Philippine Management Review 2023, Vol. 30, 59-72.

An Empirical Study of the Capital Structure Theories on Philippine Listed Firms

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This study aims to determine whether the Trade-Off Theory and the Pecking Order Theory are able to explain the financing behavior of Philippine listed firms using data from 2010 to 2019. Analysis on the relationship of firm-specific variables against leverage as well as individual and joint testing of the TO and PO models were performed using panel data regression. The results have shown that while no model is dominant over the other, both capital structure theories are evident in the financing behavior of Philippine listed firms. Growth opportunity and profitability exhibit a positive and negative relationship with leverage, respectively, supporting the Pecking Order Theory. While firm size has shown a positive relationship with leverage, supporting the Trade-Off Theory. Individual and joint testing of the capital structure models were also able to provide significant results in support of both models.

Keywords: trade-off theory; pecking order theory; capital structure models; financing behavior

1 Introduction

The timeless search for aspects that increase firm value begat corporate finance theories, one product of which is the development of capital structure models. Tests on the applicability of these models on developed economies comprise a great deal of finance literature, with a growing body being dedicated to developing economies. This body of research prominently features Trade-off (TO) theory and Pecking Order (PO) theory. In the Philippines, one of the most cited studies for capital structure applicability is authored by Yu and Aquino (2009), where they examine the TO and PO models on Philippine listed firms from 1990 to 2001 and conclude that the PO model better explains the firms' financing behavior.

This paper follows the testing of Yu and Aquino in the years after their study, from 2010 to 2019, past both the Asian Financial Crisis in 1995 and the Global Financial Crisis in 2008. These two phenomena have been, over several commentaries and past research, thought of as significant events that have altered established thinking on capital structures, or at the very least encouraged some serious rethinking. And now, in this period of economic calm after these disruptive events, our results show support for both TO and PO models; growth opportunity has a positive relationship with leverage, which supports the PO Theory. Profitability is negatively related to leverage, which also shows support for the PO Theory. Lastly, firm size is found to have a positive relationship with leverage, which offers support to the TO Theory. Results also show that firms adjust toward their target leverage ratios by 3 to 4 years using balanced panel data, lending support to the TO theory. Financing deficit coefficients are also close to one, which strongly supports the PO theory. The J-test to determine which model is more dominant is inconclusive.

2 Review of Related Literature

2.1 Capital Structure Theories

The seminal work of Modigliani and Miller in 1958 showed that in perfect capital markets, the total value of a firm is equal to the total market value of its cash flows and is not affected by its choice of capital structure. This went against the general view at the time that leverage affects firm value. However, the following years have seen studies proving the implications of using leverage. Investors are aware that firm managers use private information when issuing or repurchasing securities, which creates the asymmetric information problem, in which investors discount the firm's new and existing securities when firms plan to have new issuances. This, in turn, creates the adverse selection problem, where managers may waive investments financed by those new securities because of the price

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discounts. To solve this, managers would need to lessen the asymmetry and show a credible signal to investors that their securities are high-quality. Ross (1977) postulates that issuing leverage can be used as that credible signal of good information because a high-quality firm can issue more debt than an underhanded one as more debt increases bankruptcy risks, and this increased risk is a costly outcome for firm managers.

These studies elicit the question of how firms finance and manage their capital structure. The traditional or static trade-off theory postulates that firms will choose the optimal mix of debt and equity based on the benefits of leverage (tax savings from interest) and the costs of financial distress as a result of bearing too much debt. Firms try to find the right balance or the optimal capital structure such that the cost and benefit of debt is at equilibrium. A variation of this theory, called dynamic TO theory, says that firms might drift from their target ratios over time but will take steps to move back toward the targets.

Contrary to TO, the PO theory, first observed by Donaldson (1961) and popularized by Myers and Majluf (1984), assumes that the information costs from the asymmetry problem makes firms prefer internal financing or retained earnings first, then external debt, then external equity in funding their investments and dividends. Firms would then have no target debt ratios, which suggests that observed capital structures are accidental accumulations of financing needs and not rationally calculated levels. Yu and Aquino (2009) lean towards the PO model. They argue that the major weakness of the model, the issuance of new equity by firms, is due to 'inside' equity provided by parties friendly to existing stockholders, as PH firms have the dominance of family culture. The other explanation is that executives are primarily concerned with long-term survival, which makes them issue new equity during good times to preserve their debt capacity so that they can draw on that during bad times.

2.2 Determinants of Leverage

Empirical studies commonly use Growth opportunities, Profitability, Size, and Financing deficit as independent variables in their estimation procedures of levels and target ratios of leverage.

Growth opportunities are represented by the year-end price per share over year-end total book value of shareholder's equity per share. TO states that growth opportunities are negatively related to leverage as greater opportunities increase agency problems between managers/shareholders and creditors (Myers, 1976). A positive correlation of growth opportunities and leverage is supportive of the PO theory, as firms that undertake investments use external financing first before equity.

High profitability, measured by ROE, is positively correlated to leverage in TO, as more revenue means tax shields become more valuable (due to treatment of interest payments) and increased capacity for external debt. If probability is negatively correlated to leverage, then it supports PO theory instead as the theory assumes profitable companies will pay down their debt with their earnings.

TO expects that size, represented by total sales, is positively correlated to leverage, as bigger firms get lower cost of debt while PO expects bigger firms used retained earnings instead of external financing.

