

## **DETERMINANTS OF CAPITAL STRUCTURE ANALYSIS: EMPIRICAL STUDY OF TELECOMMUNICATION INDUSTRY IN INDONESIA 2008-2015**

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*Abstract. The capital structure is an essential element in the firm's long-term financial strategic decision. Generally, the firm's management tends to create leverage with the optimal capital structure as the target. The optimal capital structure reflects proportional number of debt and equity to maximize the return on investment and firm's value alongside minimizes the cost of capital that directly protects the firm from any potential risks such as bankruptcy and financial distress. Many studies have been discovered the contemporary capital structure theory which helps the firms to understand financing behavior with the capital structure determinants. But, these theories also proposed different hypotheses/assumptions regarding the capital structure. The result of those studies does not lead to a concurrence for the specific factors that affect the capital structure so that the theories cannot perfectly explain the ideal financing decisions. Therefore, this research focuses on investigating the capital structure regarding the MoF (Minister of Finance) regulation No. 169/PMK.010/2015, the government limits the Debt to Equity Ratio ("DER") maximum of 4:1 which effective for Fiscal Year 2016. One of the industries that will be restructured their capital is telecommunication. They had an important role as one of the key industries in Indonesia. This final project reviews the capital structure theories to formulate testable hypotheses regarding the determinants of capital structure. The panel data econometric techniques are used to investigate the most significant factors that affect the capital structure of telecommunication industry in Indonesia which represented by five listed telecom firms with the largest market capitalization in Indonesia Stock Exchange (IDX) during 2008-2015. The final project processes the data from secondary sources to be tested in a statistical software STATA.11. The result shows 68.5% variation of the dependent variables (leverage/TDR) of capital structure as a whole can be explained by the variables in the model such as profitability, size, tangibility, liquidity, risk, the effective tax rate, ownership, interest rate and GDP, while the remaining 31.5% is influenced by other variables outside the system. The final project suggests the most significant factors that affect the capital structure such as size, tangibility, liquidity, risk, interest rate, GDP and ownership which consistent with some capital structure theories. It is suggested for managers in the telecommunication industry in Indonesia to consider those factors when restructuring their capitals or others financial decision. However, the optimal capital structure variable evidently does not affect the firm's value in industry level. The result indicates that firm value independent of the capital structure due to behavioral factors of the investors in Indonesia who tend to ignore the fundamental factor(s) of the firm.*

Keywords: *Indonesia's telecommunication industry, capital structure, leverage, value of the firm*

### **Introduction**

Damodaran (2006) states the capital structure is one of the three major principles in financial management decisions; together with investment and dividend (Sartono, 2001). Capital structure is the mix of debt and equity that a firm uses for its financing (Zerriaa and Noubbig, 2015). Generally, the firm's management tends to create leverage with the optimal capital structure as the target. They combines the proportional number of debt and equity to maximize the return on investment and firm's value while minimizes the cost of capital; and also protects the firm from

any potential risks such as bankruptcy and financial distress; therefore, the optimal capital structure is very important for every firm (Youssef and El-ghonamie, 2015)<sup>1</sup>.

The capital structure has the policy to determine the amount and the type of debt that will be used with equity (Bubic & Susak, 2015). In Indonesia itself, The Ministry of Finance (MoF) reforms and limit the number of debt to equity ratio from 3:1 to 4:1 which effective for Fiscal Year 2016 after being postponed 31 years since 1985<sup>2</sup>. This regulation will be implemented in all industry except financial services, infrastructure, oil and mining industry, and others exception that had regulated in The Ministry of Finance Regulation No.169/PMK. 010/2015.

One of the industries that will restructure their capital is telecommunication. This industry had an important role as one of the key industries in Indonesia. Over 300 million subscribers have supports Indonesia's telecommunication industry to become the 4<sup>th</sup> largest mobile market in the world and the 3<sup>rd</sup> higher mobile penetration in Asia<sup>3</sup>. In 2008-2010, together with transportation, telecommunication becomes the largest contributor to the Indonesia's GDP based on sector. However, this industry's GDP contribution significantly decreases 7%-11% in 2011-2014.

In 2011-2014, telecommunication also counted as one of the largest foreign direct investment realization based on sector (50,720 Billion IDR)<sup>4</sup>. In the 4<sup>th</sup> quarter of 2015, the business tendency index from this industry also shows the increase point from 111.32 up to 118.37 in 2011<sup>5</sup>. Mason Analysis estimates the penetration rate of 100% which reached 158% at the end of 2019, up from 325 million in 2013 to 411 million subscribers in 2019 (Britama.com, 2015)<sup>6</sup>. This is the highest growth level compare to other industry. A faster-than-expected industry offers better profitability and a promising industry outlook for the key industry players. In order to support the industry competitiveness, the government creates budgeting allocation through national medium-long term development plan 2015-2019 that shows the private firms in this industry require larger capital than state-owned firm (8:1).

To fulfill the capital structure needs, Indonesia's stock exchange facilitates them to finds appropriate financing and funding such as debt and equity. In the last decades, most of the firms in this industry always counted as top leading market capitalization in Indonesia's Stock Exchange (IDX). Most of the firm in this industry creates significant debt financing for business expansion, merger, and acquisition. However, the aggressive leverage possibly leads the firms to negative industry outlook (e.g. XL-AXIS, Smart-Mobile 8 Telecom, Telkomsel-Bakrie Telecom, etc.)<sup>7</sup>. The highest and the lowest leverage made by Bakrie Telecom (BTEL) with the maximum leverage level at 2.31 and the minimum leverage around 0.35. This result shows that higher ratio indicates the higher degree of financial risk on its debt because the number of debt larger than the number of assets.

In line with the financial objectives, the financial managers tend to create the optimal capital structure to maximize firm value. The optimal leverage was reflected on its feasible minimum debt to assets ratio that equals to the maximum market value of a firm. The Indonesian telecom firms show significant differences among state owned and private firm. The highest level of optimal leverage in this industry is PT XL Axiata Tbk and the lowest one is PT Telekomunikasi Indonesia Tbk. Su (2010) and Huang & song (2006) argues that the government-controlled firms use less debt financing (Alipour et al., 2015).

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<sup>1</sup> See, also (Mohammad Alipour, 2015) and (Simerly and Li, 2015).

<sup>2</sup> Based on Ministry of Finance Republic of Indonesia No. 169/PMK. 010/2015. On 9 September 2015, The Minister of Finance ("MoF") set new regulation of DER (Debt to Equity Ratio) regarding finance expenses that can be deducted when calculating corporate income tax payable.

<sup>3</sup> Redwig-Asia, Asean Today, SpirE-research, retrieved March 23, 2016

<sup>4</sup> Industry Facts and Figures, Ministry of Industry Republic of Indonesia, 2012 p.14, p.47, p.54, and p.61.

<sup>5</sup> Business Tendency Index 2015, BPS accessed in April 28, 2016 at 03:15 PM

<sup>6</sup> Mason analysis: Telecommunication & Media Specialists

<sup>7</sup> XL use debt financing for the M&A and services the debt by sell and lease-back of 3,500 tower assets for IDR5.6tn with tower lease rentals below the market average (Reuters, 2014). Smart Telecom acquired Mobile 8 Telecom, Telkomsel acquired Bakrie Telecom and merging (Telkomflexi) (The Report: Indonesia, 2013 : Economy, Banking, Energy, Transport, p. 248)

The capital structure decision may influence the firm's risk profile, financial strategy, the cost of financing/funding is, and the expected return for the debtholders/investors. Many studies have been discovering the contemporary capital structure theory. The capital structure theories also help the firms to understand financing behavior with all potential variables that could affect to its capital structure. But, these theories also proposed different hypotheses/assumptions regarding the capital structure. So that, the result of those studies does not lead to a concurrence for the specific factors that affect the capital structure.

