THE INFLUENCE OF MULTINATIONALITY ON DETERMINANTS OF CHANGE IN DEBT LEVEL
Empirical Evidence from Indonesia

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This study aims to investigate whether: (1) the change in debt level is affected by agency problems, the probability of bankruptcy, firm size, and profitability; (2) the change in debt level is affected by multinationality (i.e., multinational corporations (MNCs) or domestic corporations (DCs)) and whether multinationality affects the relationship of agency problems, probability of bankruptcy, size, and profitability to the change in debt level. This study finds that in general, the change in debt level is negatively affected by the probability of bankruptcy and size. Furthermore, the changes in debt level for Indonesian MNCs are negatively affected by the probability of bankruptcy, firm size, and profitability. The negative effects of size and profitability on the change in debt level support the view of the Pecking Order Theory. However, for domestic companies, none of the determinants has a significant effect on the change in debt level. We also find that: (1) only size has a negative influence on the change in debt level when we include all interactive terms in the model; (2) if we include one interactive variable at a time, the probability of bankruptcy, firm size, and profitability have

negative influences on the change in debt level; in addition, a positive impact of agency problems on the change in debt level is more pronounced for MNCs compared to DCs. Overall, we conclude that multinationality affects the relationship between agency problems and the change in debt level.

Introduction

Globalization induces multinational firms (henceforth MNCs) to conduct foreign direct investments (FDIs) in developing countries such as Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand, and Vietnam. Economists consider an FDI to be a major driving force for economic growth. It contributes to national economic measures, such as Gross Domestic Product (GDP), Gross Fixed Capital Formation (total investment in a host economy), and balance of payments (Nugroho and DTE 2006). They also argue that an FDI promote development since it could provide sources of new technologies, processes, products, organizational systems, and management skills to the host country or firms that receive the investment. Furthermore, it may provide a company with new markets and marketing channels, cheaper production facilities, and an access to new technologies, products, skills and financing.

According to the Investment Coordinating Board, the net value of FDIs (the inflows of FDIs minus the outflows) in Indonesia after the crisis in 1998, as shown in Table 1, tend to decrease even though the growth rates were positive in 2002 and 2004 (Tambunan 2006). However, the number of new FDI projects is greater than that of new projects funded by domestic investments, as shown in Figure 1. Thus, the role of FDIs is more important in direct investments than domestic investments (see Figure 1). Based on the growth of MNCs in Indonesia, it is an empirical issue to investigate how financing decisions made by MNCs differ from those made by domestic firms (henceforth DCs); in other words, it is compelling to examine whether multinationality affects the debt financing decision. Studying the effect of multinationality in Indonesia matters because previous studies show that: (1) MNCs have relatively larger size, lower cash flow volatility, and a better access to international capital markets (Mitto and Zhang 2008), and (2) country-specific factors have a strong influence on the firm's capital structure (e.g., Rajan and Zingales 1995).

Table 1. **The Net Values of Foreign Direct Investment Flows to Indonesia during Years 1990-2004 (in Million USD)**

Year	Value	Year	Value
1990	1.093	1998	-0.356
1991	1.482	1999	-2.745
1992	1.777	2000	-4.550
1993	2.004	2001	-2.978
1994	2.109	2002	0.145
1995	4.346	2003	-0.597
1996	6.194	2004	0.423
1997	4.667		

Source: Bank Indonesia (The Indonesia Central Bank) : Indonesia Financial Statistics, several sequential publication until February 2005, in Tambunan (2006).

Note: The Foreign Direct Investment Inflow including Privatization of State-Owned Enterprise to foreign parties and bank restructuring, mainly the selling of bank assets to foreign investor.