Byuon and Rhim (n.d.) calculate financial deficit as the sum of dividend payments of a firm at time t, net capital expenditures at time t, and net changes in working capital from time t to t1, less operating cash flows after interest and taxes at time t. Meanwhile, Frank and Goyal (2003) followed the same definition except instead of only considering net capital expenditures, they used the net investment of a firm. The pecking order theory suggests that if a firm has a positive financial deficit, then it is more likely to issue debt. This variable takes stock of the investments, cash flows, and dividends of firms, and its test determines the coefficient. A coefficient close to one means that all the firm's needed funding after accounting for retained earnings are financed through debt.

Table 1 shows the findings of recent studies regarding the correlation of the various independent variables to leverage. These results show differentiating results across countries. Recent studies like Nguyen et al., (2019) and Khoa & Thai (2021) show that the TO theory better explains the capital structure decisions of Vietnamese firms from 2008 to 2017. Kannadhasan et al., (2018) also find support of TO theory for China, India, and South Africa firms from 1999 to 2016. Dang (2013) also proves that the Trade-Off theory best explains the capital structure of firms in the United Kingdom, France, and Germany from 1980 to 2007 (See Table 1. Summary of results of various empirical studies on leverage correlation).

Table 1. Summary of results of various empirical studies on leverage correlation

	TO Prediction	PO Prediction	LLTC				KTGC			DANG		
Country			Philippines	Thailand	Indonesia	Malaysia	China	India	South Africa	UK	Germany	France
Sample size			123	385	226	757	412	675	96	1,340	446	316
Period			1998-2007	1998-2007	1998-2007	1998-2007	1999-2016	1999-2016	1999-2016	1980-2007	1980-2007	1980-2007
Independent Variables												
Non-debt tax shields	-	N/A	-	-	-	0	-	0	0	+	0	+
Growth opportunities	-	+										
Profitability	+	-	+	+	-	-	-	-	0	-	-	-
Firm Size	+	-	-	-	+	-	+	+	0	+	+	+

+: positively correlated to leverage
-: negatively correlated to leverage
0: not significant
Sources: Liang, et al., 2020; Kannadhasan et al., 2018; Dang, 2013

2.3 Capital Structure Choice in the Philippine Setting

However, in contrast to the aforementioned previous studies leaning towards the TO model, Yu and Aquino (2009) lean towards the PO model in their paper, citing family business dominance and consideration of long-term survival as the reasons for the weakness of the model. Reiterating its relevance, in 2018, the Top 15 Philippine conglomerates have total revenues equivalent to nearly 20% of the country's GDP of the same year as documented in Torio et al. (2021). The dominance of family businesses and conglomerates can make firms deviate from the leverage variable predictions of both TO and PO theories. They can prioritize issuing equity rather than debt as this inside equity is easier to acquire without giving private information to other investors (Yu & Aquino acknowledge this). However, on the other hand, they can issue debt instead as they have their own financial intermediaries which can lessen transaction costs substantially. The International Monetary Fund (IMF) has also reported that the nonfinancial corporate leverage in the Philippines has steadily increased since 2010 until 2018 (Minsuk, 2018). This probably points out to strength in the country's bond market and that the nonexistence of financial crises that affect the country during these years made banks lend more willingly. This trend in the Philippine setting provides additional motivations for the revisiting of the Yu and Aquino (2009) study to determine if these developments have affected approaches on managing capital structures.

If these conglomerates can use inside equity just as much as debt from the bond market, then the firm managers may tend not to worry about information asymmetry problems, which is the focal point of the PO model. Hovakimian et al. (2001, p.2) "assume that when firms make significant changes in their levels of debt or equity capital," it is an active process where "managers would make thorough analyses of various tradeoffs involved". If there is no information or agency problems to consider, the capital structure choice is likely to be toward the optimal debt ratio, which is supportive of the TO model. Recent studies mentioned above has also produced results that support the TO model for both developing and developed economies. We therefore hypothesize that due to these reasons, during the period of no impacting financial crises, our findings will be favorable to the TO model.

3 Data and Methodology

The data used in this study come primarily from company annual reports and published datasets from 2009 to 2019. Similar to Yu and Aquino's study, we exclude banking and financial institutions and firm-years with negative shareholders equity, no operating revenues, and no market trading activity. The final firm count is 239 for the unbalanced panel. 143 companies have complete financial data for the 10-year period which are included in the balanced panel. We also use STATA statistical software in generating the results.

The definition of the used firm-specific variables also follows that in the study of Yu and Aquino (2009):

1. Growth Opportunities – this is measured by the firm's year-end share price divided by its year-end shareholders' equity.
2. Profitability – this is represented by Return on Equity (ROE), which we obtain by dividing net income by the total shareholders' equity.
3. Firm Size – this is measured by the natural logarithm of sales.

4. Financing Deficit – we follow the alternative definition as formulated by Auerbach (1985). This definition calculates Financing Deficit as follows:

$$FIN\_DEF_T = CAPEX_t + DEP\_EXP_t + CASH\_DIV_t - (CAPEX_t \times TLA_{t-1}) - (NIAT_t + DEP_{EXP}{}_t) \quad (1)$$

where

$CAPEX_t =$ Annual change in (total assets less current assets) + depreciation expense at year t.
$DEP\_EXP_t =$ Depreciation expense at year t
$CASH\_DIV_t =$ Cash dividends at year t
$TLA_{t-1} =$ Total Liabilities over Total Assets at year $t-1$
$NIAT_t =$ Net income after tax at year t

The data in the paper are restricted to book values. Myers (1977) points out that market values incorporate present value of growth opportunities and would therefore not reflect the current business value in the year.

Hovakimian et al. (2002) test the TO model by (1) regressing a measure of leverage as the dependent variable against proxies of determinants of corporate leverage as the independent variables and (2) calculating firms' optimal leverage ratio and using time-series analyses to determine if firms will revert back to their target ratios over time. Their study includes 5,000 U.S. companies from 1979 to 1997 and concludes that companies take measures that move themselves to an optimal debt ratio target in the long-run.

