“The determinants of firm financing structures across sectors: an evidence from Indonesian listed companies”

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THE DETERMINANTS OF FIRM FINANCING STRUCTURES ACROSS SECTORS: AN EVIDENCE FROM INDONESIAN LISTED COMPANIES

Abstract

The study investigates the impacts of firms-, industry-, and country-level covariates on the financing structure amongst the Indonesian listed companies. Using artificial nested testing procedure, the preferred models were selected that could illustrate the association between debt ratio and its determinants. By making use of the full sample, it was found that these three levels of determinants explain approximately 73% of leverage variations.

Further, the importance of these determinants on leverages across sectors is also investigated in this study. The sectoral behavior plays a crucial role as the firm- and sector-level covariates indicate more important variables than country-level covariates, which implies that the firm-level covariates become the main factors in firm financing structure determination.

The artificial nested testing procedure (F-test) was used choose the preferred models, which is suitable for each sector. The selection of models depends on the sectoral characteristics, which indirectly control the orientation and magnitude of relationships. Those three levels of determinants have different impacts on capital structure across sectors, which provides evidence that the sectoral behaviors indirectly tend to influence the association between determinants and firm financing pattern in the Indonesian context.

Keywords capital structure, sector, industry, country, determinants

JEL Classification G30, G32

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INTRODUCTION

Study of capital structure is still a warm topic to be discussed since it may be related to the firm's value whenever the firms manage their financing decision (Modigliani & Miller, 1963). Some studies on the firm financing structure highlight the firm-level covariates, like profitability, tangibility, size, and so on, as the leverage determinants (Frank & Goyal, 2003; Rajan & Zingales, 1995). Several studies have analyzed the role of country determinants of financing decision (Antoniou, Guney, & Paudyal, 2008; Bancel & Mittoo, 2002; Beck, Demirgüç-Kunt, & Maksimovic, 2008). They recommended that besides firm-specific factor, country-level explanatory variables such as GDP and inflation could affect firm financing structure. Majority of financing decision literature analyzed firm and country characteristics as explanatory variables of leverage, while those neglect the role of industry factors that are included in the variable of the study; except for the studies conducted by Mackay and Phillips (2005), Simerly and Li (2000) who argued that the environmental dynamism could also influence the firm financial structure. Some recent studies such as Bilal et al. (2014), Kayo and Kimura (2011) suggested that industry-specific covariates such as industry concentration, munificence, and dynamism also have a direct impact on firm leverage decision.

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The empirical researches on financing policies have been mostly conducted at developed countries, for example, Booth et al. (2001), Wald (1999) in 10 developed countries, Rajan and Zingales (1995) in G7 countries, Harris and Raviv (1991), Hovakimian and Opler (2001), Jalilvand and Harris (1984), Lemmon et al. (2008), Myers (2001) in USA, Antoniou et al. (2008), Ozkan (2001) in UK, and Miguel and Pindado (2007) in Spain.

In a developing country context, like Indonesia, the study of financing decision determinant is underexplored and still gets little attention from scholars. Most of them merely investigate firm-specific determinants for specific industry (Maruli Tua Sitorus, Priyarsono, Manurung, & Maulana, 2014; Ningsih & Djuaeriah, 2013; Pertiwi & Anggono, 2014; Suhendra, 2014; Utami & Inanga, 2012; Yolanda & Soekarno, 2012). However, studies of capital structure which consider industry-specific determinants are still rare. Most of those researchers merely capture industry effect as dummy variable; they have not analyzed industry-specific variable in their studies (Hardiyanto, Achsani, Sembel, & Maulana, 2014; Santi, 2003; Tzang, Wnag, & Rahim, 2013).

The objectives of our study are: first, we analyze the firm financial structure of the Indonesian listed companies across sectors based on Jakarta Industrial Classification (JASICA), except for the banking and financial sector. We incorporate three level determinants, viz. firm-, industry- and country-level suggested by Bilal et al. (2014), Kayo and Kimura (2011) in analyzing financing behavior of each sector. Second, we identify possible models of capital structure determinants and propose a preferred model for each industry using the artificial nested testing procedure as suggested by Gujarati, Porter, and Gunasekar (2012). As far as we know, the studies of analyzing capital structure across sectors by including three level determinants in the Indonesian context have not been conducted by any scholars before.

1. LITERATURE REVIEW

The modern capital structure theories were born since Modigliani and Miller (1958) study, which proposed that the modifications of firm's financing structure cannot change the firm value, under a perfect capital market assumption. However, those assumptions are unrealistic; in fact, the dividends, corporate tax, transaction costs, asymmetric information and so on exist (Brigham & Ehrhardt, 2011).

Later on Modigliani and Miller (1963) revised their theory that interest can be tax-deductible, and it indirectly spurs the leverage utilization, and in turn, maximizes firm value. Thus, the higher debt ratio leads to the higher firm value due to the additional benefits from debt utilization. Subsequently, the prominent capital structure theories have emerged to explain firm's financing behavior.

1.1. Pecking Order Theory (POT)

In 1961, Donaldson (1961) conducted a survey of 25 large companies in the US. He concluded that management favors utilizing internally generated resources, if available, than to consume external source of funds.

Subsequently, Myers (1984), Myers and Majluf (1984) strengthen Donaldson's (1961) findings by constructing the asymmetric information theory. This theory suggests that the firm's investment opportunities are privately well known by the insiders (firm managers), which are unknown by outsiders (investors).

Managers are reluctant to issue equity if they perceived that the market underprices the new equity issuance. On the other hand, investors are aware that managers are unwilling to make equity offerings whenever the market undervalues this issuance. Consequently, both managers and investors react in different manner based on their available information.

If a new project is financed by equity issuance, the new investors take advantage from underpricing and capture net present value (NPV) of new project, while the existing shareholders would lead to losing their NPV. Hence, internal source and leverage would be preferable to equity. As the internal source of fund is insufficient, firms seek risk-free credits, next turn to risky borrowings, and lastly equity financing.

1.2. Trade-Off Theory (TOT)

In 1973, Kraus and Litzenberger (1973) constructed the optimal financial leverage model. They argued that the benefits from tax shield could be balanced by the cost of financial distress. As reported by Kim (1978), Scott (1976), this theory concludes that by weighting between tax-shield benefits and the costs concerning debt utilization, like bankruptcy, agency costs, as well as financial distress, an optimal financing structure can be achieved to maximize firm value.

1.3. Agency Theory (AT)

In 1976, Jensen and Meckling (1976) published a theory that debt might create an agency conflict. They found that the agency relationship happened when the principals (shareholders) delegated some authorities to the agents (managers) in order to perform the activities on the shareholders' behalf. In some occasions, managers do not perform activities in the shareholder's interest. Thus, the conflict of interest between those parties becomes worse. Jensen and Meckling (1976) proposed that as the agency costs among equity holders and debt holders are increasing, the optimal combination of external sources among debt and equity would bring down the total costs of agency.

