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The Effect of Capital Structure on Telecommunication Firm Performance: An International Evidence

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ABSTRACT

This study analyzes the effect of capital structure on the performance of telecommunications firms. The firm performance is measured by return on assets while capital structure is proxied with the ratio of debt total assets. Data of telecommunication firm in 62 countries period of year 2010-2020 proceed with a dynamic data panel regression model using the generalized method of moment approach. The empirical results indicated that capital structure of telecommunication firm has significantly impact to the firm performance in developed and developing countries as well as in integrated and wireless telecommunication firms. The other factors that effect on firm performance are firm size and growth. The novelty of this study lies in the scope of analyses that cover world-wide telecommunication industry based on demographic group (developed and developing countries) and main businesses (integrated and wireless telecommunication).

Introduction

The studies on the impact of capital structure to firm performance mostly perform based on country total industry. Ibhagui and Olokoyo (2018) reveal that impact of capital structure on firm performance in Nigeria is negative. The same result stated by; Nguyen and Nguyen (2020) in Vietnam; Nenu et al (2018) in Rumania; Monga (2018) in India; Salim and Yadav (2012) in Malaysia; Antoniou et al (2008); Zeitun and Tian (2007) in Jordan. Meanwhile Wibowo and Rahim (2019) concluded positive effect of capital structure on company profitability, where structure of capital computed as ratio of debt to assets and debt to equity while firm profitability proxied by operating income margin and return on equity. Several study with the positive relationship between capital structure and firm performance are Abdullah and Tursoy (2019) for non-financial firms in Germany; Margaritis and Psillaki (2007); Berger et al (2006); Abor (2005) and Doorasamy (2021) in East Africa.

Telecommunications sector is capital intensive and high leverage. Huge capital is needed to cope with innovations and technology that are constantly evolving (Dorselaer dan Breazeale, 2011). Shifting from fixed telephone and short message service to mobile data and internet services require the development of mobile and broadband network with business expansions need capital. This leads to the importance of capital structure decision that determine the mixture of internal and external funding for telecommunication firm. Getzman et al (2015) stated that telecommunication recorded highest portion of debt compares to other industries in Europe and US, and the third highest leverage in Asia.

The high competition suppressed the telecommunication business performance. The deregulation and competition that become trend are determine factor of telecommunication investment (Heimeshoff, 2013) and impact to increase country economic. In micro level, deregulation and competition trigger the price war among telecommunication operator and lead to lowering operating margin. The

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convergence with internet applications such as Whatsapp, Netflix, Amazon, GoTo that require telecomunication operators continue to invest although profit tend to decline.

This research provides the analyses of telecommunication firm capital structure and its impact to firm performance. Financial report data of telecommunications companies that listed in 62 countries are compiled from Datastream while the source of macro-economic data obtain from World Bank. The descriptive statistics perform to describe the brief summary of capital structure and dynamic data panel analysis carried out to acknowledge the impact of capital structure to firm performance. The results shows that capital structure of telecommunication firms on the periods of research show uptrend pattern over the time and indicated that capital structure significantly affected to firm performance both in developed and developing countries, as well as in integrated and wireless telecommunication.

The result indicated the reverse relationship between long-term capital structure and firm performance, meaning that the increase of long-term debt will decrease the firm performance in all groups. Meanwhile for short-term debt, the reverse relationship occurs in developing country and integrated telco, while in developed country and wireless telco, increase of short-term debt will decrease firm performance. The other factors that also indicated impact to firm performance are firm size and growth.

The main contribution of this research is the empirical result of telecommunication firm capital structure impact to firm performance in world-wide evidence. This result will enrich the academic research on corporate finance especially in capital structure on telecommunication sector. This study will be beneficial to several telecommunication business enthusiast: manager, banker, fund manager and policy maker as based line consideration.

The rest of the paper is structure as follows. After the introduction, there are four parts presented: literature review section that review both theoretical and empirical studies, next part introduces the background information on research and methodology section, follows with the findings and discussion section that provide result of study and implications. Finally, paper concludes with key points, recommendations, future research directions and limitations.