Shyam-Sunder and Myers (1999) postulate that the PO model coefficient needs to be close to one to be supportive of the theory. They ran a test on the PO model and find a coefficient of 0.85 with an R^2 of 0.86 for the PO. Frank and Goyal (2003) reiterate in their study that Shyam-Sunder and Myers' financing deficit is treated as exogenous when it includes endogenous variables of investment and dividends. Endogeneity will make small changes to equation specifications lead to large changes in coefficient estimates – which is indicative of bias and instability across time periods. To check this problem, we follow the 2SLS method.

Shyam-Sunder and Myers (1999) also did a fitting test of PO to a target adjustment model (TO). Frank and Goyal (2003) go beyond by stating that the financing deficit needs to wipe out the effects of other variables in explaining the change in leverage if it is indeed the key driver. The financing deficit variable therefore needs to be tested if it will still be significant when the variables in the leverage equation are introduced in the PO model.

We followed the same methodology applied by Yu and Aquino (2009), which also follows the methods used by Hovakimian et al (2002), Shyam-Sunder & Myers (1999) and Frank & Goyal (2003). We first formulated a regression equation using the variables previously defined as the independent variables and the leverage ratio (calculated as Total Liabilities over Total Assets) as the dependent variable. Then we retained only those variables deemed to be statistically significant and together with their corresponding coefficient, we form an equation that will estimate the target leverage ratio of firms. We also used Balanced and Unbalanced Panel Data Regression in testing the validity of the models. Each step can be described as follows:

1. Using the coefficients of the statistically significant variables from the first regression equation, we formulated an equation that will compute the target leverage ratio of each firm. These target leverage ratios are then used to calculate the "target adjustment variable", which is defined by Yu and Aquino (2009, p.1978) as "the rate at which a firm moves toward its target debt ratio." The validity of the TO Theory is determined by checking whether the coefficient of the target adjustment variable is significant or not.
2. To test the validity of the PO Theory, we first solved for FIN_DEF_t and used this as the independent variable which will be regressed against different dependent variables, such as change in total liabilities, change in total liabilities/total assets, etc. We also tested the explanatory power of the financing deficit variable by fitting the standard leverage equation variables in the PO model. We also tested for the exogeneity of the PO model using the Hausman test to address the possible endogeneity problem.

3. We created a joint regression equation which combines the target adjustment variable and the financing deficit variable. Using the 2-Stage Least Squares approach, we determined if the coefficients of the explanatory variables are significant to identify which variable has explanatory power over the leverage ratio of firms. As additional support, we also performed the J-test to verify whether the TO and PO fitted values obtained from the previous steps hold explanatory power in the PO and TO environment, respectively.

4 Results and Discussion

4.1 Summary Statistics

Table 2 below shows the summary statistics of some of the key variables broken down by year. Philippine firms had the highest growth opportunity in the year 2015 with Price to Shareholders' Equity averaging 9.36. It is also in the same year where we saw firms to be the most profitable, recording a mean ROE of approximately 6.35. There is also an increasing trend in the Philippine firms' mean total liabilities from 2010 to 2019, with the annual increase in total liabilities averaging around 17%. Since total assets also have an upward trend from 2013 to 2019, this could have contributed to the decreasing trend in leverage ratio for the same period. The financing deficit is stable until 2019, where there is a huge spike of surplus. This could be an accumulated result of steady increase in change in total liabilities since the start of the time period. Table 2 shows high volatility – which may be caused by financial figures being used as is with no standardization or scaling done (See Table 2. Summary Statistics of Key Variables (Amounts in PHP Millions)).

Table 2. Summary Statistics of Key Variables (Amounts in PHP Millions)

	Growth Opportunities (price_equity)		Profitability (roe)		Size (ln_sales)		Total Liabilities (total_liab)		Leverage (tla)		Financing Deficit	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
2010	- 6.1155	89.2879	- 5.9211	215.7263	12,410.23	35,485.46	14,661.76	49,438.03	11.8005	161.1307	2,069.11	19,462.48
2011	- 9.2876	137.3967	- 0.8613	101.1883	15,111.51	50,169.02	16,582.96	53,145.85	11.6041	159.6029	1,662.97	11,871.11
2012	5.4112	76.7643	5.2750	98.0708	19,279.50	64,990.97	23,329.25	73,817.27	11.3086	157.3909	3,316.28	16,830.33
2013	5.0685	71.3065	2.4579	69.0845	22,644.85	70,364.27	31,678.44	103,061.45	0.6456	1.7891	1,782.86	7,346.81
2014	7.2967	103.3858	3.5696	43.6808	27,778.54	88,096.91	35,665.64	109,452.15	0.6321	1.7800	1,536.11	6,030.50
2015	9.3626	138.4206	6.3462	28.5276	27,176.68	78,634.00	38,580.40	115,416.67	0.5949	1.3573	1,688.23	6,927.25
2016	6.5812	96.9441	- 46.3183	804.8465	28,542.97	80,742.51	42,356.60	123,545.39	0.6357	1.5257	1,229.61	10,677.00
2017	5.2202	76.0087	- 1.5689	103.3630	33,330.18	96,513.45	46,107.48	131,908.41	0.5365	1.0101	- 407.06	13,678.73
2018	3.1953	41.4379	0.4776	60.3892	38,059.49	115,898.75	53,648.51	158,237.11	0.5360	0.8654	1,226.01	7,439.66
2019	2.4214	33.8136	0.3605	62.5232	39,603.37	116,794.94	59,596.56	173,288.38	0.4904	0.5608	- 6,325.50	99,974.55

4.2 Relationship of Firm-Specific Variables and Leverage Ratio

Table 3 shows the results of the regression analysis. Using unbalanced panel data, all three independent variables, Price to Shareholders' Equity, ROE, and logarithm of Sales, are statistically significant at the 0.01 level or less. The F-Test was also performed to check whether the coefficients of the independent variables are significantly different from 0. The resulting p-value shows that we can reject the null hypothesis that all three independent variables are equal to 0. The signs of the coefficients indicate that price to shareholders' equity and sales are positively related with leverage ratio while ROE exhibits a negative relationship.