Relate to the explanation above, the authors has an interest to investigate the capital structure determinants of telecom industry in Indonesia due to the newest DER regulation. This paper reviews conditional capital structure theories to formulate testable hypotheses regarding to the determinants of capital structure such as Modigliani & Miller Theory, Pecking Order Theory, Trade-Off Theory, Agency Theory, Signalling Theory, Market Timing Theory and Free Cash Flow Theory. Moreover, the existences of theoretical differences on the capital structure in the prior research becomes a few reason the needs of further investigation in this research.

The authors proxies Total Debt Ratio (TDR) as the capital structure which can define the leverage level by comparing the total debt to financing its total assets. The panel data econometric techniques are used to investigate the most significant factors that affect to the capital structure of telecommunication industry in Indonesia which represented by five listed telecom firms with the highest market capitalization in Indonesia Stock Exchange (IDX) during 2008-2015. The authors collects the data from the secondary data such as quarterly report, financial statement and another published report that related to this research. The empirical analysis has processed by using STATA.11 statistical software.

The result suggests the most significant factors that affect to the capital structure are size, tangibility, risk, interest rate, gdp and ownership which consistent with some capital structure theories. In industry level, value of the firms does not affected by optimal capital structure variable. Therefore, it is suggested for managers in the telecommunication industry in Indonesia to consider those factors when restructuring their capitals or others financial long term decision. However, the optimal capital structure variable evidently does not affect the firm's value in industry level. The result indicates that firm value independent of the capital structure due to behavioral factors of the investors in Indonesia tend to ignore the fundamental factor(s) of the firm.

This paper is organized by systematic writing analysis as follows: In section 1, the authors brings a brief rational explanation regarding to the context of capital structure in Indonesia's telecommunication industry; Section 2, the authors presents the literature review and capital structure determinants; section 3 shows the research methodology; section 4 presents the results of empirical analysis; section 5 discusses the findings; and section 6 summarizes the findings and recommendation.

## Literature Review

The capital structure is one of the important areas in the long-term financial strategic decision which is has huge impact to the firm value.

*"The capital structure is the mix of long-term debt and equity maintain by the firm that can be affect to firm risk and return"* (J.Gitman, 1997, p. 468).

In other proxies, capital structure is also defines as the mix of debt and equity that a firm uses for its financing (Zerriaa and Noubbigh, 2015).

*"The optimal capital structure is when the capital structure at which weighted average cost of capital is minimized, thereby maximizing the company's value"* (Gitman and Zutter, 2010, p. 358)

The optimal capital structure can be measured by minimizing WACC that will allow the company to undertake a large number of profitable projects and increase the value of the firm at the same time. On the other hand, Sheikh and Wang (2011) argue that there is still no specific and undeniable method for the financial managers to determine the optimal capital structure. It is not yet possible to provide a precise methodology for the financial managers to determine the optimal capital structure. The needs of scenario plans of capital structure make the method less accurate because the optimal composition on the reality can be searched by trial and error (Hermanto, 1999). Generally, firm uses leverage as the optimal capital structure instrument to increase the return on investment and also maximize firm's value. In the real world, there are variables that have different impact to return on capital (decision) such as tax benefits, probability of bankruptcy, agency costs, and asymmetric information. Numerous classical theories also prove the evidence of capital structure effect toward company value. This research discusses few capital structure theories to elaborate the knowledge regarding to the topic. However each theory has different emphasizes and assumptions. Hence, these theories cannot perfectly explain the ideal financing decisions. Many researchers have been proposed capital structure and still evolve comprehensively.

#### *Capital Structure Theories*

The contemporary capital structure theories initially developed by Modigliani and Miller (1958) who has illustrated two theoretical models. First, irrelevance proposition or **MM I (1958)** show the capital structure does not affect the firm's value. This model assumes that perfect market has zero transaction costs or bankruptcy costs, the capital market is efficient, and the information is symmetry both in the internal or external organization; therefore, the leverage does not affect the market value of the firm and this irrelevance proposition assumes that a firm's total market value is independent of its capital structure. Second, **MM II (1963)** reviews the prior model then suggests tax and growth factors, also the more debt has to be used in the capital structure to create tax advantages that maximize firm's market value. But, this assumption ignores the increasing level of risks on debt which make this model less attractive (Youssef and El-ghonamie, 2015). This relevance proposition assumes that a firm's cost of equity increases linearly with its debt to equity ratio. Furthermore, Miller (1977) investigates three tax rates which affect to the market value of the firm. He has concluded, indeed after considering taxes factor, the capital structure does not affect the firm's value. On the other side, the debt tax shield can be substituted by non-debt tax shields from investment credit tax, depreciation and amortization deductions which also reduce debt financing (Deangelo and Masulis, 1980). Scott (1977) argues that bankruptcy costs also limit the benefit of potential interest tax shields and limit borrowing consequently (Zerriaa and Noubbigh, 2015).

After Modigliani and Miller proposed MM theory, many researchers conduct empirical studies regarding the capital structure. Donalson (1961) firstly introduced trade-off theory (TOT), and then Jensen and Meckling (1976) develop this theory comprehensively. They had predicted the positive relationship between the capital structure and the variables such as profit, size, collateralized assets and growth. The managers tend to choose the mix of debt and equity that achieves a balance between the tax advantages on debt and the various costs of financial leverage (Alipour et al., 2015). The firm borrowing debt to the point when an extra dollar of taxes saving from its debt is exactly equal to the cost of debt which increased the financial distress risk level (Youssef and El-ghonamie, 2015). Kraus and Litzenberger (1973) argues that optimal capital structure reflects a single period of the trade-off between the tax advantages of debt financing and the deadweight costs of bankruptcy risk (Koksal and Orman, 2015).

Myers (1984) proposed pecking order theory (POT) which emphasizes the financing hierarchy on the capital structure decision. Myers (1984) and Myers and Majluf (1984) argues that pecking order theory suggests the firms follow a financing hierarchy to reduce the asymmetric information

problem between insiders and outsiders (Koksal and Orman, 2015). Alipour et al., (2015) argues POT has rejected the optimal capital structure existences because this theory proposed the pecking order in corporate finance decisions. The order in which funds are raised is retained earnings first, then debt, then convertible debt and preference shares, and last, new issues of equity.

Baker and Wurgler (2002) initially proposed the market timing theory (MTT), this theory states that the capital structure is depends on the stock performance and bond market conditions (Zerriaa and Noubbig, 2015). This theory suggests that financing choices follow timing behavior. The firms issue the stock when their market value is high and vice versa. This theory help to explain the factors that may affect the capital structure decision such interest rate (Frank and Goyal, 2004). The interest rate on debt is lower than dividend rate due to risk element which makes the debt capital becomes the cheaper financing source.

According to Berle and Means (1932), **the agency theory (AT)** states that the capital structure decision results allow the agency problem which means there is the reconciliation of conflict of interests between the shareholders/bondholders and the managers. The capital structure decision can affect the firm's value by the way the managers make the decision and shareholders supervise the funding behaviors of the managers. The higher monitoring activity of the managers, the higher agency costs will be. The firm should determine the optimal structure of ownership to reduce the agency costs.

Jensen (1986) discussed **the free cash flow theory (FCFT)** and argues there is the potential conflict of interest between managers and stockholders. This theory states the aim of firm's debt financing is to reduce the incentives of cash balance and misappropriation of firm's free cash flow and eliminates organizational inefficiency; also debt financing reduces the agency cost by forcing the management to work efficiently in order to service the debt and protect the firm from bankruptcy risks.

Also, **the signaling theory (ST)** illustrates the effect of asymmetry information between management and investors toward the capital structure. This theory illustrates the way managers use the debt financing as signals to communicate the firm's risks and profitability to the external parties such investors (Ross, 1977).

2.2 Leverage as Capital Structure Proxy and Optimal Leverage as Optimal Capital Structure Proxy  
In the prior research, Frank and Goyal (2009) have been investigating 36 variables which predicted to be correlated with US firms leverage decisions<sup>8</sup>. Due to the differences of variables definition in determinants of capital structure, there are so many kinds of debt ratios definition that can be adopted<sup>9</sup>. The capital structure definition depends on the analysis objectives (Rajan and Zingales, 1995). According to explanation above, the authors proxies Total Debt Ratio (TDR) as the capital structure which can define the leverage level by comparing the total debt to financing its total assets.