Literature Review

Frank and Goyal (2009) classify capital structure theory into large groups related to the bankruptcy costs, namely trade off theory and pecking-order theory which related to agency costs and information asymmetry. The trade-off theory states that there is an optimal condition for the company's capital structure. The optimal condition is achieved when the present value of the marginal cost of tax benefits from additional debt is equal to the present value of the marginal cost of financial distress because of additional debt (Modigliani and Miller, 1963). Trade off theory shows the importance of limiting debt. In other words, this theory implies an optimal ratio between debt and equity that maximizes firm value.

The pecking-order theory is based on the information asymmetry theory. Companies prefer use internal funds compared to external funds. This theory also assume that companies prefer debt to equity, because there is no clear definition of the optimal capital structure that must be achieved (Myers, 1984; Myers and Majluf, 1984). Therefore, the company's investment will first be financed from internal funds, then debt, then equity as the last source of financing (Abor, 2005). If external funding is needed, the company will start from the lowest-cost funding, start from debt, then to the higher-cost funding, shares (Gitman and Zutter 2015).

Kayhan and Sheridan (2007) state that leverage is higher when there is a financial deficit. In other words, from a debt perspective, leverage is lower when the company is profitable (Fama and French, 2002) and from a profitability perspective it is higher when the company has more investment opportunities (Antonoiu et al 2008). Myers and Majluf (1984) state that companies with high levels of profitability are companies with low levels of debt because companies with high profitability have large internal sources of funds. Gitman and Zutter (2015) also state that companies with high profitability have low debt.

The study related to impact of capital structure to performance of telecommunication company is limited. Khan et al (2018) on Indian telecom companies reveal that leverage has inverse relationship with performance while company size and growth have direct relationship. Velnampy and Anojan (2014) study on telecommunication firm in Srilanka, find that capital structure is negatively correlated with profitability. Antoniadis et al (2020) result on telecommunication firms in eastern europe and the black sea region find that leverage has a negative and statistically significant effect on profitability while the size of the firm and liquidity are not statistically significant.

Research Methodology

The research classified worldwide telecommunications companies into four group to explore impact of capital structure to each specific group. Based on location, the group are developed and developing country, while based on main business are integrated telecommunication (integrated telco) and wireless telecommunications (wireless telco). The classification of developed and developing countries follows the grouping of the M49 code issued by the United Nations statistics bureau which is also used by the international telecommunication union, while main telecommunication business grouping base on Datastream classification.

The selection of research variables is based on theory and previous study. The company's performance as the dependent variable proxied by return to assets, while the company's capital structure is proxied by the short-term ratio and long-term debt ratio. Other

independent variables are company size and company growth. The concept, measurement and reference of research variables are as shown in Table 1.

Table 1: Concept and Measurement of Research Variables

Variable	Measurement
Firm performance is proxy by Return OnAssets (ROA)	ROA = Earning before interest and tax / total assets. References: Antwi (2021), Nguyen and Nguyen (2020), Dodoo RNA(2020), Zaidanin (2020), Rashid and Linda (2019); Nenu et al (2018), Ibhagui and Olokoyo (2018), Iqbal & Usman (2018),Dananti *et al* (2017), Cheema (2017), Ashraf *et al* (2017), Nguyen (2016), Vatavu (2015), Salim and Yadav (2012)
Short term capital structure proxy by Short Term debt to asset Ratio (STR)	STR = short-term debt / total assets References: Nguyen and Nguyen (2020), Nenu, et al(2018), Ibhagui and Olokoyo (2018), Danantie*t al* (2017), Cheema (2017), Ashraf *et al* (2017), Nguyen (2016), Vatavu (2015), Salim and Yadav (2012), Taani (2012), Ebaid (2009).
Long term capital structure proxy byLong Term debt to asset Ratio (LTR)	LTR = short-term debt / total assets. References: Nguyen and Nguyen (2020), Nenu et al(2018), Nirajini and Priya (2013), Taani (2013), Salim and Yadav (2012)
Firm size proxy by total assets (Size)	*Size* = Ln total assets References: Nguyen and Nguyen (2020), Dodoo RNA(2020), Rashid and Linda (2019), Ying et al (2016), Getzmann et al (2015), Salim and Yadav (2012), Getzmann et al (2010), Deesomsak et al (2004)
Firm growth as proxyby sales growth (Growth)	*Growth* = (Salest - Salest-1) / Salest-1 References: Nguyen and Nguyen (2020), Dodoo RNA(2020), Al Shiab (2015), Salim and Yadav (2012)