On the other hand, using balanced panel data, all three variables remain significant but at the 0.10 level. The p-value from the F-Test also allows us to conclude that the independent variables are significantly different from 0. Moreover, similar to the results using unbalanced panel data, price to shareholders' equity and sales shows a positive relationship with level ratio, while ROE moves in the opposite direction (See Table 3. Linear Regression Results).

Table 3. Linear Regression Results

Unbalanced Panel		
Number of Observations	1,778	
R-Squared	0.0668	
Adjusted R-Squared	0.0653	
Variable	**Coefficient**	**P>|t|**
price_equity	0.0005554**	0.000
roe	-0.0284237**	0.000
ln_sales	0.0313653**	0.000
p-value (F-Stat)	0.0000	

Balanced Panel		
Number of Observations	1,320	
R-Squared	0.1765	
Adjusted R-Squared	0.1746	
Variable	**Coefficient**	**P>|t|**
price_equity	0.0286849**	0.000
roe	-0.0230734**	0.000
ln_sales	0.032243**	0.000
p-value (F-Stat)	0.0000	

Note: **p-value < 0.01; *p-value < 0.10

According to the TO theory, growth opportunities is expected to have a negative relationship with leverage. For firms with high growth opportunities, bankruptcy and agency costs can be greater. To avoid incurring high bankruptcy costs, these types of firms tend to less rely on debt. Moreover, the TO Theory suggests that greater growth opportunities could lead to possible agency problems as firm management would likely underinvest to avoid having the creditors accrue the firm benefits which will come from debt financing (Serrasqueiro & Caetano, 2015). Meanwhile, profitability is expected to show a positive relationship since as a firm becomes more profitable, it will likely resort to leverage to take advantage of the tax shield driven by its high profits. Size is also expected to exhibit a positive relationship with leverage since larger firms tend to have diversified businesses which could translate to lower likelihood of bankruptcy (Serrasqueiro & Caetano, 2015).

The results support the TO Theory as illustrated by the positive relationship between size and leverage. It should be noted that there are several family-owned Philippine businesses and conglomerates which venture into different businesses, thus allowing them to obtain revenue from different industries, and therefore could result to lower probability of bankruptcy.

On the other hand, the PO Theory suggests that growth opportunity has a positive relationship with leverage, while profitability and size behave in opposite direction with leverage. Firms with great growth opportunities will likely undertake several investment projects, thus, prompting the need for financing assistance. As external equity is costlier and riskier, firms will tend to rely on debt once it exhausts its internal equity. Meanwhile, since firms with high profits are likely able to accumulate greater retained earnings, these firms will resort to internal equity for funding needs, supporting the PO Theory. Similarly, larger firms, which tend to generate high profits, will likely turn to internal equity for funding of its investment projects (Vatavu, 2012). Given this discussion, the results also show support for the PO model in that for both balanced and unbalanced panel, profitability and size are negatively related with leverage.

Using the coefficients generated from the regression exercise, each firm's target leverage ratio (TLR) can be calculated as follows:

Using Unbalanced Data:

$$TLR_{it} = 0.1863158 + \left(0.0005554 \times PRICE_{EQ}{}_{it}\right) - (0.0284237 \times ROE_{it}) + (0.0313653 \times \ln\ \_sales_{it}) \quad (2)$$

Using Balanced Data:

$$TLR_{it} = 0.1525295 + \left(0.0286849 \times PRICE_{EQ}{}_{it}\right) - (0.0230734 \times ROE_{it}) + (0.032243 \times \ln\ \_sales_{it}) \quad (3)$$

4.3 Testing of TO Behavior

The TO Theory implies that firms have a target leverage ratio in which any deviation from it will eventually result in an adjustment back to the optimal ratio (Abdeljawad, et al., 2013). To test the validity of the TO Theory, Equation 4 was formulated by Yu and Aquino (2009):

$$dTLA_{it} = a_i + b_{TO}\left(T\_TLR_{it} - TLA_{i,t-1}\right) + \delta_{10}Y_{10} + \delta_{11}Y_{11} + \cdots + \delta_{19}Y_{19} + \varepsilon_{it} \quad (4)$$

where

$dTLA_{it}$ = change (difference) in total liabilities over total assets
a_i = intercept
b_{TO} = target adjustment coefficient
T_TLR_{it} = target leverage ratios obtained through Equations (1) or (2)
$TLA_{i,t-1}$ = lagged actual debt ratio
$Y_{10}, Y_{11}, \cdots, Y_{19}$ = dummy variables for the years (1 or 0)

If the b_{TO} is greater than 0 and is statistically significant, then it can be inferred that the TO Theory explains the behavior of Philippine listed firms. The results of the regression are shown in Table 4 (See Table 4. Regression Results of TO Behavior Test).