The firm's management chooses ideal proportion between debt and equity on the capital structure to maximize value of the firm and minimize the cost of capital; that known as the optimal capital structure. The right financial leverage decision possibly creates interest tax shield benefits and stock value from its increases total return to the investors (net income paid to the shareholders and the interest paid to the debtholders) which increase value of the firm and reduce the cost of capital. But, increasing debt in the capital structure beyond acceptable limit will

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<sup>8</sup> see, also, Koksal and Orman (2015)

<sup>9</sup> For example, Alipour et al. (2015), Koksal and Orman (2015), Li et al. (2015) use STDR, LTDR, and TDR to define the capital structure. Then, Youssef and El-ghonamie (2015) only use LTDR and TDR. While, Chadha and Sharma (2015) is only use DER for the definition. See, also, Bubic and Susak (2015) define the capital structure with LTDR and DER. Sitorus et.al (2014) argues that a firm should choose its debt-equity ratio in such a way that it maximizes the value of the firm.

possibly lead the firm to the financial risks/financial distress e.g. bankruptcy. Generally, the firm's management used financial leverage to control its cost of capital risk. Therefore, the financial management tends to maintain leverage and create the optimal capital structure by minimizing cost of capital to maximize the firm value<sup>10</sup>. In this paper, the authors define optimal capital structure with the optimal leverage (TDR<sub>2</sub>) as the quadratic equation of its capital structure. The authors formulate the model as follows:

$$LEV = f( PROF, SIZE, TANG, LIQ, RISK, ETAX, IR, GDP, OWN)$$

**Equation 2-1 Leverage as capital structure proxy**

$$v = \alpha + \beta TDR + \delta TDR^2 + \beta IR + \beta GDP + \beta OWN + \theta t + \varepsilon$$

**Equation 2-2 Quadratic Equation of Optimal Leverage (TDR/MV Approach)**

**Determinants of Capital Structure**

Many studies have been investigated the capital structure in different industries across the countries which tested by using different measurement/approach on particular variables such as profitability, size, tangibility, liquidity, risk, effective tax rate, ownership, interest rate, and gdp growth rate, etc. (e.g. Alipour et al., 2015)<sup>11</sup>. So that, the authors adopts the capital structure determinants from the prior research.

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**Firm-Specific Determinants**

The capital structure theories are used to define the capital structure determinants. The previous researches about capital structure suggest these micro-specific factors as important variables in the capital structure determinants such as profitability, size, asset structure (tangibility), liquidity, risk (volatility), and tax. In addition, this research also included macro-specific variables such as interest rates and GDP. Also, this research is using the dummy variable to control the effect of ownership between state and the private firm on capital structure.

**Profitability**

Profitability often considered on financial management decision. Profitability determines the firm's ability in generating profits effectively. Firms with a large number of profits are potentially used more debt to their capital structure and the existence of asymmetry information in profitable firms reflects a positive sign to show their quality through debt. *The tradeoff theory* and *agency theory* estimates the positive relationship between profitability and debt ratios. Firms with high-level profits confidence to utilize more debt and used the benefit of tax shields on debt interest payment because they have the less bankrupt risk (Alipour et al., 2015)<sup>13</sup>. In the prior research, Sitorus et al. (2014) confirm that profitability is a significant factor that affects the Indonesian telecom capital structure<sup>14</sup>.

In contrary, *pecking order theory* suggests firms with high profitability to utilized their internal financing such retained earnings to generates profits than used more external financing such as issuing debt or stock equity. This theory indicates the negative relationship between profitability and debt ratios. According to Zerriaa and Noubbigh (2015), many researchers suggest the negative relationship between profitability and financial leverage (debt ratios)<sup>15</sup>. Fattouh et al.

<sup>10</sup> Cost of Capital is the financing cost and its minimum rate of return that a project/investment must earn to increase firm value (Gitman and Zutter, 2010).  
<sup>11</sup> See, also, Youssef and El-ghonamie (2015), Zerriaa and Noubbigh (2015), Koksai and Orman, 2015; Sitorus et al. (2014), Sheikh and Wang (2011); Hadianto (2007), and so on).  
<sup>12</sup> For example profitability, size, tangibility, liquidity, risk, effective tax rate, ownership, interest rate, and gdp growth rate, etc. (e.g. Alipour et al., 2015) See, also, Youssef and El-ghonamie (2015), Zerriaa and Noubbigh (2015), Koksai and Orman, 2015; Sitorus et al. (2014), Sheikh and Wang (2011); Hadianto (2007), and so on).  
<sup>13</sup> See, also, (Karadeniz et al., 2009)  
<sup>14</sup> Sitorus et al. (2014) measure the capital structure by using Debt to Equity Ratio. See also, Sheikh and Wang (2011), Ezeoha (2011), Abor and Biekpe (2009), Karadeniz et al., 2009; Ezeoha (2008), Viviani (2008), Rajan and Zingales (1995).  
<sup>15</sup> See, also, Sheikh and Wang (2011), Rajan and Zingales (1995), Titman and Wessels (1988), Myers (1984), Myers and Majluf, 1984).

(2005) found the negative relationship between profitability and debt ratios (Youssef and El-ghonamie, 2015)<sup>16</sup>.

*H1. There is a positive relationship between profitability and capital structure*

#### *Firm Size*

*The trade-off theory and the agency cost theory* suggest a positive relationship between the firm's size and its debt ratios. These theories assume that the large firms have the capacity to borrow more debt and diversified the risk to protect the firm from financial distress (Sheikh and Wang, 2011). The size of the firm is predicted to be positively affecting the capital structure. Firms with large size are less risky to bankrupt, so they tend to use more debt financing. The large firms have large debt capacity because they have easy access to borrow rather than small firms (Sayilgan et al., 2006). In line with *the trade-off theory*, debt ratio has a positive relationship to the size of the firm. According to Titman and Wessels (1988), larger firms are enabled to tolerate higher debt ratio because they have lower earnings volatility. Koksai and Orman (2015) suggests sales define the size as the natural logarithm to avoid multicollinearity since many variables (dependents and independents) scaled by total assets<sup>17</sup>. On the contrary, *the pecking order theory* suggests the negative relationship between firm's size and debt ratios. Generally, large firms tend to less to borrowing debt due to the firm's capabilities to issuing new stock. So that, the cost of capital for the large firms should be lower than the small firms (Rajan and Zingales, 1995)<sup>18</sup>.

*H2. There is a positive relationship between firm size and capital structure*

#### *Tangibility*

*The trade-off theory and the agency cost theory* predict the positive relationship between tangibility and debt ratios. Karadeniz et al. (2009) state the firm with the safe tangible assets tends to use more debt in their capital structure rather than the firm with risky intangible assets<sup>19</sup>. Myers and Maljuf (1984) states that firm with a large number of tangible assets, the firm could easily borrowing debt because its tangible assets could be collateralized to guarantee the debt. According to *the signaling theory*, although the firms have a large number of total assets, issuing debt could be a positive signal for the investors. Zoo and Xiao (2006) and Qian and Wirjanto (2007) confirms the positive relationship between the tangibility and debt ratio (Youssef and El-ghonamie, 2015). However, *the pecking order theory* predicts that a firm with larger fixed assets has less asymmetrical information. Hutchinson and Hunter (1995) states that tangible assets could also have a negative impact on financial leverage by augmenting risk through the increase of operating leverage (Alipour et al., 2015)<sup>20</sup>.

*H3. There is a positive relationship between tangibility and capital structure*

#### *2.3.1.4 Liquidity*

*The tradeoff theory* predicts the positive relationship between liquidity and debt ratios because firms with higher liquidity ratios prefer to borrow more debt to enhance their ability to meet contractual obligations on time (Rajan and Zingales, 1995). On the contra, *the pecking order theory, agency theory, and free cash flow theory* predicts the negative relationship between liquidity and debt ratios level. The reason is, firms with higher liquidity tend to use internal financing (retained earnings) rather than internal financing for the new investment. Jensen and Meckling (1976) argue that *the agency theory* justifies this negative effect by the potential conflict

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<sup>16</sup> See, also, Alipour et al. (2015)

<sup>17</sup> On the other side, Alipour et al. (2015) adopted the natural logarithm of total assets to define size of the firm from Sheikh and Wang (2011), Su (2010), and Abor and Biekpe (2009).