2. LEVERAGE DETERMINANTS

2.1. Firm-level determinants

The importance of firm-level variables on debt ratio determination could be explained by some prominent theories, i.e. Trade-off Theory (TOT), Pecking Order Theory (POT), and Agency Theory (AT). The relationships between debt ratio and its determinants might be positive or negative, depends on the theories they relied on (Kayo & Kimura, 2011). Hence, we use the size of firm, growth, profitability, tangibility, liquidity, and risk as the firm-level determinants.

Firm's size could be explained by TOT as follows: the large company has more stable cash flow so that it can reduce the risk of using the debt/financial distress (Chen & Strange, 2005). The large companies have lower default risk and probability of bankruptcy than small firms (Elsas & Florysiak, 2008). The creditor considers large company as riskless firm, so these firms enjoy lower costs of debt than small companies; consequently, it will encourage large companies to use more debt (Song, 2005). The larger company's size, the lower bankruptcy risk, the lower agency cost of debt and monitoring cost, so it is easier to access the credit market, and so on (Deesomsak, Paudyal, & Pescetto, 2004). Lastly, large firms were less subject to bankruptcy due to diversified business entity, so they prone to more leverage level (Nagano, 2003). Hence, TOT predicts a positive influence of firm size on debt ratio.

Meanwhile, POT argues that the large companies get financing more easily through issuing equity share in capital market, because they have less information asymmetry (Smith & Warner, 1979). The other argument is when large companies issue equity share, the issuance costs are lower than that of small companies (Titman & Wessels, 1988). Therefore, the relationship between size of the company and debt ratio as capital structure measure is negative.

Growth opportunity might be proposed by POT with the argument that higher growth opportunities of the company lead to greater asymmetric information. The company would prefer to use debt to suppress the asymmetric information that probably happened (Song, 2005). So, POT suggests a positive impact of this variable on leverage. Based on AT perspective, with higher growth opportunity, firms are prone to have greater costs of agency, which lead to substantial costs of debt. When manager takes opportunity in the risky projects, creditors will burden more interest charges. This practice leads a corporate control shift to creditors, since more cash flow would be used as interest payments. Consequently, these firms tend to maintain lower debt ratio level to minimize creditors' constraints as in debt covenants (Jensen & Meckling, 1976). Therefore, AT proposes a negative association between this variable and debt ratio.

Profitability might be elaborated with POT that the firms with higher profitability level have larger internal financing sources, so their financing

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needs from external sources are less (Schoubben & Hulle, 2004). Thus, POT proposes a negative association between this variable and debt ratio. Meanwhile, TOT suggests the profitable companies tend to have more advantages of tax shield (Pettit & Singer, 1985). Consequently, the relationship between this variable and leverage would be positive. According to AT, companies which have higher profitability prefer to utilize debt financing to reduce misuse of funds by managers; the companies prefer to distribute their profits rather than use it for re-investment (Hardiningsih & Oktaviani, 2012). Consequently, the relationship between profitability and leverage would be positive.

Assets structure (tangibility) premises as proposed by TOT are as follows: a business which has more assets will get more loan, because creditors will always ask for collateral (Brigham & Ehrhardt, 2011). Also, the company's assets could be pledged as collateral in borrowing decision, and consequently, the more assets a company has, the more it will escalate the level of debt capacity (Elsas & Florysiak, 2008). Thus, the association between assets structure (tangibility) and debt ratio is positive. Meanwhile, POT argues that when a company has higher proportion of asset tangibility, then the valuation of assets becomes easier; so the problem of information asymmetry becomes less. Thus, the company can reduce debt utilization when the proportion of tangible assets increases (Schoubben & Hulle, 2004). Therefore, the relationship between assets structure and debt financing would be negative.

According to Deesomsak et al. (2004), Ozkan (2001), liquidity could be perceived as current assets divided by current liabilities ratio. Liquidity can explain POT with the argument that the company prefers to use internally generated financing more than external funding; thus, a company with high liquidity level is expected to reduce borrowing consumption (Deesomsak et al., 2004). Therefore, the association between this variable and debt ratio is supposed to be negative.

Regarding firm's risk, TOT proposes that as the firms' earnings volatility increases, the financial distress probability is higher due to uncertain inflow earnings; consequently, they are not able to pay the interest charges and go bankrupt; this will lead to lower debt level (Krishnan & Moyer, 1997). AT suggests that firm's risk also has a negative influence on debt ratio, because the higher the volatility of firm's earnings (or business risk), the greater the probability of its cash flows not being sufficient to fulfill debts payments (Harris & Raviv, 1991). The POT also suggests a negative impact of this variable on leverage, because with higher earnings volatility, firms would accumulate capital when they are prone to avoid losing investment opportunities in times of deficits (Myers, 2001). Based on arguments of those prominent capital structure theories, the impacts of risk on firms' leverage should be negative.

2.2. Industry-level determinants

The series of firm financing studies mostly use dummy variables in controlling the industry effect on debt ratio, and few of those researches characterize, rather than classify, each sector as the leverage determinants (Kayo & Kimura, 2011). In one science of strategy, Simerly and Li (2000) suggested that environmental factors to all firms in a given industry should be considered when determining corporate strategy. Hence, it makes sense that the specific nature of the given industry could also affect the firm financial structure (Bilal et al., 2014; Kayo & Kimura, 2011). Regarding this, we also analyze three industry variables viz. concentration, munificence, and dynamism.

The first concept in industry-level factor as our concern is industry concentration. A study conducted by Mackay and Phillips (2005) divided the industry into high- and low-concentrated industry. They argued that the firms operating in higher industry concentration (HHI) tend to have higher profitability and size, as well as the risk. Consequently, these firms have higher level of leverage and lower intra-industry dispersions. Meanwhile, the firms operating in low-concentrated industries have lower leverage level (Mackay & Phillips, 2005).

However, studies by Bilal et al. (2014), Kayo and Kimura (2011) documented different results. Kayo and Kimura (2011) documented that indus-

try concentration negatively influences leverage in both the developed and emerging countries. Meanwhile, Bilal et al. (2014) found that industry concentration negatively influences on debt ratio in a developed country (Spain) and an emerging economy (Malaysia), but it has a positive influence in a developing country (Pakistan). From this point of view, to capture industry concentration effect on leverage, HHI is used to measure the influence of industry concentration on debt ratio. The firms operating in high-concentrated industry tend to have higher profitability compared to firms operating in low-concentrated industry (Mackay & Phillips, 2005).