The analytical method used both descriptive statistical and quantitative analysis of dynamic panel data. Data processing employs a dynamic data panel regression model with the generalized method of moments estimation method Arrelano and Bond (1991). Generalized method of moments regression implied to capture endogeneity and heterogeneity issues that eliminates fixed effects with first differences of variables andusing the lagged values of explanatory variables as instruments.

The mathematical model used for dynamic panel data processing is as follows:

$$ROA_{it} = \alpha 0 + \alpha 1 ROA_{t-1} + \alpha 2 STR_{it} + \alpha 3 LTR_{it} + \alpha 4\ Size_{it} + \alpha 5 Growth_{it} + \varepsilon i$$

where :

ROA_{it} = Earning before interest and tax divided by assets i in year t

ROA_{t-1} = Earning before interest and tax divided by assets i previous year

STR = Short-term debt divided by total assets

LTR = Long-term debt divided by total assets

Size = Ln total assets

Growth = Firm sales growth

i = individu: country or firm

t = year 2010 - 2020

ε = error term

$\alpha 0$ = intercept (constant)

$\alpha 1 - 5$ = regression coefficient

The research hypothesis is as follows:

H1: Capital structure of long-term debt ratio has a positive effect on the firm performance

H2: Capital structure of short-term debt ratio has a positive effect on the firm performance

H3: Firm size has a positive effect on the firm performance

H4: Firm growth has a positive effect on firm performance

Findings

Descriptive statistics

Table 2 informs the results of descriptive statistics in the form of the number of observations, mean, standard deviations, minimum and maximum values of five variables in four the model: developed country, developing country, integrated telco and wireless telco. Total leverage ratio of telecommunications industry is the sum of short-term ratio (STR) dan long-term ratio (LTR) is between 25. 3% in developing country and 30.5% in developed country. This leverage level is on the range of total industry leverage as reported in previous study. Leverage of total industry firm in Vietnam is 51.92% (Le and Nguyet, 2017), eight European countries is 16.1% - 38.7% (El Charaani, 2014), Pakistan is 10.8% - 41.6% (Cheema et al, 2017), Margaritis and Psillaki (2007) stated that leverage ratio is 26.9 - 34.0% in New Zealand.

Table 2: Descriptive statistics

Variable	Observations	Mean	Std Dev	Min	Max
Developed country					
STR	1177	0.062	0.095	0	0.779
LTR	1177	0.243	0.190	0	0.941
Growth	1070	0.148	3.300	-1	107.5
Size	1177	6.098	1.282	1.699	8.742
ROA	1177	0.045	0.267	-6.259	0.884
Developing country					
STR	1122	0.070	0.093	-0.853	0.940
LTR	1122	0.183	0.169	0	0.909
Growth	1020	0.111	0.450	-1	8.212
Size	1122	6.290	0.974	3.387	8.413
ROA	1122	0.088	0.117	-0.619	0.762
Integrated Telecommunication Business					
STR	1453	0.067	0.097	0	0.794
LTR	1453	0.215	0.184	0	0.941
Growth	1322	0.067	0.349	-0.995	4.546
Size	1453	6.188	1.133	2.076	8.742
ROA	1453	0.075	0.113	-1.214	0.884
Wireless Telecommunication Business					
STR	846	0.064	0.090	-0.853	0.940
LTR	846	0.213	0.181	0	0.909
Growth	846	0.238	3.901	-1	107.5

Variable	Observations	Mean	Std Dev	Min	Max
Size	846	6.198	1.169	1.669	8.357
ROA	846	0.051	0.31	-6.259	0.662

Table 2 show that total leverage, debt ratio both short and long-term in developed country (30.5%) is higher than developing country (25.3%). Loan interest rate in developed country is lower and the access to loan facilities is easier compared to developing country, hence firm in developed country experience higher leverage (Lemma and Negash, 2014; Getzmann et al, 2015). In contrary, Spitsin et al (2020) study on capital structure in Russia, conclude that country with transitional economiesand developing country tend to be high leverage.