<sup>18</sup> See, also, Titman and Wessels (1988)

<sup>19</sup> Based on tradeoff theory, Alipour et al. (2015) also argues a firm's tangibility has a predicted positive impact on debt level because a firm with more tangible assets would need to have more collateral assets to service debt in the event of bankruptcy and, therefore, would have a greater ability to attract more debt.

<sup>20</sup> Many researchers such as Youssef and El-ghonamie (2015), Viviani (2008), Frank and Goyal (2002), and Rajan and Zingales (1995) confirms the positive correlation between asset structure and long-term debt ratio (Alipour et al., 2015). On the contrast, some researchers such as Abor and Biekpe (2009), Amidu (2007), Booth

between shareholders and debtholders. Eldomiaty and Azim (2008) and Deesomsak et al. (2004) confirm the negative relationship between liquidity and debt ratios.

*H4. There is a negative relationship between liquidity and capital structure*

#### *Risk*

Baranoff et al. (2007) believe that risk plays a very important role in the capital structure. Jordan et al. (1998) confirm when the market has a higher growth, there is a positive relationship between risk and market value of debts because bankruptcy risk increases with the firm's debt. Some researchers such as Ezeoha (2011), Su (2010), Viviani (2008), Cassar and Holmes (2003) confirms the insignificant relationship between risk and debt ratios (Alipour et al., 2015).

*The tradeoff theory* and *pecking order theory* predicts the negative relationship between risks and debt ratios. The risky firms who have the high level of default risk should not borrow more debt or increase the leverage because high risks are more likely to faces bankruptcy or financial distress (Titman and Wessels, 1988). Some researchers such as Sheikh and Wang (2011), Abor and Biekpe (2009), Eldomiaty (2007) found negative relationship between risk and debt ratios because risky firms tend to use internal financing rather than external financing such debt in order to protect the firms from the bankrupt (Alipour et al., 2015).

*H5. There is a negative relationship between firm risk and capital structure*

#### *Effective tax rate*

*MM theory (MM II)* and *tradeoff theory* predict positive relationship between effective tax rate and debt ratios because the firms would prefer debt to other financing resources due to the benefits of tax deductibility of interest payments. Deangelo and Masulis (1980) confirm the positive relationship between effective tax rates and the long term debt ratio on the financing decisions. On the contra, Karadeniz et al. (2009) and Sogorb-Mira and How (2005) argues that because the effect of this rate on capital structure depends on tax regulations of each country which indicate the negative relationship between effective tax rate and debt ratios (Alipour et al., 2015).

*H6. There is a positive relationship between effective tax rate and capital structure*

#### *Ownership structure*

Jensen and Meckling (1976) and Jensen (1986) states that *the agency theory* suggests that the optimal structure of leverage and ownership may be used to reduce total agency costs, its capital structure could affect to the governance structure. Leland and Pyle (1977) confirm that leverage is positively correlated with the ownership structure. Also, Su (2010) prove that government-controlled firms use less debt financing (Alipour et al., 2015).

*H7. There is a positive relationship between ownership and capital structure*

### Macro-Economic Determinants

#### *Interest Rate*

Interest rate plays an important role. The increase in lending interest will decrease the demand for borrowing funds and the equity capital demand with return on equity also rises with the interest rate. The allocation of equity capital applies to issuing stock and/or using of retained earnings. In line with market timing theory, (Frank and Goyal (2003) argues the increase of interest rate will reduce debt since the managers avoid to use debt when the interest rate is high (Zerriaa and Noubbigh, 2015).

*H8. There is a negative relationship between interest rate and capital structure*

#### *2.3.2.2 GDP*

GDP growth can define the economic growth opportunities for the firms. *The pecking order theory* predicts a positive relationship between GDP and leverage, high level of GDP ratio to internal funds implies the greater need for external finance (Koksai and Orman, 2015). On the contrast, *the*



*trade-off theory* predicts a negative relationship between GDP and debt ratios. Empirical studies generally find a negative association between leverage and macroeconomic growth<sup>21</sup>.

*Hg. There is a positive relationship between GDP growth and capital structure*

## Research Methodology

### Data

The authors collect panel data of telecommunication industry that represented by the five listed telecom firms with the highest market capitalization on Indonesia's Stock Exchange (IDX) during 2008-2015. This research analyzing the data from the secondary data such as quarterly report, financial statement and another published report that related to this research. The limitation is considering the data availability, firm's track record and the business nature differences in the telecommunication industry. Telecom firms which operate on infrastructure (e.g. BTS) are not included to this analysis as their business nature has different characteristics with our selected sample. Finally, the research sample was represented by five biggest telecom firms; they are PT. Telekomunikasi Indonesia Tbk, PT. XL Axiata Tbk, PT. Indosat Tbk, PT. Smartfren Tbk, and PT. Bakrie Telecom Tbk. This research employs balanced panel data of 32 quarterly data during 2008-2015, so this research has 160 observations.

### Panel Regression

#### Classical Assumption Tests

This research conducts the BLUE test to ensure the goodness of fit of *Ordinary Least Square* (OLS) method on the panel regression model. The BLUE (*Best Linear Unbiased Estimator*) assumptions that consist of linearity test, normality test, multicollinearity test, homoscedasticity test, and autocorrelation test<sup>22</sup>. The BLUE assumptions have linear model in the parameter with the normal distribution, homoscedasticity, no relationships between the variables and error terms, no autocorrelation and also no multicollinearity that makes these assumptions consistent, unbiased, and efficient.

Not all classical assumption tests should be carried out on each model of linear regression with OLS approach. If the regression does not fit with the *Ordinary Least Square* (OLS) method and the results does not fulfill the classical assumption requirements, the authors tends to validate panel data regression by using *Feasible Generalized Least Square* (GLS) approach from *Seemingly Unrelated Regressions* (SUR) method for robustness check. FGLS uses estimation result from contemporaneous correlation matrix with the iterative process where the regression estimator achieves *maximum likelihood* (ML). The authors develops the regression model that estimated by OLS or another consistent estimator of the errors covariance matrix first and then using the consistent estimator of the covariance matrix of the errors by GLS ideas.

According to the explanation above, the hypotheses testing must be fulfilling the classical assumption test such a multicollinearity, heteroscedasticity, normality, and autocorrelation. The authors eliminates the linearity test from the model because this research has assumed there is the linear relationship between the dependent and its independent variables that will be shown in the value of coefficient correlation between the dependent and its independent.

### Panel Regression Model

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<sup>21</sup> (for example, Demircuc-Kunt and Maksimovic 1996).

<sup>22</sup> According to Gujarati (2003), Linearity test is aim to test which the specification on empirical model better to be use, whether it in linear, square or cubic; Normality test is to test the data in regression model which have to distributed normally i.e. histogram of residuals, normal probability plot, etc.; Multicollinearity is to determine the correlation between dependent and its independent variable(s), in the regression model; Heteroscedasticity is to test the variance inequality of residual value between the observation; then, Autocorrelation observes the correlation between member series of observations on the certain period.

This section explain the empirical steps that consists of estimation model, choosing estimation model, classical assumption test, and interpretation the panel regression of capital structure.

*The regression analysis is concern with study of the dependent variable on the independent variable/s (one or more) with a view to estimating and/or predicting the population mean or average value of the former in terms of the known of fixed (repeated sampling) values of the latter (Gujarati, 2003, p.*

18)

The panel regression analysis is a regression with panel data structure. Alipour et al. (2015) argues that panel data models are the powerful research instruments<sup>23</sup>. According to Alipour et al. (2015), the authors use existing panel regression model. This research employs panel data econometrics techniques to test the hypotheses in the capital structure model. Generally the parameter estimation in the regression analysis on cross section data is done by using the least square estimation method called *Ordinary Least Squares (OLS)* or *General Least Square (GLS)*.