Figure 1. **The Growth of Total Foreign Direct Investment Projects and Total Domestic Investment Projects Approved by the Indonesian Investment Coordinating Board**
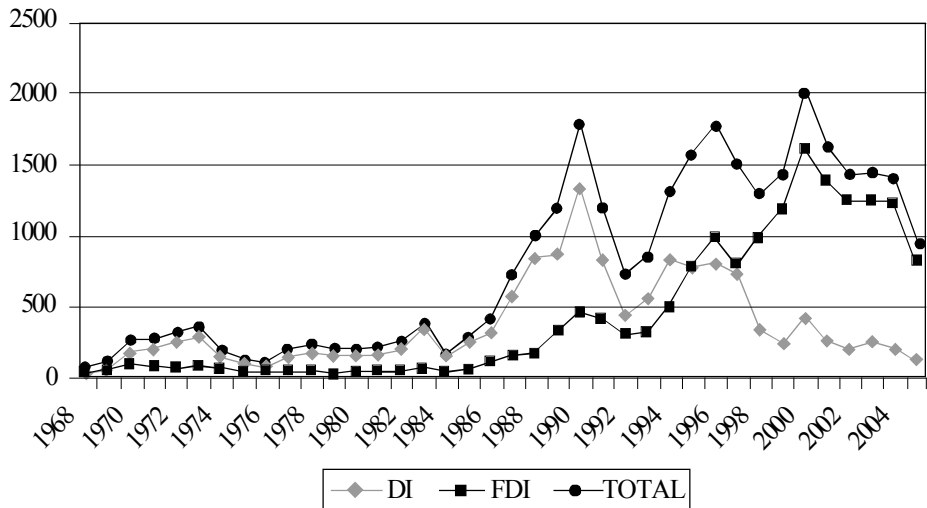
Source: Badan Koordinasi Penanaman Modal or BKPM (2004) in Tambunan (2006)

Michael and Shaked (1986) define MNC as a firm with foreign sales of at least 20 percent of its total income, and that invests its capital at least in six countries. In general, the business activities of an MNC are coordinated by a holding firm located in its country of origin (Yuliati and Prasetyo 1998). Eiteman et al. (2007) argue that MNCs should be able to maintain the optimal debt ratio to finance their operations due to their abilities to undertake international diversification. However, some factors, such as agency problems, the possibility of bankruptcy, profitability and firm size, could also affect the debt levels of MNCs.

Burgman (1996) finds that the agency problems of MNCs are higher than those of DCs, thereby reducing their leverage. MNCs have larger audit costs, higher cultural differences, higher political risks, and different accounting systems. Consequently, investors are faced with high asymmetric information and agency costs. As a result, the agency problems are strengthened in MNCs compared to in DCs.

Furthermore, in contrast to DCs which operate in a single country, MNCs are affiliated with other firms in different countries. This has created an opportunity for the MNCs to reduce the bankruptcy risk on account of their abilities to diversify their businesses. Therefore, the lower bankruptcy risk should reduce the cost of debt and increase the capability of debt payment. Hence, the likelihood of MNCs' bankruptcies has a negative influence on the debt financing (Doukas and Pantzalis 1997).

Other factors that are found to influence the capital structure decision are firm size and profitability (Rajan and Zingales 1995). Firms with larger size have more asymmetric information, so they will bear higher cost of debt when they seek the debt financing through the capital markets. The size of MNCs is expected to be larger than that of DCs; accordingly, the leverage of MNCs is estimated to be lower than that of DCs.

On the other hand, Copeland, Weston, and Shastri (2005) and Fama and French (2002) find that higher corporate profits cause firms to rely more on retained earnings than debt to finance their investment activities. Therefore, MNCs with higher profitability would be able to rely on retained earnings instead of debt.

Based on the discussion above, this study aims at answering the following questions:

1) Is there any influence of agency problems, the probability of bankruptcy, firm size, and profitability on the change in debt level?

2) Is there any effect of multinationality (i.e., MNCs or DCs) on the relationship between agency problems, the probability of bankruptcy, firm size, profitability, and the change in debt level?