Regarding the influence of profitability on leverage in firm-level determinants, it could be a positive or negative relationship depending on the underlying theories. As mentioned before, POT predicts a negative effect of this variable on leverage; meanwhile, TOT and AT predict a positive one. Expanding capital structure theories from the firm-level variables into the industry-level variables, POT confirms the negative association between industry concentration and debt ratio; whereas TOT and AT prove the positive relationship. Therefore, this study tests the hypothesis whether industry concentration substantially influences on debt ratio.

The second concept in industry-level factors which play an essential role in leverage determinants is munificence. Munificence was defined by Dess and Beard (1984) as the capacity of environment to sustain growth. The larger munificence environment has abundance of resources, consequently the profitability is higher (Dess & Beard, 1984). Confounding results were also found from previous studies. Kayo and Kimura (2011) found a negative influence of munificence level on leverage across both the developed countries and the emerging countries. On the other hand, Bilal et al. (2014) documented a negative relationship in a developed country (Spain), but positive relationship in an emerging economy (Malaysia) and a developing country (Pakistan). Similar to industry concentration, POT predicts a negative influence of this variable on leverage, while TOT and AT predict a positive one. Hence, we test the hypothesis that munificence influences the leverage.

The third concept in industry-level factors that we analyze is industry dynamism. The concept of industry dynamism concerns the firm's business risk (Tsvirko, 2014) or the rate of instability due to the change of environment (Child, 1972; Dess & Beard, 1984; Simerly & Li, 2000). Business risk is defined by Ferri and Jones (1979) as expected variability in future income. The firms operating in high business risk industry tend to have lower leverage level due to higher profit uncertainty to estimate their ability to pay the fixed obligation. High-profit volatility potentially makes financial distress, and the firms tend to decline their leverage level (Ferri & Jones, 1979). Therefore, this study tests whether industry dynamism negatively influences debt ratio.

2.3. Country-level determinants

Some literature suggests the firm's financing decision should not only consider the firm's characteristics, but also country-specific variables, for example, country's institutional environment, legal framework, corporate governance, and macroeconomic factors (Deesomsak et al., 2004; Demirgüç-Kunt & Maksimovic, 1996; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998). Moreover, Antoniou et al. (2008) argued that a firm that operates in a particular country could not be generalized to other types of economies. However, Bilal et al. (2014), Joeveer (2008), Kayo and Kimura (2011), Mitton (2008) suggested that country-specific variable effects could be subsidiary compared to firm-specific covariates. Considering these arguments, we analyze two country-specific determinants, viz. growth of GDP and rate of inflation, using the Indonesian market as the subject of the study.

Previous literature (Bas, Muradoglu, & Phylaktis, 2009; de Jong et al., 2008; Deesomsak et al., 2004; Mitton, 2008) found that in case of the economic downturn (proxied by GDP growth), firms are prone to decrease borrowing decision due to unfavorable revenue performance, increase potential bankruptcy costs and financial distress, and reduce operating cash flow. On the contrary, when the economy is booming, firms seek more funds for undertaking good projects and implementing expansion programs. Expanding firm-level capital structure theories into coun-

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Table 1. Variable definition and theory prediction

Variables	Formulation	Theory prediction	
		Positive	Negative
Dependent variables			
Total Leverage (TDMV)	Total debt divided by total value of firm; where total value of firm is total of debt plus market value of equity	–	–
Independent variables – Firm Level (L1)			
Firm Size (SIZE)	Natural logarithm of sales	TOT	POT
Growth Opportunity (GROW)	Firm market value divided by total assets	POT	AT
Profitability (PROF)	Net operating income divided by total assets	TOT, AT	POT
Tangibility (TANG)	Property and plant assets divided by total assets	TOT	POT
Liquidity (LIQU)	Current Assets divided by current liability	TOT	POT
Earnings Volatility (RISK)	The volatility of earnings (EBIT) divided by total assets	–	TOT, POT, AT
Independent variables – Industry Level (L2)			
Industry Concentration (HHIC)	The sum of squares of each firm's market share within a given industry	TOT, AT	POT
Munificence (MUNI)	Step 1: conducting time regression against sales of an industry for the past five years under the period of study Step 2: taking the ratio of the slope coefficient of regression divided by the mean value of sales for the same period	TOT, AT	POT
Dynamism (DYNA)	The ratio of standard error of slope coefficient from the munificence regression divided by the mean value of sales for the same period	–	TOT, POT, AT
Independent variables – Country Level (L3)			
GDP Growth (GDPG)	Annual real GDP growth (constant dollar price)	TOT	POT
Inflation (INFL)	Annual Inflation (consumer prices)	TOT	POT

Note: This table describes the formulation of dependent and independent variables accompanied by underlying capital structure theories.

try-level, such as POT and TOT, the influence of GDP growth on firms financing decision can be positive or negative depending on these underlying theories. Therefore, this study tests the hypothesis whether GDP has a significant influence on firm leverage.

As inflation could be predicted, the inflation premium tends to be included in the nominal interest rate by the lenders to reduce their default risk issues. Hence, an inflation premium spurs the additional interest rate as borrowing costs (Brigham & Ehrhardt, 2011). The research scholars Beck et al. (2008), Booth et al. (2001) documented an opposite relationship between this variable and debt ratio, and they found that firms minimize their leverage debt utilization, because the interest rate is higher as a result of greater inflation rate. This study test the hypothesis whether the rate of inflation has a negative relationship with firms leverage.

3. METHODOLOGY

3.1. Data and sample

This study analyzes capital structure determinants across sectors with Indonesian listed firms as a pilot of the study. Firm-level and sector-level data were mainly retrieved from Thomson Reuters Eikon, Indonesian Stock Exchange (IDX) Fact Book and Indonesian Capital Market Directory (ICMD), while country-level data were obtained from Statistics Indonesia (BPS) and World Bank (WB) Indicators.

The sample includes all firms in IDX across sectors based on JASICA (Jakarta Stock Industrial Classification) for covering the 12-year period from 2005 until 2016. As a common consensus, incomplete data elements and firms from the financial sector are dropped from objects of this study. The initial sample was 534 firms; after

Table 2. Number of sample firms and number of observations

No.	Sector	Code	Unbalance panel	
			Firms	No. of obs.
1	Agriculture	AGRI	21	169
2	Mining	MINI	43	350
3	Basic industry and chemical	BASI	61	508
4	Miscellaneous industry	MISC	37	342
5	Consumer goods industry	CONS	35	332
6	Property, real estate, and building construction	PROP	55	473
7	Infrastructure, utilities, and transportation	INFR	52	369
8	Trade, services, and investment	TRAD	115	882
Full sample data			419	3,425

Note: This table shows the number of firms as a sample of the study, as well as the number of observations from 2005 to 2016. As of 2016, the number of listed firms in the Indonesian Stock Exchange (IDX) is 534. The financial and banking sector firms are excluded, and the incomplete data are dropped from this study.

excluding financial sector firms and incomplete data elements, the final sample was 419 firms with unbalanced panel data. Table 2 shows the number of sample in unbalanced panel data set for the whole sample, as well as for each sector.