Table 4. Regression Results of TO Behavior Test

Unbalanced Panel		
Number of Observations	1,768	
R-Squared	0.0225	
Adjusted R-Squared	0.0219	
Variable	**Coefficient**	**P>|t|**
target_adj	0.0460664**	0.000
p-value (F-Stat)	0.0000	

Balanced Panel		
Number of Observations	1,330	
R-Squared	0.0366	
Adjusted R-Squared	0.0359	
Variable	**Coefficient**	**P>|t|**
target_adj	0.0694403**	0.000
p-value (F-Stat)	0.0000	

Note: **p-value < 0.01; *p-value < 0.10

The number of observations in both the unbalanced and balanced panels are greater than that of Yu and Aquino's, where they have 1,157 unbalanced and 495 balanced (ours is 1,768 and 1,330). This larger sample size can be attributed to the increase of Philippine listed firms and the improvement in statutory reporting since then.

Using unbalanced panel data, the coefficient of the target adjustment variable b_{TO} is greater than 0 and is statistically significant at p-value less than 0.01. The results imply that it would take a period of approximately 21 years (1/0.0460664 = 21.7078) for the leverage ratio of Philippine listed firms to adjust towards their target level. These are discouraging results for the TO Theory as our data only includes a span of 10 years yet it will take 21.7 years before the adjustment.

In the same manner, using balanced panel data also generated a statistically significant coefficient, implying that firms will adjust to their optimal leverage ratio, but still for a relatively long period of approximately 14 years (1/0.0694403 = 14.4009), which is still longer than our 10-year period study. However, this regression does not consider time effects in the data of firms, causing the target debt ratios to be fixed.

To eliminate the fixed time effects of the above, Yu and Aquino (2009) also present another form of Equation (3) which allows for the simultaneous calculation of the target leverage ratios in the equation. This is consistent with Hovakimian et al.'s test which accounts for the fact that firms may change over time, causing their target ratios to change. The alternative equation (Equation 5) is given as follows –

$$TLA_{it} = \gamma_i + \hat{\beta}X + \theta\left(TLA_{i,t-1}\right) + \delta_{10}Y_{10} + \delta_{11}Y_{11} + \cdots + \delta_{19}Y_{19} + \varepsilon_{it} \quad (5)$$

where

TLA_{it} = total liabilities over total assets (dependent variable)
γ_i = $a_i + b_{TO}(\alpha_i)$
$\hat{\beta}$ = $b_{TO}(\beta')$
X = vector of explanatory variables (Price to Shareholders' Equity, ROE, and natural logarithm of sales)
θ = $1 - b_{TO}$

Tables 5 and 6 show the results of the regression exercise using the alternative form specified in Equation 4. This alternative form offers the elimination of the static time effect problem – wherein the results can now show the adjustment period to dynamic target debt levels – as must be the case to account for the fact that firms change their leverage levels over time (which in turn should change their target or optimal leverage levels). The adjusted R-squared numbers are also much higher than Table 4's findings (See Table 5. Results of the Alternative Form of Equation Y using Unbalanced Panel Data and Table 6. Results of the Alternative Form of Equation Y using Balanced Panel Data).

Table 5. Results of the Alternative Form of Equation Y using Unbalanced Panel Data

Unbalanced Panel without Time Effects		
Number of Observations	1,768	
R-Squared	0.4887	
Adjusted R-Squared	0.4875	
Variable	**Coefficient**	**P>|t|**
price_equity	0.0001318	0.107
roe	-0.0145671*	0.013
ln_sales	0.0104131**	0.000
lagged_tla	0.7891193**	0.000
Partial Adjustment Factor	0.2108807	
p-value (F-Stat)	0.0000	

Unbalanced Panel with Time Effects		
Number of Observations	1,768	
R-Squared	0.4921	
Adjusted R-Squared	0.4884	
Variable	**Coefficient**	**P>|t|**
price_equity	0.0001246	0.128
roe	-0.0146299*	0.013
ln_sales	0.0097716**	0.000
lagged_tla	0.7897542**	0.000
Partial Adjustment Factor	0.2102458	
p-value (F-Stat)	0.0000	

Note: **p-value < 0.01; *p-value < 0.05

Table 6. Results of the Alternative Form of Equation Y using Balanced Panel Data

Balanced Panel without Time Effects		
Number of Observations	1,320	
R-Squared	0.7232	
Adjusted R-Squared	0.7224	
Variable	**Coefficient**	**P>|t|**
price_equity	0.0110159**	0.000
roe	-0.0120008**	0.000
ln_sales	0.12424**	0.000
lagged_tla	0.6924516**	0.000
Partial Adjustment Factor	0.3075484	
p-value (F-Stat)	0.0000	

Balanced Panel with Time Effects		
Number of Observations	1,320	
R-Squared	0.726	
Adjusted R-Squared	0.7233	
Variable	**Coefficient**	**P>|t|**
price_equity	0.0105201**	0.000
roe	-0.011957**	0.000
ln_sales	0.0119868**	0.000
lagged_tla	0.695212**	0.000
Partial Adjustment Factor	0.304788	
p-value (F-Stat)	0.0000	

Note: **p-value < 0.01; *p-value < 0.05

Using Unbalanced Panel Data without fixed time effects, the firm-specific variables, Price to Shareholders' Equity, ROE, and the Natural Logarithm of Sales, all retained their signs, however, Price to Shareholders' Equity is no longer statistically significant. Moreover, the coefficient of the Partial Adjustment Factor, b_{TO} calculated as 1-θ, is approximately 0.21. This figure is approximately 0.16 points higher than the coefficient of the target adjustment factor in the previous equation equivalent to 0.0460664 (Refer to Table 4). Since the partial adjustment factor coefficient is higher using the alternative equation, the adjustment period will become relatively shorter, down to approximately 4.7 years.