Heretofore, most studies conducted in Indonesia investigated the determinants of debt level without distinguishing the multinationality status

(e.g., Tahirman 2000; Purba 2001; and Permana 2005). On the other hand, empirical studies in international settings which examine the debt levels of MNCs are numerous (e.g., Michael and Shaked 1986; Lee and Kwok 1988; Burgman 1996; and Chkir and Chosset 2001). In Indonesia, these studies are relatively rare (e.g., Kusuma 1999; Vera et al. 2005). In contrast to previous research in Indonesia, this study: (1) investigates the determinants of changes in debt levels of MNCs compared to those of DCs; (2) directly compares the differences in the determinants of changes in debt levels between MNCs and DCs in a single regression model with an interaction variable, which acknowledges the influence of multinationality on the relationship between the determinant factors (i.e., agency problems, the probability of bankruptcy, firm size, and profitability) and the change in debt level; (3) has two objectives, i.e., to investigate the determinant factors of the change in debt level without considering multinationality and to investigate the change in debt level after taking multinationality into account. Therefore, the contribution of this research is to extend the scope of previous studies in determining the change in debt level in Indonesia based on multinationality.

The paper is organized as follows. In section 2, we provide theoretical framework and develop hypotheses. In section 3, we elaborate on research designs, including sample selection and data collection. Section 4 provides empirical tests, and section 5 discusses our conclusion.

Theoretical Framework and Hypotheses Development

The Influences of Agency Problems, the Probability of Bankruptcy, Firm Size, and Profitability on the Change in Debt Level

Easterbrook (1984) and Jensen (1986) state that excess free cash flows[2] raise the conflict of interests between stockholders and managers. Managers tend to invest excess funds below the cost of capital or spend them for personal gains, such as management perks, rather than distribute them as dividends to stockholders. Thus, higher free cash flows are positively associated with more severe agency problems, as manifested by the conflict of interests between the principal (stockholders) and the agent (managers).

Jensen and Meckling (1976, 1986, 1989); Stulz (1990); Maloney et al. (1993) explain that debt can be used to reduce the conflict of interests between stockholders and management. In other words, the debt also provides management disciplines (Rubin 1990). The periodic payment of interest and

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[2] Excess free cash flows are cash flows in excess of that required to fund all projects that have positive NPVs.

principal of debt should limit the flexibility of management to use free cash flows for self-interested behavior (Control Hypothesis). Furthermore, default on the interest payment can result in management losing their jobs (Threat Hypothesis).

Several empirical studies corroborate the self-interested behavior of managers in making capital structure decisions to avoid the disciplinary roles of debt, for instances, increasing management's shareholding tends to reduce debt to equity ratio (Friend et al. 1988), or entrenched CEOs make efforts to stay away from debt, and gearing ratios remain lower in the absence of demand from owners (Berger et al. 1997). Accordingly, debt reduces the agency cost of free cash flows by reducing the cash flows available for spending at the discretion of managers (Stulz 1990; Harris and Raviv 1991; and Doukas and Pantzalis 2003).

Hence, greater agency problems will encourage firms to increase the use of debt to control for potential conflict of interests between shareholders and managers.

HI.1: Agency problems are positively related to the change in debt level.

Altman (1968), Douglas and Finnerty (1997), and Akhtar and Oliver (2009) find that the probability of bankruptcy has a negative influence on the change in debt level. A firm that has a high level of possibility of bankruptcy would be difficult to get financing from debt as its cash flows are deemed not

sufficient to pay the interest and principal of debt. In the trade-off theory, capital structure decisions of firms depend on benefits and costs of using more debt. Less debt is used if the cost of bankruptcy is higher than the tax shield benefit or other benefits from using more debt (Kim and Sorensen 1986; Graham 2000). Therefore, firms with a high likelihood of bankruptcy will reduce the use of debt.

HI.2: The possibility of bankruptcy is negatively related to the change in debt level

Rajan and Zingales (1995) state that there is a negative relationship between debt and firm size since informational asymmetries among insiders in a firm and the capital markets are lower for large firms. So, large firms should be more capable of issuing informationally sensitive securities like equity, thereby having lower debt. Consequently, a large firm will rely on retained earnings to finance its investment activities; when it raises external financing, it will prefer equity rather than debt (Graham 2000; Tong and Green 2005). In other words, the increase in firm size will induce the firm to rely more on retained earnings or equity issuance and to reduce the use of debt.

HI.3: Firm size is negatively related to the change in debt level.