3.2. Model

Basically, this study analyzes the influence of three level determinants on firm leverage. Hence, we classified the determinants into 3 levels viz. firm-level, industry-level, and country-level determinants. Level 1 (L1) contains the firm-level covariates, i.e., size, growth, profitability, tangibility, liquidity, and risk; Level 2 (L2) includes the sector-level covariates, i.e., industry concentration, munificence, and dynamism; and lastly Level (L3) consists of country-level covariates, i.e., GDP growth and inflation rate.

Model 1 – Firm-level determinants (L1):

$$TDMV_{it} = \alpha_i + \beta_1 SIZE_{it} + \beta_2 GROW_{it} + \\ + \beta_3 PROF_{it} + \beta_4 TANG_{it} + \beta_5 LIQU_{it} + \\ + \beta_6 RISK_{it} + u_{it}. \quad (1)$$

Model 2 – Industry-level determinants (L2):

$$TDMV_{ijt} = \alpha_i + \beta_7 HHIC_{jt} + \beta_8 MUNI_{jt} + \\ + \beta_9 DYNA_{jt} + u_{ijt}. \quad (2)$$

Model 3 – Country-level determinants (L3):

$$TDMV_{it} = \alpha_i + \beta_{10} GDPG_t + \beta_{11} INFL_t + u_{it}. \quad (3)$$

The nested model may combine amongst those three level determinants, such as a combination of firm-level and sector-level variables (L1 + L2), firm-level and country-level variables (L1 + L3), sector-level and country-level variables (L2 + L3), or combining all firm-level, industry-level, and country-level determinants at once (L1 + L2 + L3).

Model 4 – nested firm-level and industry-level determinants (L1 + L2):

$$MDR_{ijt} = \alpha_i + \beta_1 SIZE_{it} + \beta_2 GROW_{it} + \\ + \beta_3 PROF_{it} + \beta_4 TANG_{it} + \beta_5 LIQU_{it} + \\ + \beta_6 RISK_{it} + \beta_7 HHIC_{jt} + \beta_8 MUNI_{jt} + \\ + \beta_9 DYNA_{jt} + u_{ijt}. \quad (4)$$

Model 5 – nested firm-level and country-level determinants (L1 + L3):

$$TDMV_{it} = \alpha_i + \beta_1 SIZE_{it} + \beta_2 GROW_{it} + \\ + \beta_3 PROF_{it} + \beta_4 TANG_{it} + \beta_5 LIQU_{it} + \\ + \beta_6 RISK_{it} + \beta_{10} GDPG_t + \beta_{11} INFL_t + u_{it}. \quad (5)$$

Model 6 – nested industry-level and country-level determinants (L2 + L3):

$$TDMV_{ijt} = \alpha_i + \beta_7 HHIC_{jt} + \beta_8 MUNI_{jt} + \\ + \beta_9 DYNA_{jt} + \beta_{10} GDPG_t + \beta_{11} INFL_t + u_{ijt}. \quad (6)$$

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Model 7 – nested all firm-level, industry-level, and country-level determinants at once (L1 + L2 + L3):

$$\begin{aligned} TDMV_{ijt} &= \alpha_i + \beta_1 SIZE_{it} + \beta_2 GROW_{it} + \\ &+ \beta_3 PROF_{it} + \beta_4 TANG_{it} + \beta_5 LIQU_{it} + \\ &+ \beta_6 RISK_{it} + \beta_7 HHIC_{jt} + \beta_8 MUNI_{jt} + \\ &+ \beta_9 DYNA_{jt} + \beta_{10} GDPG_t + \beta_{11} INFL_t + u_{ijt}. \end{aligned} \quad (7)$$

where $TDMV_{ijt}$ – market debt ratio (total leverage), α_i – individual intercept, $SIZE_{it}$ – firm size, $GROW_{it}$ – growth opportunity, $PROF_{it}$ – profitability, $TANG_{it}$ – tangibility, $LIQU_{it}$ – liquidity, $RISK_{it}$ – business risk, $HHIC_{jt}$ – industry concentration, $MUNI_{jt}$ – munificence, $DYNA_{jt}$ – dynamism, $GDPG_t$ – GDP growth, $INFL_t$ – inflation, u_{ijt} – error term to be assumed independently and identically distributed with zero mean and constant variance or $\sim iid\left(0, \sigma_u^2\right)$.

Subsequently, the discussion would analyze model selection by using F-test (or the artificial nested testing) to choose the preferred model. The F-test is calculated based on the restricted model (L1), (L2), and (L3) against the unrestricted model (combination of L1, L2, and L3). If F-test indicates insignificant level, then the restricted model is selected. Conversely, if F-test shows significant result, then the unrestricted model is chosen.

The F-test which is utilized to select the preferred model is as follows (Gujarati et al., 2012):

$$F = \frac{\frac{RSS_R - RSS_{UR}}{m}}{\frac{RSS_{UR}}{n-k}}, \quad (8)$$

where RSS_{UR} – residual sum square of unrestricted regression, RSS_R – residual sum square of restricted regression, m – number of linear restriction or number of variable which is excluded from the restricted model, k – number of parameter in of unrestricted regression, n – number of observations.

The calculation of F-test can also be expressed in terms of R^2 as follows (Gujarati et al., 2012):

$$F = \frac{\frac{R_{UR}^2 - R_R^2}{m}}{\frac{1-R_{UR}^2}{n-k}}, \quad (9)$$

where R_{UR}^2 – the R^2 value from unrestricted regression, R_R^2 – the R^2 value from restricted regression.

It should be noted that methods of F-test calculation as (8) and (9) will produce similar value as long as the dependent variable of both restricted and unrestricted regression is the same (Gujarati et al., 2012). In general, RSS_R or R_R^2 restricted model of with k parameter is compared against RSS_{UR} or R_{UR}^2 with $k+m$ parameters, based on hypothesis $H_0 = \beta_{k+1} = \beta_{k+2} = ... = \beta_{k+m} = 0$ versus H_1 – at least $\beta \neq 0$. When F-test value is greater than or equal to the critical value, then H_1 should be rejected.

4. RESULTS AND DISCUSSIONS

4.1. Results of regressions

Table 3 exhibits the regression result of various models that describe the relationship between leverage and its determinants using cross-section fixed-effect method based on unbalanced panel full sample data; here the dependent variable is total leverage (TDMV). Model 1 to Model 3 present the relationship between debt ratio and the variables viz. firm-level (L1), industry-level (L2), and country-level (L3) as determinants. Model 4 to Model 7 are nested models by combining L1, L2, and L3 as determinants. The preferred model is selected using the artificial testing procedure (F-test) as mentioned in formulae (8) and (9).