According to the definition above, this research contains more than one explanatory variable is known as multiple linear regression. The regression has some models to test the goodness of fit and accuracy of the model. In this research, the authors using the panel data regression model and estimation that will be performed through three approaches, among others:

(1) *Common Effect Model/Pooled Least Square Model:*

$$Y_{it} = \beta_0 + \beta X_{it} + \varepsilon_{it}$$

**Equation 3-1 Common Effect Model/Pooled Least Square Model**

(2) *Fixed Effect Model:*

$$Y_{it} = \beta_{0i} + \beta X_{it} + \mu_{it}$$

**Equation 3-2 Fixed Effect Model**

(3) *Random Effect Model:*

$$Y_{it} = \beta_0 + \beta X_{it} + \varepsilon_{it} + \mu_{it}$$

**Equation 3-3 Random Effect Model**

#### *Common Effect Model/Pooled Least Square*

Common Effect Model or Pooled Least Square (PLS) is simplest panel data model because it combines data time series and cross section. In this model neglected dimension of time as well as individuals and assumed that the firms' data has the same behavior in different periods. This method can use the approach *Ordinary Least Square (OLS)* or a least squares technique to estimate the panel data model. PLS is applied in the form of a data pool or processing panel data using ordinary least squares method. The specification test of Hausman (1978) is used to test the best model either fixed effect or random effect if the PLS cannot be the best model to interpret the research estimation.

#### *Fixed effects*

Fixed Effect Model (FE) assumes that differences between individuals can be accommodated on the difference intercept. Fixed effects model estimation on the panel data using the technique of dummy variables to capture the difference between the firm's intercept, the intercept differences may occur because of differences in the work culture, managerial, and incentives. However, the slop is equally between the firms. The estimated model is often called the technique of *Least Squares Dummy Variable (LSDV)*.

<sup>23</sup> Panel data are also called longitudinal data or cross-sectional time-series data. These longitudinal data have "observations on the same units in several different time periods" (Kennedy, 2008: 281). Psillaki & Daskalakis (2009) argues that panel data allow the researchers to discover and measure the effect, which is not possible in pure cross-sectional and time series data; In addition, panel data can take into account firms' heterogeneity to greater extent (Rehman and Mushtaq, 2015).

### Random Effects

This model will estimate the panel data where disturbance variables may be interconnected across time and between individuals. Random effect on the model intercept differences are accommodated by the error terms of each firm. The advantages of using the random effect models is eliminate the heteroscedasticity and autocorrelation. This model is also called the *Error Component Model* (ECM) or technique *Generalized Least Square* (GLS).

This research conducts BLUE test to ensure the goodness of fit of ordinary least square (OLS) method on the panel regression model. The BLUE (*Best Linear Unbiased Estimator*) assumptions that consists of linearity test, normality test, multicollinearity test, homoscedasticity test, and autocorrelation test<sup>24</sup>. The BLUE assumptions has linear model in the parameter with normal distribution, homoscedasticity, no relationships between the variables and error terms, no autocorrelation and also no multicollinearity that makes this assumptions consistent, unbiased, and efficient. Not all classical assumption tests should be carried out on each model of linear regression with OLS approach. If the regression does not fit with the *Ordinary Least Square* (OLS) method and the results does not fulfill the classical assumption requirements, the authors tends to processing panel data regression by using *Feasible General Least Square* (GLS) approach from *Seemingly Unrelated Regressions* (SUR) method. FGLS uses estimation result from contemporaneous correlation matrix with iterative process where the regression estimator achieves *maximum likelihood* (ML). The authors develop the regression model that estimated by OLS or another consistent estimator of the errors covariance matrix and then using the consistent estimator of the covariance matrix of the errors by GLS ideas.

**Table 3—1 Variables Definition**

Variables	Descriptions	Prior Research
<b>Dependent Variables</b>		
Total debt ratio	TDR= total debt divided by total assets	Alipour et.al (2015), Youssef and El-ghonamie (2015), Koksal and Orman (2015), Su (2010), Viviani (2008), Amidu (2007), Booth et al. (2001)
<b>Independent Variables</b>		
Profitability	PROF=net income divided by total equity	Youssef and El-ghonamie (2015)
Firm size	LNTS= natural logarithm of total sales	Youssef and El-ghonamie (2015), Karadeniz et al. (2008), Titman and Wessels (1988)
Tangibility (Assets Structure)	TANG=net fixed assets divided by total assets	Alipour et al. (2015), Youssef and El-ghonamie (2015), Sheikh and Wang (2011), Su (2010), Abor and Biekpe (2009), Karadeniz et al. (2009), Titman and Wessels (1988)
Liquidity	LIQ=current assets divided by current liabilities	Alipour et al. (2015), Youssef and El-ghonamie (2015), Sheikh and Wang (2011),

<sup>24</sup> According to Gujarati (2003), Linearity test is aim to test which the specification on empirical model better to be use, whether it in linear, square or cubic; Normality test is to test the data in regression model which have to distributed normally i.e. histogram of residuals, normal probability plot, etc.; Multicollinearity is to determine the correlation between dependent and its independent variable(s), in the regression model; Heteroscedasticity is to test the variance inequality of residual value between the observation; then, Autocorrelation observes the correlation between member series of observations on the certain period.

		Eldomiaty and Azim (2008)
Risk	VOLAT= standard deviation of (ROA)	Alipour et al. (2015), Ezeoha (2011), Sheikh and Wang (2011), Abor and Biekpe (2009)
Efektive tax rate	ETAX=tax divided by earning before tax	Alipour et al. (2015), Karadeniz et.al (2009)
Interest rate	IR=% interest rate BI rate	Zeriaa and Noubigh (2015), Frank and Goyal (2003)
GDP	GDP=% change in real GDP	Koksal and Orman (2015)
<b>Dummy Variable</b>		
Ownership structure	OWN=takes value of 0 for state-owned firm and a value 1 for private-owned	Alipour et al. (2015), Su (2010), Li et al. (2009)

Source: Author

Then, the researcher will validate the most significant factors of determinants capital structure that also directly affect to value of the firm using panel econometric techniques by using STATA 11 statistical software. Here are the hypotheses that will be tested in this research:

*H<sub>0</sub>: The independent variables are not significant to explain the dependent variable*

*H<sub>1</sub>: The independent variables are significant to explain the dependent variable*

#### Measures

##### *Dependent Variables*

According to Alipour et.al (2015), Youssef & Elghonamie (2015) and Koksal & Orman (2015), etc.; this research define the capital structure using total debt ratio (TDR) to test the variables. The authors uses different method compare to debt to equity ratio (DER) from Sitorus et al. (2014) as the prior research on telecommunication industry in Indonesia.

##### *Independent Variables*

This research use these suggested factors as important variables in determination of capital structure such as profitability, firm size, tangibility, liquidity, risk, ownership structure, effective tax rate, interest rate, and GDP. Also, the authors choose ownership as dummy variable to compare the difference between state-owned firm and private-owned firm in telecommunication industry in Indonesia.

#### Data Analysis

##### *Capital Structure Determinants Analysis*

##### *Descriptive statistics and Correlation matrix*

**Table 4—1 Descriptive Statistic**

Variable	Obs	Mean	Std. Dev.	Min	Max
tdr	160	0.6874935	0.2862469	0.350204	2.308212
prof	160	-0.2145088	2.052434	-16.47009	3.297619
size	160	8.456599	1.775369	4.174387	11.53732
tang	160	0.8528573	0.0759511	0.507873	0.988046
liq	160	0.7364831	0.7814414	0.009408	5.424242
risk	160	0.0480655	0.05375	0.003658	0.22163
etax	160	0.3557967	1.792362	-1.143376	22.5
ir	160	0.0702148	0.0093465	0.0575	0.09
gdp	160	0.0568212	0.055344	0.011532	0.345372
own	160	0.8	0.401256	0.00	1.00

Notes: tdr=total debt ratio, prof=profitability, size=firm size, tang= tangibility, liq=liquidity, risk=firm risk, etax=effective tax rate, ir= interest rate, gdp=gross domestic product, own=ownership

Source: Author

Descriptive statistics on table 4-1 shows this industry has high leverage level (mean TDR 0.69). This result reflects that most of the telecom firm(s) is typically pro-financial leverage because the number of debt is higher than equity. The maximum of leverage level on this industry (2.31) indicates that the firms who have high level of debt face high risk of unable to service the debt because the firms issuing debt higher than its firm(s) total assets. While the minimum of the leverage (0.35) indicates that the firm(s) also considers to funding their investment/project using internal sources in capital structure to control the risk on debt (see figure 1). Therefore, debt becomes the importance financing source for telecommunication industry.