On the other hand, using balanced panel data produced different results. All three firm-specific variables still retained their signs, however, unlike when unbalanced panel data was used, using balanced panel data, with and without fixed time effects, resulted in Price to Shareholders' Equity being statistically significant at the 0.01 level. Also, similar to when unbalanced panel data was used, the coefficient of the Partial Adjustment Factor increased. This means that the adjustment period towards the target leverage ratio will decrease, from approximately 14 years obtained using the original partial adjustment equation to 3 years (1/0.3075484 = 3.2515).

The above target periods (4.7 and 3 years) are longer to Yu and Aquino's findings of about only 2 years adjustment period. However, it is notable that there is a drastic change in our findings from using an equation that does not account for time effects to an equation that accounts for it – from 21.7 years (14.7) to 4.7 (3.2) years for unbalanced (balanced data). This might be a result of having a greater number of observations from Yu and Aquino (2009) as mentioned earlier. However, this also implies

that firms still take 3 years to adjust to their optimal debt levels, which is too long a time for a period of no crises and no scarce source of credit.

4.4 Testing of PO Behavior

The basic regression model used is:

$$\Delta D_{it} = a_i + b_{PO} FIN\_DEF_{it} + \delta_2 Y92_t, + \cdots + \delta_{12} Y01_t + e_{it} \quad (6)$$

where ΔD_{it} is the change in total liabilities, b_{PO} is the PO coefficient, DEF_{it} is the financing deficit defined in Equation 1, and e_{it} is the error term. The regression results show that the coefficient of the financing deficit variable is positive and close to one in the unbalanced panel. This strongly supports the PO theory. In the balanced panel, observations dropped from 1,257 to 520 and shows a positive coefficient more than one. This high coefficient implies that firms raised even more debt than their financing deficit. Yu and Aquino (2009) found a 1.24 PO coefficient for 1996-2001 when they separated the PO model into two subperiods and stated that this is a result of the involuntary bloating up of debt in the Asian financial crisis. In this period of no crisis, it means that both firms and financial institutions are not afraid to enter into debt agreements. This is consistent with the report from IMF's 2018 evaluation of corporate leverage in the Philippines where nonfinancial corporations have steadily increased their leverage since 2010. The country ranks among the highest in the Southeast Asian Region, and a significant share of outstanding debt is denominated in USD.

It is interesting to know what sets the balanced firms apart from the unbalanced firms, wherein they tended to raise debts more than their financing deficit. The balanced firms that reported continuously has higher Sales, which represent firm size, by about 74%, in average, compared to the unbalanced firms. This is consistent with the findings of Frank and Goyal (2003), where they find that firms with no reporting gaps issue significantly higher amounts of debt and has assets almost twice the broader population. However, the ROE, which represent profitability, of balanced firms in our data is lower by about 75%, in average, compared to the unbalanced firms, suggesting that the additional level of debt the balanced firms acquire does not translate well to their profitability.

We also tested using annual change in the leverage ratio as the dependent variable but find infinitesimal coefficients. Yu and Aquino (2009) also conclude that the change in total liabilities is the better dependent variable.

Table 7. Linear Regression Results on PO Model

Unbalanced Panel		
Number of Observations	1,257	
R-Squared	0.2234	
Adjusted R-Squared	0.2228	
Variable	**Coefficient**	**P>|t|**
FIN_DEFt	0.918422	0.000
p-value (F-Stat)	0.0000	

Balanced Panel		
Number of Observations	520	
R-Squared	0.3494	
Adjusted R-Squared	0.3482	
Variable	**Coefficient**	**P>|t|**
FIN_DEFt	1.276285	0.000
p-value (F-Stat)	0.0000	

Note: **p-value < 0.01; *p-value < 0.10

Frank and Goyal (2003) maintain that financing deficit needs to wipe out the effects of other variables when they are put into the equation. Equation 7 modifies this to include the growth opportunities, sales, and size to test the significance. The results show that PO does not wipe out the effects of the variables. Size continues to be a significant variable (See Table 8. Significance of Financing Deficit to beat other models).

$$\Delta D_{it} = a_i + b_{PO} FIN\_DEF_{it} + \beta_1 \, x \, price_{equity} + \beta_2 \, x \, roe + \beta_4 \, x \, ln_{sales} + \delta_{10} Y10_t, + \cdots + \delta_{19} Y19_t + e_{it} \quad (7)$$

Table 8. Significance of Financing Deficit to Beat Other Models

Balanced Panel		
Number of Observations	1,255	
R-Squared	0.2942	
Adjusted R-Squared	0.2868	
Variable	**Coefficient**	**P>|t|**
FIN_DEF2	0.8676513	0.000
price_equity	943.9691	0.135
roe	-14.20022	0.462
ln_sales	1999.502	0.000

4.5 Testing for exogeneity of the financing deficit

In the critique part of the Auerbach (1985) study, Gordon (Auerbach, 1985, p.322) pointed out that the financing deficit variable includes terms that are inherently endogenous: taxes, profits, and other investments. When variables are endogenous, estimates of the coefficient will be biased and inconsistent. It is therefore pragmatic to test the exogeneity of the variable and how severe it is. The Hausman test, wherein we initially regressed the financing deficit variable against identified instrumental variables to collect the residuals from the regression then perform a second regression where the residuals is one of the independent variables, is carried out as the exogeneity test.