4.2. Model selection

Table 4 exhibits the selection results of the preferred model to describe the relationship between debt ratio and determinants based on artificial testing procedure (F-test) as mentioned in formulae (8) and (9). The tests show that the preferred model based on unbalance panel full sample data sets is Model 7. In other words, by utilizing unbalanced panel full sample data, the variables from all levels viz. firm-level (L1), industry-level (L2), and country-level (L3) variable are essential to be considered as determinants of leverage.

Table 3. Regression results of the relationship models between debt ratio and its determinants – full sample data

Dep. var. TDMV	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
No. of observations	3425		3425		3425		3425		3425		3425		3425	
	t-stat.	Prob.	*t*-stat.	Prob.	*t*-stat.	Prob.	*t*-stat.	Prob.	*t*-stat.	Prob.	*t*-stat.	Prob.	*t*-stat.	Prob.
C	2.094	0.036**	26.350	0.000***	14.964	0.000***	4.770	0.000***	0.461	0.645	12.394	0.000***	1.783	0.075*
SIZE	2.163	0.031**	–	–	–	–	0.333	0.739	4.729	0.000***	–	–	3.594	0.000***
GROW	–11.314	0.000***	–	–	–	–	–11.397	0.000***	–10.304	0.000***	–	–	–10.233	0.000***
PROF	–6.706	0.000***	–	–	–	–	–6.192	0.000***	–6.747	0.000***	–	–	–6.450	0.000***
TANG	4.014	0.000***	–	–	–	–	3.434	0.001***	4.598	0.000***	–	–	4.225	0.000***
LIQU	–3.693	0.000***	–	–	–	–	–3.738	0.000***	–3.203	0.001***	–	–	–3.080	0.002***
RISK	–2.889	0.004***	–	–	–	–	–2.853	0.004***	–3.128	0.002***	–	–	–3.212	0.001***
HHIC	–	–	–3.954	0.000***	–	–	–4.293	0.000***	–	–	–5.499	0.000***	–5.349	0.000***
MUNI	–	–	–5.154	0.000***	–	–	–4.403	0.000***	–	–	–4.582	0.000***	–3.607	0.000***
DYNA	–	–	–2.266	0.024**	–	–	–1.873	0.061*	–	–	–3.517	0.000***	–3.349	0.001***
GDPG	–	–	–	–	–6.751	0.000***	–	–	–5.921	0.000***	–3.000	0.003***	–2.889	0.004***
INFL	–	–	–	–	8.473	0.000***	–	–	8.835	0.000***	10.861	0.000***	10.563	0.000***
Cross-section fixed effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R-squared	0.712	–	0.699	–	0.703	–	0.718	–	0.723	–	0.712	–	0.729	–
Adj. R-squared	0.672	–	0.657	–	0.662	–	0.678	–	0.683	–	0.671	–	0.690	–
S.E. regression	0.152	–	0.155	–	0.154	–	0.150	–	0.149	–	0.152	–	0.147	–
SSR	69.144	–	72.320	–	71.302	–	67.823	–	66.696	–	69.231	–	65.106	–
F-stat. regression	17.529	–	16.582	–	16.967	–	17.864	–	18.333	–	17.546	–	18.802	–
Prob. (F-stat)	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***

Note: This table presents the regression result of various models that describe the relationship between the dependent variable and the determinants using cross-section fixed-effect method based on full sample data. Total Debt to Total Firms Market Value (TDMV) is used as the dependent variable with a combination of firm-level (L1), industry-level (L2), and country-level (L3) as the independent variables. The construction of the explanatory variable is referred in Table 1. Model-fit statistics are reported at the bottom of the table. P-values are *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

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Table 4. Model selection of relationship between debt ratio and three level determinants – full sample data

Leverage measurement		Total leverage (TDMV)	
No. of firms		419	
No. of observations		3425	
Layer-1			
Unrestricted	**Restricted**	***F*-test**	***P*-value**
Model 7 (L1 + L2 + L3)	Model 4 (L1 + L2)	71.2226	0.0000***
	Model 5 (L1 + L3)	27.7849	0.0000***
	Model 6 (L2 + L3)	36.0346	0.0000***
Layer-2			
Unrestricted	**Restricted**	***F*-test**	***P*-value**
Model 4 (L1 + L2)	Model 1 (L1)	22.1634	0.0000***
	Model 2 (L2)	37.7327	0.0000***
Model 5 (L1 + L3)	Model 2 (L2)	62.6832	0.0000***
	Model 3 (L3)	39.3135	0.0000***
Model 6 (L2 + L3)	Model 2 (L2)	76.2823	0.0000***
	Model 3 (L3)	34.0959	0.0000***
Preferred model		Model 7 (L1+L2+L3)	

Notes: This table exhibits the result of Artifical Nested Testing Procedure (F-test) as in equation (8) and equation (9). P-values are *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

4.3. Method selection

According to Gujarati et al. (2012), the regression method of paned data can be analyzed through three methods, namely: Pooled OLS, Fixed Effect, and Random Effect. Hence, the regression method of Pooled OLS and Random Effect are also conducted by the similar way with the Fixed Effect method as in Table 3 and Table 4. Subsequently, the preferred analysis of panel regression among those methods can be selected by using three tests, namely: Chow Test (Redundant Fixed Effect – Likelihood Ratio), Breusch-Pagan test (Lagrange Multiplier Test), and Hausman Test (Correlated Random Effects).

Based on Table 5, those three tests, namely Chow Test, Breusch-Pagan Test, and Hausman Test, show significant results. Therefore, the Fixed-Effect method is favorable to be used as panel data regression.

4.4. The analysis of capital structure determinants – full sample data

As in Table 3, Model 7 demonstrates the preferred models of the relationship between debt ratio (TDMV) and its determinants (L1, L2, and L3). All level determinants have an impact on total debt ratio at 1% significance level and overall these variables explain about 73% of leverage variations.

Table 5. Preferred estimation method for panel data analysis

Tests	Results	
	Stat.	**Prob.**
Chow Test – likelihood ratio		
Cross-section F	13.8483	0.0000***
Cross-section Chi-square	3685.10	0.0000***
Breusch-Pagan for LM Test		
Cross-section random	133.254	0.0000***
Hausman Test for random effects		
Breusch-Pagan	4939.28	0.0000***
Honda	70.2800	0.0000***
Preferred estimation method	Fixed-effect	

Note: P-values are *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Firm size impacts positively on leverage, and this means the creditors are more concerned at firm size when companies need funds. This evidence confirms TOT which predicts that size positively impacts on leverage, due to the larger companies being in more stable operation and with less probability of financial distress, as well as bankruptcy (Chen & Strange, 2005; Elsas & Florysiak, 2008; Nagano, 2003). Consequently, the creditors consider them as riskless firms and charge with low cost of debt and finally encourage to utilize more leverage (Deesomsak et al., 2004). This result supports the findings by Kayo and Kimura (2011), Bilal et al. (2014).