In accordance with the pecking order theory, the higher the profitability of firms, the more likely the firms rely on retained earnings. This is because external financing through the capital

markets requires high disclosure and transparency of information due to the existence of asymmetric information (Myers and Majluf 1984). This implies that profitable firms will retain earnings and become less levered whereas unprofitable firms will borrow and become more levered, thus creating a negative relation between profitability and the probability that external financing is raised. This argument is also supported by Rajan and Zingales (1995), Shyam-Sunder and Myers (1999), and Fama and French (2002), who find that profitability is negatively related to debt ratio. Thus, an increase in profitability will cause a firm to rely more on retained earnings, and consequently the use of debt will be lower.

HI.4: Profitability is negatively related to the change in debt level.

The Influence of Multinationality on the Relationship of Agency Problems, the Probability of Bankruptcy, Firm Size, and Profitability to the Change in Debt Level

In this section, the first four hypotheses are not different from those developed in the previous section. This section focuses on the influence of multinationality on the relationship of agency problems, the possibility of bankruptcy, profitability, and firm size to the change in debt level.

As mentioned earlier, MNCs with operations in many countries have various advantages, such as international diversification. MNCs can reduce the cost of capital and are more resilient to face an unfavorable change in a country since the sources of their operating cash flows are not concentrated only in one country (Eiteman et al. 2007). Sing and Nejadmalayeri (2004) find that international diversification is positively associated with higher leverage for the sample of French corporations. Meanwhile, Mittoo and Zhang (2008) provide evidence that Canadian MNCs have higher leverage relative to Canadian DCs. This is also substantiated by Vera et al. (2005), who find that MNCs have more debt than do DCs. Thus, MNCs should experience a higher change in debt level compared to DCs due to their relatively lower cash flow volatility and easier access to international capital markets.

HII.5: The change in debt level for MNCs is higher than that for DCs.

Burgman (1996) and Vera et al. (2005) state that MNCs are faced with higher auditing costs, language differences, sovereignty uncertainties, and varying legal and accounting systems. In addition, their investors are confronted with wider informational gaps and higher costs of investigation. Hence, MNCs are likely to face significantly higher monitoring costs than DCs, and consequently suffer from higher agency problems than do DCs. Similarly, others argue that the agency costs of MNCs are higher than those of DCs

since they are more difficult to monitor due to increased complexity and geographic diversity (Aggarwal and Kyaw 2010). Consequently, because the agency problems of MNCs are expected to be higher than those of DCs, a higher debt level will be needed to mitigate the agency problems (Jensen and Meckling 1976, 1986, 1989; Stulz 1990; Maloney et al. 1993; Rubin 1990). Therefore, we expect that the positive relation between agency problems and the change in debt level is stronger for MNCs than DCs.

HII.6: The positive relation between agency problems and the change in debt level is more pronounced for MNCs compared to DCs.

The possibility of bankruptcy of MNCs is expected to be lower than that of DCs as MNCs operate in various countries which are not perfectly correlated and giving rise to diversification opportunities for the MNCs. Consequently, the overall cash flows of MNCs will be more stable, thereby reducing the probability of bankruptcy and increasing the ability of debt financing (Shapiro 1978 in Lee and Kwok 1988). The argument of more stable MNCs' cash flows compared to DCs' is also corroborated by Burgman (1996) and Eiteman, Stonehill, and Moffett (2007). The main rationales are: (1) MNCs have a range of revenues not only from the country of origin, thereby increasing cash flows available for debt payment and (2) MNCs have a better ability to manage and hedge against ex-

change rate risk. Furthermore, Doukas and Pantzalis (2003) also argue that since the operations of MNCs are industrially and geographically diversified, the business and financial risks of MNCs are expected to be lower in comparison to those of DCs. Hence, it suggests that financial distress for MNCs should be relatively low, leading to reduced cost of debt and rising MNCs' leverage. Therefore, the negative relationship between the possibility of bankruptcy and the change in debt level should be stronger for MNCs than DCs.

HII.7: The negative impact of the possibility of bankruptcy on the change in debt level is stronger for MNCs than DCs.