For the instrumental variables, we used variables that are relevant to the endogenous variable. According to Yu and Aquino (2009), the variable should be correlated with the financing deficit variable, and are exogenous, i.e., the variable should be uncorrelated with the error term in Equation (6). We identified the instrumental variables as cash flow from investments (cfi), cash flow from operations (cfo), and fixed assets (fixed_assets). The variables cfi and cfo are negatively related to financing deficit, as increased cash inflows from these tend to decrease financing deficit while the *fixed_assets* variable is positively correlated as higher fixed assets mean higher depreciation expense, which decreases net income after tax, which ultimately increases financing deficit. We regressed the financing deficit variable with these instrumental variables using the equation:

$$FIN\_DEF_T = a_i + \beta_1 \, x \, fixed\_assets \, + \beta_2 \, x \, cfi + \beta_3 \, x \, cfo \, + e_{it} \qquad (8)$$

Fixed assets and cash flow from investments are significant, same with Yu and Aquino's study. We then collected the residuals and perform the second regression with the financing deficit variable. If the financing deficit is exogenous, the first stage residuals should not be significantly different from zero. Our test results show first stage residuals are significantly different from zero, therefore the financing deficit variable is not exogenous.

To address this problem, we used the same instrumental variables in a 2SLS method to estimate the financing deficit coefficient. The instruments already demonstrated their validity by being correlated with the financing deficit variable and are exogenous or uncorrelated to the error term in Equation 6. The results in Table 9 using 2SLS show that using unbalanced panel data, we obtain a coefficient of 0.9529, which is very close to the coefficient value of 0.9184 in Table 7. This means that even if the financing deficit variable is endogenous, the endogeneity problem is not serious (See Table 9. Exogeneity Test on Financing Deficit).

Table 9. Exogeneity Test on Financing Deficit

	Unbalanced Panel
Dependent Variable: Financing Deficit (from Eq. 1)	
Independent Variables:	
cfi	-0.9274**
	(0.1070)
cfo	0.2142**
	(0.1774)
fixed_assets	-0.1961**
	(0.0359)
constant	-584.1475
	(944.7108)
p-value (F-Stat)	0.0000
Number of Observations	1,506
R-Squared	0.0638
Adjusted R-Squared	0.0619

Note*: **p-value < 0.01; *p-value < 0.05*

	Unbalanced Panel
Dependent Variable: Change in Total Liabilities	
Independent Variables:	
fin_def	0.9529**
Using equation 1	(0.0550)
Residuals of fin_def	-0.9736**
Fin_def from eq. X	(0.0569)
constant	3622.68
	(491.8025)
p-value (F-Stat)	0.0000
Number of Observations	1,506
R-Squared	0.1673
Adjusted R-Squared	0.1662

Note: ***p-value < 0.01; *p-value < 0.05*

4.6 Combining the two models into a joint equation

The final step starts with the fitting of the variables in a single equation and testing for significance. Equation 9 introduces the TLA_{it} as the lagged total change in debt ratio to account for the target debt ratio.

$$TLA_{it} = \gamma_i + \hat{\beta}X + \theta\left(TLA_{i,t-1}\right) + b_{PO}FIN\_DEF_{it} + \delta_2 Y92_t + \cdots + \delta_{12} Y01_t + e_{it}$$
$$TLA_{it} = \gamma_i + \beta X + \theta\left(TLA_{i,t-1}\right) + b_{PO}FIN\_DEF_{it} + \delta_{10} Y10_t + \cdots + \delta_{19} Y19_t + e_{it} \quad (9)$$

The results show that the financing deficit becomes insignificant and has infinitesimal coefficients while the lagged leverage ratio is significant for both unbalanced and balanced panel. This is consistent with the findings of Yu and Aquino (2009), mainly citing that PO model normally explains the debt level and not the debt ratio (See Table 10. Joint Equation Results).

Table 10. Joint Equation Results

Unbalanced Panel		
Number of Observations	1,234	
R-Squared	0.44	
Variable	**Coefficient**	**P>|t|**
fin_def	-8.33E-07	0.634
price_equity	0.3293072	0.181
roe	-0.0147242*	0.036
ln_sales	0.0177293**	0.000
lagged_tla	0.7548767**	0.000

Balanced Panel		
Number of Observations	560	
R-Squared	0.6141	
Variable	**Coefficient**	**P>|t|**
fin_def	-1.14E-06	0.282
price_equity	0.1098549	0.395
roe	-0.0589749	0.000
ln_sales	0.0223943	0.000
lagged_tla	0.5213198	0.000

Note: **p-value < 0.01; *p-value < 0.05

To determine the more dominant model, we performed the J-tests done by Yu and Aquino (2009). If one model is better than the other, the fitted values from the other model would not have any additional explanatory power. First is testing of the TO model to the PO model. We computed the coefficients of the TO fitted values and perform a regression using OLS first and then adding the 2SLS test which accounts for the endogeneity problem. This step shows that the TO fitted values are significant at the 0.01 level for both the balanced and unbalanced panels and both the regressions, which indicates explanatory power of the TO variables (See Table 11. J-Test results for the PO Model).

Table 11. J-Test results for the PO Model

Unbalanced Panel				
Number of Observations	1,234			
	OLS		2SLS	
Variable	Coefficient	P>|t|	Coefficient	P>|z|
fin_def	1.349621**	0.000	1.950892**	0.000
TO_fitted_val	25657.37**	0.000	33041.07**	0.000
Adjusted R-Squared	0.5339			

Balanced Panel				
Number of Observations	560			
	OLS		2SLS	
Variable	Coefficient	P>|t|	Coefficient	P>|z|
fin_def	1.43044**	0.000	1.288959**	0.000
TO_fitted_val	22067.43**	0.000	22418.8**	0.000
Adjusted R-Squared	0.5347			

Note: **p-value < 0.01; *p-value < 0.05

The last step is the fitting of the PO fitted values to the TO model using only the OLS regression as the TO model does not have the endogeneity problem of the PO model. The results show that the financing deficit is significant at the 0.01 level for both unbalanced and balanced panel, and that the price_equity, roe, and ln_sales are insignificant at the 0.05 level for the balanced panel. Only the ln_sales retain significance at the unbalanced panel. This means that PO fitted variables, while not wiping out the significance of all TO variables, managed to make three out of four TO variables insignificant. Yu and Aquino (2009) places weight to the PO model in this test, as if the significance level requirement is tightened to 0.01, their TO model variables in their findings all lose significance to the PO model. We do not find the same results in this test (See Table 12. J-Test results for the TO Model).