Growth opportunity has a negative association with debt ratio, thus this result supports AT. According to POT, having higher growth opportunity, the companies lead to higher information asymmetry. Therefore, they prefer debt financing to suppress asymmetric information (Song, 2005). Meanwhile, AT predict that firms which have growth opportunity prefer low leverage to minimize the creditor's constraints imposed due to risk-shifting issues (Jensen & Meckling, 1976). This finding is in line with Kayo and Kimura (2011).

Profitability show negative impact on leverage, and this finding confirms POT which proposes that the profitable companies have more substantial internal financing resources, and POT predict that firms prefer to use internal resources then later on debt as external source of financing (Harris & Raviv, 1991; Titman & Wessels, 1988). This finding supports the results by Kayo and Kimura (2011) and Bilal et al. (2014).

Tangibility positively impacts on leverage and confirms TOT which postulates that asset structure of firms can be pledged as debt collateral; consequently, the more fixed assets of companies have, the more they can provide asset guarantee and encourage to borrow more money (Antoniou et al., 2008; Brigham & Ehrhardt 2011; Elsas & Florysiak, 2008; Frank & Goyal, 2003). This finding supports the results of studies by Bilal et al. (2014), Kayo and Kimura (2011).

Liquidity has a negative association with leverage; this finding sustains POT in which the more liquid are the companies, the more internal resources they have. Since companies have a lot of internally generated funds, POT predicts that they prefer to use it as a source of financing before using debt financing. This result confirms the results of studies by de Jong et al. (2008), Deesomsak et al. (2004).

Firms' risk negatively impacts on leverage, so this finding sustains TOT which argues that the riskier the firms' business, the higher earnings volatility or uncertainty exposed. Consequently, the cost of debt charged is higher and the firms discourage to utilize debt financing (Krishnan & Moyer, 1997). This result is in parallel with findings by Harris and Raviv (1991), Titman and Wessels (1988).

Industry concentration negatively impacts on leverage. This result supports POT and is consistent with studies conducted by Bilal et al. (2014), Kayo and Kimura (2011) in developed and emerging countries. Firms operating in high-concentrated industry tend to have higher profitability compared to firms operating in low-concentrated industry; consequently, they have more internal resources which can be used as a financing source. POT postulates that firm managers are willing to use internal fund first before utilizing external resources and the relationship is supposed to be negative (Myers & Majluf, 1984).

Munificence also negatively affects the leverage. This finding agrees with POT and is in line with results of studies conducted by Kayo and Kimura (2011) in both developed and emerging countries, and also Bilal et al. (2014) in a developed country (Spain). Firms operating in the environment abundant of resources (higher munificence level) are prone to generate more revenue and cash flow. POT predicts a negative influence of this variable on debt ratio, as the profitable companies prefer to utilize an internal source of financing (Myers & Majluf, 1984).

Dynamism negatively effects on leverage and this outcome is consistent with the results by Kayo and Kimura (2011) in the developed economies and Bilal et al. (2014) in all countries (Spain, Malaysia, and Pakistan) in their studies. The firms operating in the instability of environmental change are subject to higher risks due to higher uncertainty of revenue, higher variability of cash flow, and

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higher earnings volatility. Consequently, the costs of debt are also higher and, according to POT and TOT, this discourages firms to borrow more money (Bilal et al., 2014; Boyd, 1995; Kayo & Kimura, 2011; Simerly & Li, 2000).

GDP growth indicates a negative association with leverage, and this result is in parallel with findings by Kayo and Kimura (2011) in developed countries, but inconsistent with results of a study by Bilal et al. (2014) in Spain, Malaysia, and Pakistan. When economy is booming, prospected firms are looking for additional financing to expand their business or take advantage of good projects. Again, POT argues that firms prefer internal resources as a source of funding (Myers & Majluf, 1984). Hence, POT predicted a negative influence of this variable on leverage.

Surprisingly, inflation positively impacts on leverage, and this contradicts with studies by Booth et al. (2001), Demirgüç-Kunt and Maksimovic (1996) that inflation rate should have negative relationship with leverage, since it indirectly increases the interest rate as the additional borrowing costs. However, this result is in parallel with findings by Beck et al. (2008) as development banks are used as a source of financing. Taggart (1985) argued that in the tax savings-bankruptcy costs model, inflation could raise the deduction value of interest tax from debt utilization; therefore, inflation rate might positively affect the firms' leverage.

4.5. Further analysis across sectors

4.5.1. Model selection for across sectors

In analyzing capital structure across sectors, all of the possible models from Model 1 to Model 7 as in equation (1) to equation (7) should be regressed for each sector. For the sake of conciseness, the regression results using seven models for eight sectors are not presented here and kept by the authors.

The results of F-test as in Table 6 exhibit the preferred model of each sector, which describes the relationship between debt ratio and its determinants, i.e., a combination of firm-level (L1), industry-level (L2), and country-level covariates (L3). The tests show that the preferred models for each sector or industry are different from other sectors, this indicates that sectorial behavior has a crucial role in leverage determination.

4.5.2. The result of regression based on the preferred model across sectors

Table 7 exhibits the relationship between debt ratio and its determinants (combination of L1, L2, and L3) across sectors or industries based on the preferred model as results of F-test as in Table 6. It exhibits that sign and magnitude of determinant impacts on leverage are varied across sectors, as suggested by Booth et al. (2001). The impacts of these determinants on debt ratio react differently across industries. This result indicates that sectorial behavior is relevant and it should be considered in analyzing the association between debt ratio and determinants.

Firm size impacts positively on leverage across the agriculture, property, infrastructure, and trade and service sectors; while the firms in consumer goods industry impact negatively on debt ratio. The rest of the sector, such as the mining, basic industry, and miscellaneous industry do not show significant effects on leverage, though the sign of relation is positive. The positive relationship confirms TOT (Chen & Strange, 2005; Deesomsak et al., 2004; Nagano, 2003; Song, 2005), whereas the negative association supports POT (Smith & Warner, 1979; Titman & Wessels, 1988).

Growth opportunity indicates a negative relationship with debt ratio among all sectors, though the firms in consumer goods industry show an insignificant result. The negative association between growth opportunity and debt ratio confirm AT (Booth 2001; Kayo & Kimura, 2011; Rajan & Zingales, 1995).

Profitability has a negative correlation with leverage for all sectors, except for firms in the customer goods industry and trade and service that indicate insignificant results. The negative impact of this variable on leverage supports POT (Schoubben & Hulle, 2004).

The relationship between tangibility and leverage is positive across all sectors, although the firms in mining, miscellaneous industry, and consumer goods in-

dustry exhibit insignificant results. The positive association between tangibility and leverage confirms TOT (Elsas & Florysiak, 2008), while the negative relationship supports POT (Schoubben & Hulle, 2004).