Mean of profitability (-0.21) indicates that this industry average has inefficient business to generate the profits during the sample period. The maximum profitability (3.3) shows that firms still have promising outlook to generate more profits because once in a moment the firm management utilizing its equity efficiently and gives the better return to investors/shareholders. On the contrast, the minimum level of profitability (-16.47) shows this industry gaining more loss rather than profits for the shareholders. This result indicates that this industry often facing difficulties to generate more profits from its equity.

The industry's tangibility and liquidity contain high ratio which indicates this firm has less risk on assets to guarantee their obligations on debt services and its firm risk was 0.05 approximately. The average of effective tax rate is 0.36 indicating that Indonesian telecom firms paid 0.36 of tax on average while income tax rate in Indonesia is 0.25. This result indicates that firms would prefer debt to other financing resources due to the benefits of tax deductibility of interest payments. During the sample period, the macroeconomic factors such as interest rate and GDP were around 0.07 and 0.06. In this case, the number of firms in this industry has dominated by private owned which indicates that the government opens greater market competition with accessible entrance for the private firm.

**Table 4—2 Correlation Matrix**

variable	tdr	prof	size	tang	liq	risk	etax	ir	gdp	own
tdr	1.0000									
prof	-0.1271	1.0000								
size	-0.5297*	0.1588*	1.0000							
tang	0.5904*	-0.0975	-0.3745*	1.0000						
liq	-0.4076*	0.0843	0.0159	-0.8235*	1.0000					
risk	0.5474*	0.2269*	0.3863*	0.3581*	0.2173*	1.0000				
etax	-0.0401	0.0259	0.0360	-0.0451	0.0076	-0.0907	1.0000			
ir	0.1254	0.0592	-0.0230	-0.3064*	0.3071*	-0.0980	-0.0958	1.0000		

	-	-			-	-	0.017	0.2171	1.000	
gdp	0.0995	0.0258	0.0497	0.0349	0.0450	0.0181	8	*	0	
own	0.4359*	-0.0972	0.6140*	0.4636*	-0.1315	-0.0133	0.0261	0.0000	0.0000	1.0000

Notes: \*significance at  $\alpha=10\%$ ; \*\*significance at  $\alpha=5\%$ ; \*\*\*significance at  $\alpha=1\%$ , tdr=total debt ratio, prof=profitability, size=firm size, tang= tangibility, liq=liquidity, risk=firm risk, etax=effective tax rate, ir= interest rate, gdp=gross domestic product, own=ownership

Source: Author

The correlation matrix (table 4-2) reports any relationship coefficient between independent variables; the authors expect no multicollinearity problem between variables. According to Pearson correlation coefficients, go from -1 to 1. Closer to 1 means strong correlation while closer to -1 means strong inverse correlation between the variables (i.e. when one goes up, the other goes down). The result finds multicollinearity between profitability, size, tangibility, liquidity, risk, and interest rate are less than 0.75/0.8. Kennedy (1985) suggests that multicollinearity as a serious problem if the coefficient between independent variables is more than 0.8 (Mohammad Alipour, 2015). While, Gujarati (2004) argues that if the partial correlation value between variables more than 0.75/0.8 indicates multicollinearity problems among them. According to the table 10, the authors conclude that the regression model indicate that there is no correlation coefficient between independent variable.

*Classical Assumptions Tests*

**Table 4—3 Classical Assumption Test**

multicollinearity	VIF test	18.77
heteroscedasticity	Wald test	0.0000
normality	Doornik Hansen test	0.0000
autocorrelation	Wooldridge test	0.0269

Source: Author

Based on table 4-3, the data is does not fulfill the classical assumption test requirement. First, the multicollinearity test using *Variance Inflation Factor* (VIF) > 10 indicates multicollinearity problem among variables. Second, Wald test is statistically significant with  $\text{Prob}>\text{Chi}2$  (0.0000) <  $\alpha$  (0.05) which indicates the presence of heteroscedasticity on the model; thus  $H_0$  is being rejected. Third, Doornik-Hansen test above, the result rejects  $H_0$  and shows that  $\text{Prob}>\text{Chi}2$  (0.0000) <  $\alpha$  (0.05) which indicates the model has no normal distribution. The last, Wooldridge tests also shows significant  $\text{Prob F}$  (0.0269) <  $\alpha$  (0.05) that indicated autocorrelation problem. Therefore, the authors decides to validate the regression model by comparing the chosen model (CE/FE/RE) with *Feasible Generalized Least Square* (FGLS) model that aimed for robustness check and it simply could be an alternative estimator for the variance of the estimator robust to solving the classical assumption problems.

*Panel Regression Model Estimation*

**Table 4—4 Panel Regression Model Estimation**

Variable	PLS	FE	RE
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	coef.	t-stat	coef.	t-stat	coef.	z-stat
_cons	-0.70803964	-1.46	-0.27360205	-1.5	-0.70803964	-1.5
prof	0.00332701	0.49	-0.00009844	0.5	0.00332701	0.5
size	-0.02105664	-1.8	-0.071327***	-1.8	-0.02105664	-1.8
tang	0.84070045	1.76	1.0052975*	1.8	0.84070045	1.8
liq	-0.07918718*	2.04	-0.07054432	-2.0	-0.07918718*	-2.0
risk	2.1963013***	6.75	1.9629887***	6.8	2.1963013***	6.8
etax	0.00681501	0.9	0.00502630	0.9	0.00681501	0.9
ir	10.367798***	6.46	10.112391***	6.5	10.367798***	6.5
gdp	-	-	-	-	-	-
own	.91392348***	3.63	.83318698***	-3.6	.91392348***	-3.6
	.16450339**	3.06	(omitted)	3.1	.16450339**	3.1
Number of Obs.	160		160		160	
R-square	0.67055369		0.58822926			
Adj R-square	0.65078691		0.55461532			
Chow test	0.0242					
Breusch Pagan-LM test	0.8845					
Hausman test	0.3732					
Notes: *significance at $\alpha=10\%$ ; **significance at $\alpha=5\%$ ; ***significance at $\alpha=1\%$						

Source: Author

This section presents the empirical results of the capital structure determinants. The authors employs panel econometrics technique to estimates whether *Ordinary Least Square* (PLS/FE) or *General Least Square* (RE) as the most suitable model to determines the capital structure determinants. To validate the result, the authors does the investigation with Chow test, Lagrange Multiplier test, and Hausman test. According to the table 4-4, chow test is statistically significant with the p-value (0.0242) < alpha (0.05) which indicates that FE model is better to explain the panel regression of capital structure determinants than PLS model. So that, the authors has does not consider the Breusch Pagan - Lagrange multiplier test and continuous to the hausman test directly. The hausman test is statically insignificant with the p-value (0.3732) < alpha (0.05) indicating that RE model more preferable than FE model to be used on panel regression. Therefore, the authors conclude that *General Least Square* (RE) model is the most suitable model to determine the capital structure determinants. However, the result on table 4-4 also shows that the panel regression does not fulfill the classical tests that make the authors decided to validate the regression using *Feasible Generalized Least Square* (FGLS) model for robustness check.

*Interpretation*

According to table 4-4 and table 4-5, the authors concludes that the *Feasible Generalized Least Square* (FGLS) model has almost the same (similiarly) results with the *Random Effect* (RE). This results suggest that *Generalized Least Square* (GLS) is the most suitable method to define the capital structure determinants.