Based on business group, leverage of telecommunications company shows that integrated telco (28.3%) is higher than wireless (27.7%), both in long term and short- term debt ratio. Integrated telco experienced higher leverage than wireless since wireless telco relatively more cash rich. Wireless telco success in applying the advancepayment of their mobile services, compare to wireline and home telephone that still implement monthly post service payment.

Leverage of long-term ratio (18.3%-24.3%) is higher than short-term ratio (6.2%-7.0%).The important element of telecommunication firm is network infrastructure that has long economic benefit. Hence, telecommunication firm has higher long-term leverage because firms utilize their fixed asset as collateral for long term debt.

The average growth of telecommunications companies is in the range of 11.1% - 23.8%, where the largest growth is in the wireless telco business group, while the smallest occurs in developing countries. Wireless telco business experienced higher growth since this wireless service support the consumer lifestyle preference that more personal and mobile. Hence, growth of subscriber of mobile both cellular and broadband higher than fixed service (ITU, 2020). Growth of wireless telco services alsosupported by the innovation of smartphone devices technology and application that inspire multi device and subscriber.

Return on assets of global telecommunication industry, between 4.5% in developed country and 8.8% in developing country, considerably as lower level on the range of total industry as reported in previous study. Return on assets of total industry in German as 7.45%-7.82% (Abdullah and Tursoy, 2019), in ten countries European small medium enterprise is 4.3% (Li et al, 2017), in Gulf countries as 6% (Zeitun and Haq, 2015), in Vietnam as 6.32% (Le and Nguyet, 2017); 7.6% (Phung and Le, 2013), in Rumania as 3% (Nenu et al, 2018), in textile industry Pakistan as 17.39% (Iqbal andUsman, 2018), in New Zealand as 27.5% (Margaritis and Psillaki, 2007).

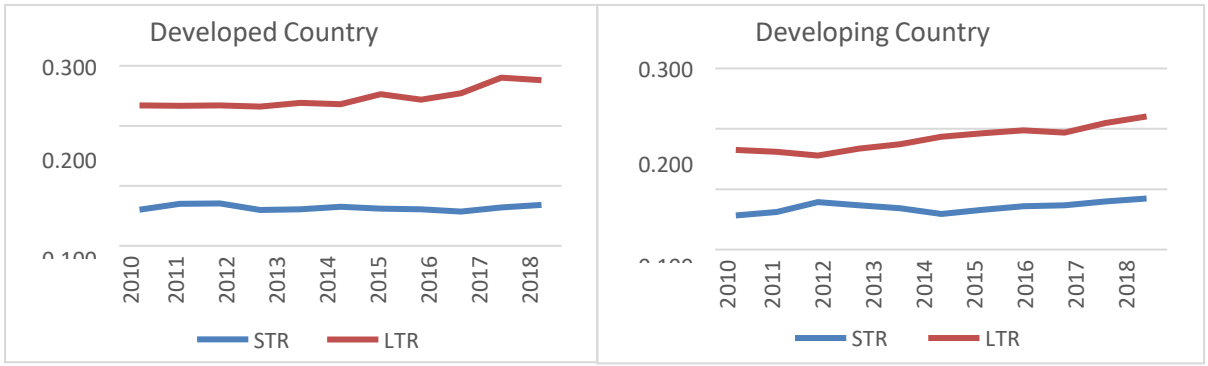

Figure 1: Yearly leverage in developed and developing countries

Figure 1 shows time series of yearly leverage in developed and developing countries during research period. Long-term debt ratio is higher than short-term debt ratio and both of them experience uptrend. It is also seen that the incremental of capital structure in developing countries is higher than developed countries.