Liquidity shows a negative influence on debt ratio across the miscellaneous industry, consumer goods industry, infrastructure, as well as trade and service sectors; but the property firms show a positive impact of this variable on debt ratio. The negative influence of leverage on debt ratio supports POT (Deesomsak et al., 2004); meanwhile the positive association probably firm's debt consumption inclines as liquidity level amplifies the debt service coverage ratio (Anderson, 2002).

Firm's risk indicates a negative association with debt ratio among the infrastructure sector; but surprisingly, it shows the positive correlation among the trade and service sector. The negative impact of firm's risk on debt ratio supports TOT (Krishnan & Moyer, 1997; Titman & Wessels, 1988), AT (Harris & Raviv, 1991) and POT (Myers, 2001). Meanwhile, the positive influence of this variable on debt ratio contradicts with TOT, AT, and POT, according to the results of a study by Correa, Basso, and Nakamura (2007).

Industry concentration has the same direction with leverage across the agriculture, property, and trade and service sectors; but it has an opposite direction with leverage across the mining, miscellaneous industry, and Infrastructure firms. The positive association between industry concentration and leverage supports TOT and AT, while a negative relationship confirms POT. This association is mainly because the firms operating in high-concentrated industry prone to higher profitability than those in low-concentrated industry are (Mackay & Phillips, 2005). TOT predicts that the more firms generate profit, the higher their debt capacity. So, they encourage to borrow new debts due to the cheaper cost of debt and other tax advantages (Pettit & Singer, 1985). AT argues that debt financing is needed to discipline managers (Jensen & Meckling, 1976). POT suggest that firms with higher profitability level have larger internal financing sources, so their financing need from external sources are less (Schoubben & Hulle, 2004).

Munificence is found to be negatively related to leverage across the agriculture, mining, and trade and service sectors; while it positively influences leverage among the infrastructure firms. The positive influence of munificence on leverage support TOT and AT, while negative correlation promotes POT. According to Dess and Beard (1984), firms operating in high munificence environment have abundant resources, the level of competition amongst firms within an industry is low, and consequently, their profitability tends to be high. Expanding firm-level prominent capital structure theories into the industry-level variables (Kayo & Kimura, 2011), then TOT and AT predict negative relationship, whereas POT suggests a positive association between munificence and leverage.

Dynamism impacts negatively on leverage across the miscellaneous industry and trade and service sectors, but strangely, it positively influences on leverage among the agriculture sector firms. The negative association between dynamism and leverage supports TOT, AT, and POT; this is because firms operating in given industry experience similar instability of environmental change (Simerly & Li, 2000) and profit instability or volatility tend to reduce level of leverage due to increasing financial distress (Ferri & Jones, 1979).

GDP growth has a negative association with leverage across the miscellaneous industry, property, and infrastructure firms, while the remaining sectors show an insignificantly negative influence of this variable on debt ratio. This finding supports POT in which as the economic condition is growing, firms are looking for the source of financing to expand their business, and POT argue that firms prefer to utilize internal resources in their project financing (Myers & Majluf, 1984).

Peculiarly, inflation rate positively influences on leverage across the mining, basic industry, property, and trade and service firms; whereas the rest of sectors show insignificantly positive effects of this covariates on debt ratio. The positive correlation of this variable and debt ratio due to the nominal value of tax advantage from debt utilization is higher than inflation premium, which is accounted in interest rate components (Taggart, 1985), so firms prefer to use debt financing.

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Table 6. Selection of preferred relationship model between debt ratio and its determinants – across sectors

Sector		1_AGRI		2_MINI		3_BASI		4_MISC		5_CONS		6_PROP		7_INFRA		8_TRADE	
Dependent variable		**TDMV**		**TDMV**		**TDMV**		**TDMV**		**TDMV**		**TDMV**		**TDMV**		**TDMV**	
No. of observations		**169**		**350**		**508**		**342**		**332**		**473**		**369**		**882**	
Layer-1		**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**
Unrestricted	Restricted																
L1 + L2 + L3	L1 + L2	2.139	0.121	4.976	0.007***	2.618	0.074*	3.682	0.026**	1.710	0.183	12.657	0.000***	5.261	0.006***	19.278	0.000***
	L1 + L3	2.890	0.037**	10.247	0.000***	1.555	0.200	6.230	0.000***	1.855	0.137	4.500	0.004***	5.924	0.001***	6.361	0.000***
	L2 + L3	5.500	0.000***	4.234	0.000***	11.478	0.000***	16.001	0.000***	6.971	0.000***	13.184	0.000***	21.740	0.000***	14.076	0.000***
Layer-2		**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**	**F-test**	**Prob.**
Unrestricted	Restricted																
L1 + L2	L1	4.050	0.008***	10.687	0.000***	4.701	0.003***	10.339	0.000***	1.951	0.121	8.330	0.000***	2.785	0.041**	13.277	0.000***
	L2	5.551	0.000***	5.231	0.000***	11.642	0.000***	17.251	0.000***	7.081	0.000***	12.307	0.000***	21.107	0.000***	58.941	0.000***
Unrestricted	Restricted																
L1 + L3	L1	1.503	0.192	2.204	0.054*	2.926	0.013**	3.822	0.002***	0.734	0.599	7.396	0.000***	0.249	0.940	11.933	0.000***
	L3	7.165	0.000***	6.990	0.000***	11.013	0.000***	15.831	0.000***	6.527	0.000***	15.975	0.000***	22.307	0.000***	14.081	0.000***
Unrestricted	Restricted																
L2 + L3	L2	0.853	0.514	3.128	0.009***	1.179	0.318	2.585	0.026**	0.762	0.577	4.085	0.001***	1.437	0.210	59.008	0.000***
	L3	5.905	0.001***	15.978	0.000***	0.734	0.532	6.005	0.001***	1.067	0.363	9.466	0.000***	6.853	0.000***	6.392	0.000***
Preferred model		**Model 4 L1 + L2**		**Model 7 L1 + L2 + L3**		**Model 4 L1 + L2**		**Model 7 L1 + L2 + L3**		**Model 1 L1**		**Model 7 L1 + L2 + L3**		**Model 7 L1 + L2 + L3**		**Model 7 L1 + L2 + L3**	

Note: This table shows the result of artificial nested testing (*F*-test) to select the preferred model for total leverage measurement (TDMV) based on the unbalanced panel for each sector data set. *P*-values are *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Table 7. Regression results of preferred relationship model between debt ratio and its determinants – across sectors