Table 12. J-Test results for the TO Model

Unbalanced Panel		
Number of Observations	1,234	
Variable	**Coefficient**	**P>|t|**
price_equity	-4906.969	0.657
roe	183.8959	0.562
ln_sales	695.9831**	0.000
lagged_tla	18956.15**	0.000
PO_fitted_val	1.136886**	0.000
Adjusted R-Squared	0.5389	

Balanced Panel		
Number of Observations	560	
Variable	**Coefficient**	**P>|t|**
price_equity	-6115.915	0.711
roe	696.3745	0.697
ln_sales	532.1351	0.087
lagged_tla	11648.89**	0.000
PO_fitted_val	0.9895805**	0.000
Adjusted R-Squared	0.5322	

Note: **p-value < 0.01; *p-value < 0.05

Both variables have explanatory power to the other competing model. The TO variables lose significance when the PO fitted variables are introduced in the model while the financing deficit variable retains significance when TO fitted variables are introduced. However, as both the fitted values retain their significance in the 0.01 level for both unbalanced and balanced data, the tests are still inconclusive.

5 Conclusion

Several tests were performed to identify the capital structure theory that explains the financing behavior of firms listed in the Philippine Stock Exchange using data from 2010 to 2019. The first test involves analyzing the relationship of different firm specific variables with the leverage ratio. Results have shown that growth opportunities, as described by Price to Shareholders' Equity, has a positive relationship with leverage, which supports the Pecking Order Theory. Profitability, as described by ROE, on the other hand, is negatively related with leverage. This also shows support to the Pecking

Order Theory. Lastly, firm size, as characterized by the natural logarithm of sales, was found to have a positive relationship with leverage, which offers support to the Trade-Off Theory. Using this test has produced results which offer partial support for both capital structure theories.

The Trade-Off Theory was then tested by checking the significance of the coefficient of the target adjustment variable. The results show significance of the coefficient and adjustment towards its target level. Following the alternative equation that eliminates fixed time effects, an adjustment period of four to five years is seen on unbalanced panel and three to four years for the balanced panel. We find this too long a time for a period of no crises and no scarce source of credit.

The validity of the Pecking Order Theory was also tested by checking the significance of the coefficient of the financing deficit variable as defined by Auerbach (1985) and if it is close to one. It was found that when the change in total liabilities is used as the dependent variable, regardless of whether unbalanced or balanced panel data is used, the financing deficit coefficient is significant and is close to 1.00, showing support to the Pecking Order Theory. The unbalanced panel shows a coefficient of 0.91 while the balanced panel shows 1.27. This implies that firms raised even more debt than their financing deficit. Yu and Aquino (2009) find a near 1.24 coefficient for 1996-2001 when they separated the PO model into two subperiods and offer that this is a result of the involuntary bloating up of debt in the Asian financial crisis. In our period of no economic crisis, finding a similar coefficient higher than 1 would imply that firms have been voluntarily taking advantage of the debt market in the country. A period of calm could also loosen up the purses of banks for them to lend more willingly.

Lastly, the target adjustment variable and the financing deficit variable were combined in a single equation and the significance of the coefficients were tested. Running the 2-Stage Least Squares model using unbalanced panel data, it was found that only firm size and lagged leverage ratio were significant at 0.01 while profitability is significant at 0.05. Using balanced panel data, firm size, lagged leverage ratio, and profitability are all significant at 0.01. The coefficient of the financing deficit variable, however, was found to be not significant. Finally, the J-Test was performed and it was found that when the fitted values of the financing deficit variable and the target adjustment variable were added as additional independent variables in the TO equation and PO equation, respectively, both variables are still significant.

Recent studies among countries that are economically alike to the Philippines have found results that support the TO. In a time of no crisis, Philippine firm managers can devote time to actively perform thorough analyses of their capital structure choice and not worry with how they can be raised as internal equity and less debt transaction costs are available due to dominance of family businesses and conglomerates. With these reasons, we hypothesized that Philippine firms will be more explained by the TO Theory during a period of no financial crisis. However, our findings show support to both the TO and PO theories. A careful weighing of results makes us lean more also on the PO model. The TO model find that firms adjust toward an optimal debt ratio, but rather, in a period where active analyses can be done with less stress from macroeconomic factors, it still takes a long time of three to four years (four to five) in the balanced (unbalanced) panel. Growth opportunity and profitability variables also lend support to the PO model. The Size factor, measured by natural logarithm of sales, lend support to TO. However, this warrants further investigation as it might be that firms find that when their size is higher is the time they can take advantage of their debt capacity due to the increased collaterals. Additionally, finding a close and even higher coefficient in the PO model bolsters support for the theory – firms are increasing their leverage in a stable debt market, rather than raise more equity. This study tried to show how Philippine firms structure their capital during a period of no crisis and find that the stability of the economy can induce them to meet their financing deficit by raising debt as well or even more than equity. As the Philippines is still largely a country where family businesses and conglomerates, it is intriguing to do a side-by-side comparison with standalone firms and see if the results will still hold.

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