The upward trend in capital structure can also be seen in the integrated and wireless telco as shown in Figure 2. Likewise, the ratio of long-term debt ratios is consistently higher than short-term.

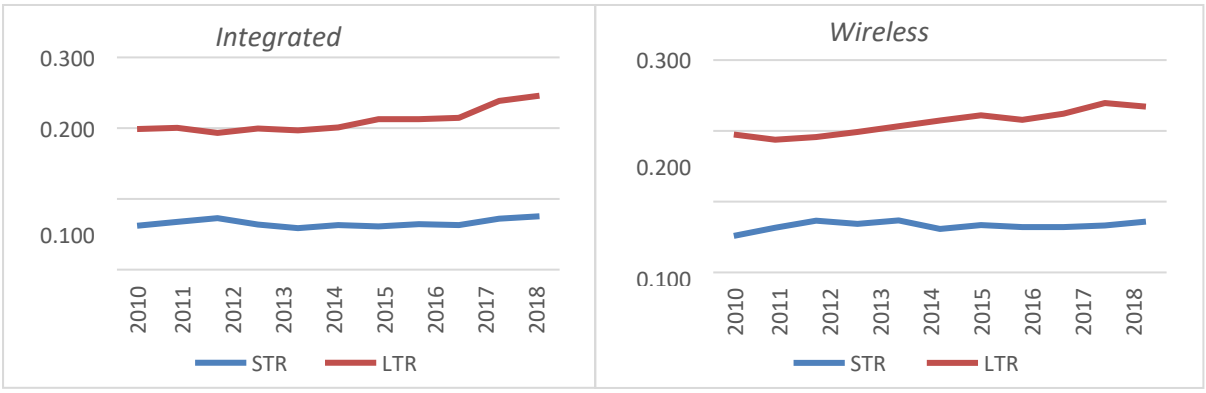

Figure 2: Yearly leverage of the integrated and wireless telecommunications

Figure 3 show yearly performance of telecommunication companies tends to decline during the research period from 2010 to 2020. The firm performance of companies in developing countries is higher than developed countries. The two groups of countries experienced a declining trend in performance, although for the developed country group in 2013 and 2017 there was an increase. Firm performance in the developing country group recorded negative growth rate of -0.57% compared to the developed country group of -0.34%.

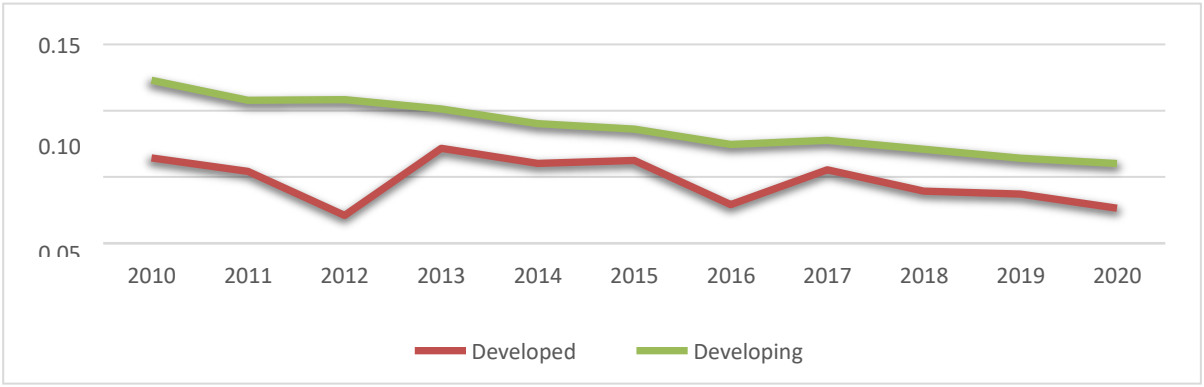

Figure 3: Yearly performance in developed and developing country

Yearly performance of telecommunication firm by business group presented in Figure 4. It shows that integrated telco experience higher performance than wireless telco companies. However, the decline in the performance of integrated telco was deeper with an annual growth rate of -0.44% than decline of -0.38% for wireless telcos. Duringthe period 2010 to 2020, wireless telcos experienced a downward trend even though their performance fluctuated, compared to integrated telcos, which tended to consistently slope down every year.