**Table 4-4 Feasible Generalized Square (FGLS) Regression Model**

Tdr	coef.	z-stat	prob.
_cons	-0.2846341	-0.59	0.552
Prof	-0.0000984	-0.02	0.988
Size	-0.071327	-3.82	0.000
Tang	1.005298	2.2	0.028

Liq	-0.0705443	-1.86	0.062
Risk	1.962989	5.77	0.000
Etax	0.0050263	0.7	0.482
Ir	10.11239	6.73	0.000
Gdp	-0.833187	-3.52	0.000
Own	-0.119219	-1.24	0.215
Firm			
2	0.1885402	2.91	0.004
3	0.2388887	3.47	0.001
4	0.1046073	2.24	0.025
5	(omitted)		
Number of obs.	160	Estimated covariances	1
Number of groups	5	Estimated autocorrelations	0
Time periods	32	Estimated coefficients	13
Prob > chi2	0.0000	Log likelihood	68.50621

Source: Author

According to table 4-5, the regression model of the variables is:

$$TDR = -0.2846341 - 0.0000984PROF - 0.071327SIZE + 1.005298TANG - 0.0705443LIQ + 1.962989RISK + 0.0050263ETAX + 10.11239IR - 0.833187GDP - 0.119219OWN + \varepsilon + \mu$$

**Equation 4-1 Regression Model of Capital Structure**

Based on table 4-5 above, the regression analysis has done by using cross sectional time series of FGLS (*Feasible General Least Square*) for robustness check and also present the capital structure determinants. The maximum log likelihood value (68.50621) indicates that 68.5% variation of the dependent variables (leverage/TDR) on regression model of capital structure as a whole can be explained by the variables in the model such as profitability, size, tangibility, liquidity, risk, the effective tax rate, ownership, interest rate and GDP, while the remaining 31.5% is influenced by other variables outside the system such as small sample size, small sample period or small number of tested variables. The result shows that variable such as profitability, liquidity and effective tax rate statically has insignificant relationship with leverage with p-value > alpha (0.05), thus the result rejects the hypotheses. These variables are does not affect the capital structure of telecommunication industry in Indonesia. The FGLS model confirms that size, tangibility, risk, interest rate and gdp are statistically significant with p-value < alpha (0.05). In addition, according to table 4-4, the RE model also shows the negative significant relationship between liquidity and leverage that indicated by the p-value < alpha (0.05) and the coefficient value is -.07918718. This result suggests that these variables are the most significant factor that affect the firm capital structure in Indonesia telecom industry.

*Optimal Capital Structure*

In order to determine the capital structure effect towards value of the firm in industry level, the authors will conducts panel data regression of firm's value (*tdr and tdr2 towards value*). The panel data regression will be done as same as the capital structure determinants. But the differences is the authors will be only conducts *Pooled Least Square* model with the assumptions that the authors neglected time effect on the model because the authors aims to investigates the optimal capital structure in industry level during sample periods. Therefore, the authors inputs some macro variables such as interest rate and GDP in order to eliminate the external factors which make the economy conditions change. Also, the authors considers ownership variable to differentiated the characteristics between state and private owned.

**Table 4—5 Optimal Capital Structure Regression**

Variable	PLS		FE		RE	
	coef.	t-	coef.	t-	coef.	z-



		stat		stat		stat
_cons	83297.84*	2.01	39968.392	1.28	83297.84*	2.01
tdr	-73458.755	-1.04	-93553.583	1.05	-73458.755	-1.04
tdr2	15878.593	0.55	31576.877	2.00	15878.593	0.55
				-		
ir	1007337.2*	2.11	928433.65*	2.15	1007337.2*	2.11
gdp	-182909.59*	-2.28	-168695.27*		-182909.59*	-2.28
	-				-	
own	66473.812***	-4.53	(omitted)	0.88	66473.812***	-4.53
Number of Obs.	160		160		160	
R-square	0.31134998		0.0540865			
Adj R-square	0.28899121		0.00397188			
Chow test			0.0206			
Breusch Pagan-LM test			-			
Hausman test			-			
Notes: *significance at $\alpha=10\%$ ; **significance at $\alpha=5\%$ ; ***significance at $\alpha=1\%$						

Source: Author

Theoretically, the relationship between value, TDR and TDR2 will shows a negative quadratic curve (See Equation 2-3 and figure 2.1). But, the regression result shows that the relationship between value, TDR, and TDR2 in telecom industry level is inconsistent with the proposed theory that was indicated by coefficient and p-value of TDR and TDR2 (see table 4-6). Therefore, the authors predicts the external factors also affect the relationship between value, TDR, and TDR2; thus the authors inputs the indicator to the regression model. Firstly, the authors inputs the ownership variable. The result shows that the ownership, interest rate and gdp are significantly affect the market value of the firm. The optimal leverage and ownership may be used to reduce total agency costs, its capital structure could affect the governance structure. This results relevance with *pecking order theory* that indicates the Indonesia telecom industry follow the order to create leverage based on ownership structure to adjust the macroeconomic indicators condition. However, the TDR and TDR2 is statistically insignificant to value of the firm where the p-value > alpha (0.05). Thus, the authors concludes that the capital structure does not affect the value of the firm in industry level.

Based on the result, the panel regression model of the optimal capital structure is:

$$VALUE = 83297.84 - 73458.755TDR + 15878.593TDR^2 + 1007337.2IR - 182909.59GDP - 66473.812OWN + \varepsilon + \mu$$

**Equation 4-2 Regression Model of Optimal Capital Structure**

**Result and Discussion**

Based on the table 4-4 and table 4-5, the most suitable method to define the capital structure determinants is GLS (*Generalized least Square*) method. Therefore, the panel regression has done by using cross-sectional time series of RE (*Random effect*) that compared to FGLS (*Feasible Generalized Least Square*) for robustness check and also present the capital structure determinants. The result shows that variable such as profitability and effective tax rate statically has insignificant relationship with leverage on both models. These indicated that those variables do not affect the capital structure of telecommunication industry in Indonesia. The size, tangibility, and liquidity variables have contrast result on both models. The result FGLS shows that size and tangibility are statistically significant with p-value < alpha (0.05). While, RE model shows that size and tangibility have insignificant relationship with the leverage with p-value > alpha (0.05). Also, both model shows that risk, interest rate and gdp are statistically significant with p-

value < alpha (0.05). Moreover, this result suggests that these variables are the most significant factor that affect the firm capital structure in Indonesia telecom industry.

- Profitability

Contrast with Sitorus et al. (2014), this research confirms that profitability is insignificantly relationship with the capital structure with coefficient (-0.0000984) and p-value (0.988) > alpha (0.05). The contrast result may be driven by different method, proxy, the larger sample size and time period because the previous research (Sitorus et al, 2014) investigates the capital structure determinants (DER) on telecommunication industry that represented by three biggest firms during 2006-2011 by using ANOVA (*Analysis of Variance*).

- Size

Based on FGLS model, the result consistent with *the pecking order theory hypothesis*. The coefficient (-0.071327) and p-value (0.000) < alpha (0.05) of size shows a significant negative relationship with the leverage (TDR) as the proxy of capital structure. This result indicates that the smaller telecom firms tend to utilize higher debt level than the larger firms because they may not have much choice but to rely on debt financing. While the larger firms tends to less borrow debt because the firm has capabilities to utilized their internal financing or issuing new stock. Thus, the smaller its firm, the larger the number of debt financing on the capital structure will be.

- Tangibility

As shown in table 4-5, tangibility statistically significant with the p-value (0.028) < alpha (0.05) that indicates that tangibility has significant relationship towards leverage on FGLS model. Relevance of *the trade-off theory* and *the agency cost theory*, the positive coefficient (1.005298) indicates the firm with the safe tangible assets tends to use more debt in their capital structure rather than the firm with risky intangible assets. The firm with the large number of tangible assets, the firm could easily borrow debt because its tangible assets could be collateralized to guarantee the debt. In line with *the signaling theory*, the firms have a large number of total assets; issuing debt could be a positive signal for the investors. This result is consistent with Karadeniz et al. (2009), Myers and Maljuf (1984), Zoo and Xiao (2006) and Qian and Wirjanto (2007).

