 4. Our regressions control for the impact from omitted firm factors which tend to be time invariant and thus, result in spurius correlation between the speed of adjustment and thus, influencing the distance measure, our model is catered to control for fixed effects at the unit of observation (firm level). We control for firm fixed effects in order to further control differences across specific firms which are also time invariant. This includes the possibility of bias that could arise from a particular firm having talented management or potential shocks in the economy leading to sample bias over the time frame.

In addition, our standard errors are clustered based on time and firm (both at t an i) level (Petersen, 2009). The rationale for 2-dimensional clustering is in order to simultaneously control for correlation across time for a particular firm as well as correlation across all firms in the sample for a particular year. The reported results are robust by Rogers (1994) standard errors as well as White (1980) standard errors.

In columns 1 and 2, the results are significant for the distance measure (Byoun, 2008; Khalaf, 2017). Given the main notion of the study which is motivated in the above text, we include a dummy to capture the effect Shari'ah compliance and the adjustment to target levels. The third and fourth column shows that the distance variable with the interaction term remains significant. In addition the interaction terms remains significant in the fifth and sixth column.

Our results are robust to estimating target leverage on both frameworks. The results indicate that the adjustment to target levels is only significant if firms which are Shari'ah compliant are above target levels and non-Shari'ah compliant firms are below target levels.

Thus, our findings show that managers of Shari'ah compliant firms tend to increase rate of adjustment only for certain situations which provides confirmation of our

Table 4: Speeed of adjustment of Shari'ah compliant firms versus non-compliant firms

	Under-levered firms			Over-levered firms		
Variables	1	2	3	4	5	6
Panel A: Estimating target leverage t+1 using Fama and French framework						
Distance	0.5885*** (0.0064)	0.6451*** (0.0219)	-	-	-	-
Distance×NSCD	-	-	0.4504*** (0.0118)	0.5619*** (0.0314)	-	-
Distance×SCD	-	-	-	-	0.7199*** (0.0801)	0.8044*** (0.1551)
Adjusted R^2	0.4827	0.5244	0.5755	0.6152	0.4644	0.5011
Wald (p-values)	0.00	0.00	0.00	0.00	0.00	0.00
Observations	6,896	6,896	4,603	4,603	1,956	1,956
Period	2007-2016	2007-2016	2007-2016	2007-2016	2007-2016	2007-2016
Panel B: Estimating target leverage t+1 using Blundell and Bond framework						
Distance	0.6344*** (0.0604)	0.7231*** (0.0801)	-	-	-	-
Distance×NSCD	-	-	0.3104*** (0.0201)	0.3644*** (0.0471)	-	-
Distance×SCD	-	-	-	-	0.7893*** (0.1022)	0.8421*** (0.1453)
Adjusted R^2	0.6122	0.6405	0.6591	0.6911	0.7422	0.7851
Wald (p-values)	0.00	0.00	0.00	0.00	0.00	0.00
Observations	6,896	6,896	4,881	4,881	1,640	1,640
Period	2007-2016	2007-2016	2007-2016	2007-2016	2007-2016	2007-2016

This table provides the results for analysis for adjustment to target leverage. ***, ** and * indicates significance at 1, 5 and 10%, respectively. The dependent variable is the distance from target leverage. Column 1, 3 and 5 reports results for book leverage while column 2, 4 and 6 reports results for market leverage. The coefficients are reported based on estimation for the difference between the lead and lag variable as the dependent variable; 2) Dimension clustered standard errors are reported in parantheses which are clustered at unit (firm) and time (year) level. All regressions include industry dummies [0, 1] as well as time (year) dummies and other known determinants of capital structure speed of adjustment as discussed in the text above which serve as control variables

hypothesis and the main notion of this study. We are thus, able to infer that whilst speed of adjustment for Malaysian firms does indeed vary, the rate of adjustment is dependent on the status of Shari'ah compliance. Therefore, the rate of adjustment is dependent on the cost of capital which differs for Shari'ah compliant firms and non-compliant firms.

CONCLUSION

The study uses unbalanced Malaysian panel data to empirically test the speed of adjustment to target capital structure for Shari'ah compliat versus non-compliant firms. The main notion of the study is to show that managers of Shari'ah compliant fimrs are able to adjust rapidly to target levels if they are above target levels and non-compliant firms are able to ajust at faster rates when below target levels.

IMPLICATIONS

The implications of our findings show that Shari'ah compliant firms are restricted in their ability to increase debt levels when below target levels yet are able to obtain equity financing when above target levels. This raises an important question on the understanding of speed of adjustment for Shari'ah compliant firms and cost of equity as well as potentially the ownership structure which we delegate to future researchers.

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