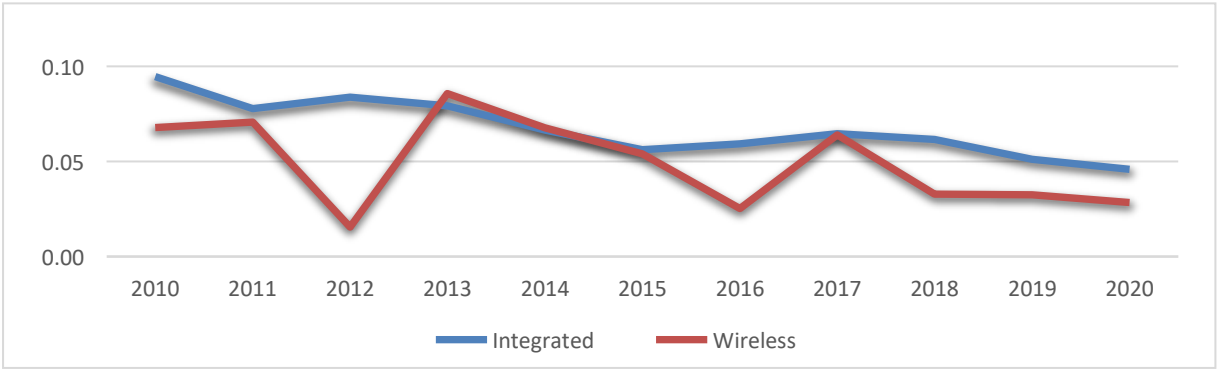

Figure 4: Yearly performance in integrated and wireless telecommunications

Data Panel Analysis

The analysis performed into two perspectives, based on country characteristics:developed and developing countries, and based on the main business: integrated andwireless telecommunication. This approach performed to accommodate specific groupcharacteristics of country and business firms since this research cover world-wide telecommunication firms.

As show in Table 3, estimation result for developed country and integrated telecommunication estimated using the dynamic panel model as one period lag of ROAt-1 is significant. The positively significant coefficient of one period lag of return of assets means that company performance of the previous year has positive relationship or has positive effect to current performance of telecommunicationscompanies in developed country and integrated telco.

Table 3: Generalized methods of moment estimation results

Variable	DevelopedCountry	DevelopingCountry	IntegratedTelco	WirelessTelco
ROAt-1	0.325*		0.317*	
LTR	-0.119*	-0.096*	-0.070*	0.068*
STR	0.022*	-0.106*	0.019*	-0.055*
Size	2.735*	-7.622*	-1.060*	-7.705*
Growth	0.232*	0.304	0.137*	0.072
Constant	-7.022*	10.794*	0.131	11.529*
N	234		932	
R2		0.113		0.114
F Test		6.370		8.868
AR (1)	-2.304		-3,807	
	(0.021)		(0.000)	
AR (2)	1.359		-1.040	
	(0.174)		(0.299)	
Sargan Test	0.2250		0.0299	

Note: Significant level * p<0.1

Estimation result on Table 3 shows that capital structure and firm size impact significantly to firm performance with different sign. In developed country, the relationship between capital structure and firm performance has different sign while indeveloping country capital structure both long and short term has same negative impact to performance. While the other factors: firm size and growth has positive effectin developed and developing country. Based on business, both integrated and wirelesstelco has different relationship between capital structure and performance. Firm size has inverse relationship while growth has positive sign.