Sector	1_AGRI		2_MINI		3_BASI		4_MISC		5_CONS		6_PROP		7_INFRA		8_TRADE	
Preferred model	Model 4 L1 + L2		Model 7 L1 + L2 + L3		Model 4 L1 + L2		Model 7 L1 + L2 + L3		Model 1 L1		Model 7 L1 + L2 + L3		Model 7 L1 + L2 + L3		Model 7 L1 + L2 + L3	
No. of observations	169		350		508		342		332		473		369		882	
	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.
C	–2.492	0.014**	1.697	0.091*	–0.792	0.428	1.618	0.107	3.211	0.002***	–0.511	0.609	–2.370	0.018**	–2.958	0.003***
SIZE	2.545	0.012**	0.143	0.887	1.153	0.249	0.786	0.433	–2.539	0.012**	1.871	0.062*	5.412	0.000***	4.950	0.000***
GROW	–2.272	0.025**	–3.330	0.001***	–5.146	0.000***	–2.487	0.013**	–0.425	0.672	–6.162	0.000***	–5.651	0.000***	–6.223	0.000***
PROF	–2.857	0.005***	–3.034	0.003***	–4.623	0.000***	–4.844	0.000***	–0.140	0.889	–3.870	0.000***	–6.042	0.000***	–0.215	0.830
TANG	1.808	0.073*	0.188	0.851	1.619	0.106	0.408	0.684	0.349	0.727	2.126	0.034**	4.955	0.000***	4.022	0.000***
LIQU	–0.705	0.482	–0.611	0.542	–1.693	0.091*	–7.004	0.000***	–5.575	0.000***	1.767	0.078*	–3.503	0.001***	–0.505	0.614
RISK	0.585	0.560	0.864	0.389	–1.010	0.312	0.167	0.868	–1.136	0.257	–0.597	0.551	–3.192	0.002***	2.179	0.030**
HHIC	1.878	0.062*	–1.766	0.079*	3.104	0.002***	–1.951	0.052*	–	–	1.912	0.057*	–3.192	0.002***	2.057	0.040**
MUNI	–3.168	0.002***	–2.944	0.004***	1.234	0.217	0.554	0.580	–	–	–0.450	0.653	3.668	0.000***	–1.420	0.156
DYNA	2.269	0.025**	0.355	0.723	–0.261	0.793	–2.458	0.015**	–	–	–0.972	0.332	–0.774	0.439	–2.237	0.026**
GDPG	–	–	–0.729	0.466	–	–	–1.995	0.047**	–	–	–2.038	0.042**	–2.836	0.005***	–1.001	0.317
INFL	–	–	2.883	0.004***	–	–	0.464	0.643	–	–	3.737	0.000***	0.854	0.394	5.499	0.000***
R-squared	0.811	–	0.694	–	0.817	–	0.816	–	0.706	–	0.662	–	0.670	–	0.687	–
Adj. R-squared	0.771	–	0.639	–	0.788	–	0.786	–	0.665	–	0.608	–	0.604	–	0.636	–
S.E. regression	0.118	–	0.161	–	0.141	–	0.134	–	0.113	–	0.121	–	0.160	–	0.143	–
SSR	1.927	–	7.689	–	8.740	–	5.289	–	3.684	–	5.954	–	7.860	–	15.424	–
F-stat. regression	20.550	–	12.639	–	28.353	–	27.655	–	17.450	–	12.262	–	10.040	–	13.295	–
Prob. (F-stat)	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***

Note: This table presents the regression result of preferred models for each sector (see Table 5) that describe the relationship between total leverage measurement (TDMV) and the determinants using cross-section fixed-effect method based on unbalanced panel data. The construction of the explanatory variable is referred in Table 1. Model-fit statistics are reported at the bottom of the table. *P*-values are *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

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CONCLUSION

Since past literature of capital structure mostly emphasized on the firm- and country-level covariates, this study also highlights industry-level variable viz. industry concentration, munificence, and the dynamism, which may influence on firm's leverage. This study also analyzes the relationship of three-level determinants viz. firm level, industry-level, country-level and leverage, both full sample and across sectors. Hence, we investigate Indonesian listed companies as pilot of a study.

Model selection analysis shows that firm-level covariates are persistently considered as primary determinants. Artificial nested testing (F-test) selects preferred models that can be implemented in full consolidated sample, as well as across sectors data sets. Results of analysis on unbalance panel full sample data exhibit that those three level determinants explain the variation of total leverage about 73%. Meanwhile, further study of capital structure across sectors shows that each industry has different combinations of those three level determinants, which may influence on debt ratio structure. Moreover, the sign of relationships and magnitude of impacts of those variables on leverage are varied across sectors. This study also confirms previous literature that financing behaviors across sectors or industries differ from each other.

This study findings strongly confirm that the influence of three level determinants varies across sectors, which is attributable to diversity of the sectoral behaviors. The indirect impacts of sector characteristics on these determinants are observable via the changes of sign and the coefficients magnitude of covariates across industries.

Firstly, the majority of firm debt ratio is highly dependent on growth opportunity and followed by profitability. These covariates seem to be the most essential variables relating to leverage and consistently maintain a negative relationship with a debt ratio, although their sensitivity varies across sectors.

Secondly, the associations between leverage and explanatory variables are likely to be persistent, although some of them indicate a different orientation. For example, firm size impacts positively on leverage across all sectors, except for the consumer goods industry firms.

Thirdly, the mechanism between the leverage and firm size shows positive correlation and remains consistent with TOT. Similarly, the positive sign of tangibility with leverage financing also sustains the applicability of TOT. Alternatively, profitability, risk, and liquidity sustain the POT. Also, growth opportunity shows a negative relationship with leverage and strongly confirms AT.

Additionally, industry-level variables are important and indicate essential effects on debt ratio across sectors. The industry concentration is positively responsive to leverage among the agriculture, basic industry, property, and trade and service sectors. However, this variable negatively impacts on leverage among the mining, miscellaneous and infrastructure sectors. The industry munificence becomes the important variable across the agriculture and mining sectors and maintains a negative relationship with leverage, although it positively impacts on leverage among the infrastructure firms. Lastly, industry dynamism impacts negatively among the miscellaneous industry and trade and service sectors, but this variable affects positively across the agriculture firms.

Last but not least, GDP growth rate is persistently considered an essential factor and maintains a negative relationship with leverage across the miscellaneous industry, property, and infrastructure firms, while the inflation rate consistently maintains a positive relationship with leverage across the mining, property, and trade and service sectors.

CONTRIBUTION

From the theoretical point of view, these empirical findings confirm previous literature and prominent financial structure theories, among others, the TOT, POT, and AT. The implementation of those capital structure theories diverges among sectors, which is attributable to various sectoral behavior or characteristics of each sector in the Indonesian context.

From a practical point of view, this study offers useful guidelines for managers in considering a set of debt ratio determinants appropriately for the concerned sectors in the process of firm financial decision making. Likewise, for the financial institution, this study provides a recipe for the strategic lending mechanism by knowing firm's position in a pertaining sector and variables that may influence on borrowing policy of each sector.

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