- Liquidity

Based on the FGLS model, this research also found the insignificant relationship between liquidity and capital structure that indicated by the coefficient (-0.0705443) and p-value (0.062) > alpha (0.05). A weaker (stronger) relation between asset liquidity and leverage significantly affect the capital structure for those firms with a lower (higher) probability of default (Sibilkov, 2007). This result indicates that the telecom firm(s) does not consider liquidity when to restructure firm's capital. However, RE model shows the negative significant relationship between liquidity and leverage that indicated by the p-value < alpha (0.05) and the coefficient value is -.07918718. This result indicates that the most liquid firm(s) has the lower number of debt/leverage.

- Risk

This research confirms that risk has the significant positive relationship with leverage as the capital structure proxy which indicated by the coefficient (1.962989) and p-value (0.0000) < alpha (0.05). This result indicates the firms with heavy debt on their capital structure contain bankruptcy risk as increases as the firm's debt. This result is consistent with Jordan et al. (1998).

- Effective Tax Rate

This result was indicated by coefficient (0.0050263) p-value of effective tax rate (0.482) > alpha (0.05). In line with irrelevance theory from Modigliani and Miller (1963) and Miller (1977), the effective tax rate does not appear as the significant factor that affects the capital structure.

- Interest Rate

The interest rate has the significant positive relationship with leverage as the capital structure proxy which indicated by the coefficient (10.11239), p-value (0.0000) < alpha (0.05). The capital structure decision considers interest rate as one of the major factors that affect the Indonesia's economic slowdown during the sample period<sup>25</sup>. This result contrast with market timing theory

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<sup>25</sup> ( B.V. Delft The Netherlands, Van der Schaar Investments, 2016)

and (Frank and Goyal (2003) that argues the increase of interest rate will reduce debt since the managers avoid to use debt when the interest rate is high (Zerriaa and Noubbigh, 2015).

- GDP

This research confirms that GDP has the significant negative relationship with leverage as the capital structure proxy which indicated by the coefficient (-0.833187), p-value (0.0000) < alpha (0.05). This research suggests telecom firms to consider GDP as the significant factor when restructuring the firm capital. In line with *the pecking order theory*, high level of GDP ratio to internal funds implies the greater need for external finance.

- Optimal Leverage

The optimal capital structure existences in telecommunication industry show that the ownership, interest rate, and gdp are significantly affect the market value of the firm. The optimal leverage and ownership may be used to reduce total agency costs, its capital structure could affect the governance structure. However, the TDR and TDR2 is statistically insignificant. Thus, the authors conclude that the capital structure does not affect the value of the firm in industry level. Thus, the authors conclude the optimal capital structures appear to be influenced by nature of industry relevance to any particular capital structure theories. The result indicates that firm value independent of the capital structure due to behavioral factors of investors in Indonesia tend to ignore the fundamental factor of the firm. Relevance with Arestis and Luintel (2004) and Hatfield et al., (1994), at the industry level issue, is whether the financial structure affects the economic growth or not (Chowdhury, 2010). Through panel regression, it was confirmed that significant relationship between capital structure and the GDP which contrast to some recent findings. The overall finding is that the relationship between a firm's debt level and value of the firm in its industry scale does not appear to be of concern to the market. Also, Alipour et al., (2015) argues that *pecking order theory* has rejected the optimal capital structure existences because this theory proposed the order in corporate finance decisions. The result also shows the differences between value of the firm with and without specific ownership factor in telecom industry. This result suggests that these variables are the most significant factor that affect the firm capital structure in Indonesia telecom industry.

- Ownership

This research found that ownership has the insignificant relationship with leverage on the capital structure. It was indicated by p-value (0.215) > alpha (0.05). This research confirms insignificantly relationship between ownership with capital structure. It indicates that the ownership does not affect the firm's (internal) decision in creating the leverage. However, this research also confirms that the ownership has significant relationship (p-value (0.215) > alpha (0.05)) with the value of the firm in industry level. This result indicates that the industry players considers the ownership characteristics when valuating value of the firm. Relevant to the figure 1.1 and table 1-4, the result indicates the private firms tend to utilized higher debt level (>50%) rather than the state owned firm (<50%).

## Conclusion and Recommendation

### Conclusion

The capital structure is an essential element in the firm's long-term financial strategic decision. The optimal capital structure reflects the "right" of mix debt-equity to be used. This financial decision is important because the number of capital that consists of debt and equity may affect the firm's value through the firm risk and wealth profile. Generally, the firm's management tends to create leverage with the optimal capital structure as the target. They combines the proportional number of debt and equity to maximize the return on investment and firm's value while minimizes the cost of capital; and also protects the firm from any potential risks such as bankruptcy and financial distress.

This research attempted to investigate the capital structure of telecommunication industry in Indonesia related to the new DER (Debt to Equity Ratio) limitation by the Ministry of Finance regulation No.169/PMK. 010/2015. This final project reviews the conditional capital structure theories to formulate testable hypotheses regarding the determinants of capital structure. The panel data econometric techniques are used to investigate the most significant factors that affect the capital structure of telecommunication industry in Indonesia which represented by five listed telecom firms with the highest market capitalization in Indonesia Stock Exchange (IDX) during 2008-2015. The result answers the research questions and suggests the variables such as profitability, size, tangibility, liquidity, risk, interest rate, gdp and ownership as the capital structure determinants which consistent with some capital structure theories.

In order to answer the first research question, the panel regression has done by using cross sectional time series of RE (*Random Effect*) and FGLS (*Feasible General Least Square*) to present the capital structure determinants which show almost the same results. The result confirms that size, tangibility, liquidity, risk, interest rate and gdp factors that statistically has significant relationship with the leverage that indicated by p-value < alpha (0.05). The answer for the second research question, the PLS (*Pooled Least Square*) model shows that the TDR and TDR<sub>2</sub> is statistically insignificant while other variables such as interest rate, GDP and ownership statically significant to value of the firm. This result indicates that the optimal capital structure in telecom industry depends on each firm. In industry level, there is no significant relationship between leverage and value of the firm. Thus, the authors conclude that the capital structure does not affect the value of the firm in industry level.

#### *Recommendation*

This final project suggests for financial managers or decision makers in the telecommunication industry in Indonesia to consider significant factors such as size, tangibility, liquidity, risk, ownership, interest rate and gdp when restructuring their capitals or others financial long term decision. Although, in industry level, the optimal leverage does not affect value of a firm while the ownership, interest rate and gdp statistically has significant relationship with value of the firm. According to the result, the managerial implication of this final project suggest the firm to optimize the sales size, guarantee the debt with safe tangible assets to minimize the risk, maintain the liquidity of firms and also protects the firm from macro-economic risk factors to maximize the optimal capital structure. Thus, the firm(s) possibly creates better capital structure decision which helps to minimize cost of capital that directly maximizes value of the firm. In addition, this final project contributes to research by discovering new findings on the capital structure determinants in Indonesia's telecommunication industry. This final project expand the investigation by testing the larger sample size and time period with different proxy (TDR) and methodology (panel econometrics) compare to the latest (previous) research from Sitorus et.al (2014) who also does the research in Indonesia's telecommunication industry.

This research only explained 68.5% of the capital structure determinants. While, the remaining 31.5% of explanatory level is still possibly indicates the variables that has not been identified in this research. It is indicates that 68.5% variation of the dependent variables (leverage/TDR) on regression model of capital structure as a whole can be explained by the variables in the model such as profitability, size, tangibility, liquidity, risk, the effective tax rate, ownership, interest rate and GDP, while the remaining 31.5% is influenced by other variables outside the system such as small sample size, small sample period or small number of tested variables. The authors suggest the further research to investigated more variables to increase the explanatory level on the regression model and provides better capital structure choices. Hopefully, the larger explanatory variables could represent the ideal financing behavior. Hence, the authors recommend the further research to investigate the capital structure determinants analysis broadly by comparing telecom to other industry in Indonesia or other country by using different methodology to discover new findings.

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