The long-term debt ratio (LTR) in the four models has a significant negative effect on the firm performance for all groups at 0.1%-10% significance level. The outcomes indicate that every 1% increase in long term debt ratio led to decrease of thetelecommunication firm return on assets in developed country, developing country, integrated telco, and wireless telco of 11,9%;9.6%;7% and 6.8% respectively. This inverse relationship between long term debt ratio and telecommunication firm performance is in accordance with previous study of Monga (2018) that found a negative relationship between capital structure and profitability in the Indian telecommunications sector. Several study for non- financial industries show similar result are Nguyen and Nguyen (2020); Le and Nguyet (2017) for non- financial firms inVietnam, Mwangi et al (2012) on non-financial firms in Kenya, and Ogieva et al (2019) on Nigerian multinationals companies.

The short-term debt ratio (STR) also has significant and positive impact in developed countries and integrated telco, while for developing country and wireless telco the effect is significant and negative. The result show that every 1% increase in the short-term debt ratio would have impact on return on assets in developed country and integrated telco to rise by about 2.2% and 1.9% respectively, while in the developing country and wireless telco would impact to decrease return on assets by about 10.6%and 5.5% respectively. Positive relationship between short term debt ratio with firm performance is in line with Iqbal and Usman (2018) finding in textile industry in Pakistan, while inverse relationship between short term debt ratio with performance as study of Nguyen and Nguyen (2020); Le and Nguyet (2017) in Vietnam.

Size of the company has a significant effect on the performance of the company in thefour models with different signs. Negative signs are seen in three groups, namely developing countries, integrated telco and wireless telcos but in developed country theimpact show positive sign. This indicates the increase of firm size would impact declines company performance in developing country, integrated and wireless telco, while in developed country, will lead firm performance decrease. The inverse relationship between size and firm performance is in line with study of Lazar (2016); Margaretha and Supartika (2016); and Ramasamy et al. (2005). The positive effect ofsize to performance as occur in telecommunication firm in developed country is in accordance with Nguyen and Nguyen (2020) study in Vietnam, Spitsin et al (2021) in Rusia and El Charaani (2014) in European.

The company's growth shows a significant positive effect on the company's performance in developed countries and integrated telco. Estimation result indicate that every 1% increase in firm growth would impact to return on assets in developed country and integrated telco to rise by about 23.2% and 13.7% respectively. The same conclusion reported by Zeitun and Tian (2007) and Nunes et al (2009) that found the positive relationship between firm growth and performance. Dodoo et al (2020) whoexamined the determinants of company performance in Ghana, stated that companiesexperiencing increased sales growth, performed better than businesses with fewer sales.

As implication, management of telecommunication firm should anticipate severalfactors to improve firm performance. Given that company size in developing country has inverse relationship with performance, management has to have special attentionon expansion strategy. Business development and expansion initiatives are encouraged to minimum assets additional that refrain the size of the company.Therefore, an alliance and partnership strategy are preferred option. Positive relationship between growth and performance in developed countries and integrated telco, motivate manager to increase marketing efforts aggressively to improve firm performance.

Conclusions

Capital structure has a significant effect on the performance of world-wide telecommunications companies. This result is in line to previous study on telecommunication firm on specific country, Velnampy and Anojan (2014); Monga (2018); Khan et al (2018); Antoniadis et al (2020). The capital structure of long-term debt has a negative impact on the performance of telecommunication firms in all groups: developed and developing country, integrated and wireless telecommunication. Meanwhile for the short-term debt, the effect is positive in developed country and integrated telecommunication but negative in developing country and wireless telecommunication.

Another factor that affects the company's performance is size and growth of the company. Firm size has a significant effect on performance in all groups with different signs, having a positive effect in developing country, integrated and wireless telecommunication, while the impact is negative in developed country. The company's growth shows a significant positive effect on performance of telecommunication companies in developed country and integrated telecommunication.

This research indicator focuses on financial aspect of firm. Further research can investigate firm specific factors that related to decision makers and other external factor such as banking, capital markets, or customer's perspective while firm performance could explore surrounding aspect such as environment sustainable growth or good corporate governance indicator. The exploration on research methodology and the industrial or country comparison are the options for further research.

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