Based on the definition of MNC by Michael and Shaked (1986) and Rajan and Zingales (1995), which have been described previously, MNCs have subsidiaries at least in six countries. Accordingly, the size of MNCs is larger than that of local firms. Consequently, if size is a proxy for financial information, outside investors should prefer equity relative to debt, and size should result in a lower change in debt level for MNCs.

This argument is also supported by Doukas and Pantzalis (2003), arguing that since MNCs are larger firms with a greater internal capital market advantage, they will have more resources available to undertake new investment projects, and therefore size should be inversely related to the use of debt.

HII.8: The negative relationship between firm size and the change in debt level is stronger for MNCs than DCs.

Previous studies show that MNCs have a better opportunity than do DCs to earn more profit mainly due to having an access to more than one source of earnings and a better chance to have favorable business conditions in particular countries (Kogut 1985; Barlett and Ghoshal 1989). Therefore, according to the pecking order theory, MNCs rely more on retained earnings rather than external financing such as debt to finance their operational activities (Burgman 1996). In other words, the use of MNCs' debt will decline because MNCs have higher profitability than do DCs, and will rely more on retained earnings instead of debt.

HII.9: The negative relationship between profitability and the change in debt level will be stronger for MNCs than DCs.

Research Sample

Sample

The unit of analysis is the listed companies on the Indonesian Stock Exchange, both domestic and multinational corporations. Observation period is from 2001 to 2005. Data are taken from the OSIRIS database.

To be included in the sample, criteria that must be met are: (1) the firms must be included in the Osiris database (Bureau Van Djiek); (2) the firms are in the manufacturing sector, and are classified as multinational firms or domestic firms based on the definition of Michael and Shaked (1986),[2] and (3) the firms' financial data are available in Osiris.

The firms that operated until the end of 2005 amounted to 329 firms, either MNCs or DCs, but the numbers of firms that meet the criteria are 48 firms as MNCs and 33 firms as DCs. Thus, this study uses 81 firms over five years, a total of 405 observations.

Definitions of Operational Variables

In accordance with the description given in the earlier literature, the operational definitions of research variables are as follows. Corporate debt is measured by the change in debt-to-asset ratio (ΔDAR). We measure leverage using the term used by Lee and Kwok (1988), Burgman (1996), Chen et al. (1997), Chkir and Cosset (2001). Debt-to-asset ratio and its change are given as follows.

$$DAR = \frac{LongTermDebt}{(LongTermDebt + MarketValue\ Equity)} \quad ....(1)$$

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[2] We also recheck the MNCs classification based on the following site: id.wikipedia.org/wiki/Perusahaan_multinasional; and wrightreports.ecnext.com/coms2/reportdesc_COMPANY

$$\Delta DAR = \frac{DAR_t - DAR_{t-1}}{DAR_{t-1}} \ ... \ (2)$$

where DAR_t is the debt-to-asset ratio in year t; DAR_{t-1} is the debt-to-asset ratio in previous year $t-1$.

The proxy for agency problems utilized in this study is free cash flow to the firm (FCFF) to total assets. As mentioned previously, free cash flow is cash flow in excess of that required to fund all projects that have positive NPV. Jensen (1986) argues that even though managers invest in all available positive net-present-value projects, they tend to use the surplus cash for their own utility rather than disgorging the cash to shareholders. Because the self-interested behavior of managers induces them to hoard and misuse free cash flows, the agency problem manifests itself through the expansion of firm size, thereby increasing the managers' control and personal remuneration even though their actions may reduce the overall firm value. Therefore, firms with high FCFs face more severe agency problems in the sense that higher FCFs provide an opportunity for managers to engage in "value destroying activities" such as increasing their perquisites, shirking, and investing in negative NPV projects. For example, Jensen (1986) shows that in the 1970s and early 1980s, the oil industry earned windfall profits but instead of paying them out to the shareholders, management spent heavily on exploration and development activities even though the projects' returns were below the cost of capital. Furthermore, the condition worsened when management also decided to invest in unrelated businesses (diversification) that further reduced shareholder wealth. *Second*, Jensen (1993 in Brush et al. 2000) demonstrates that GM, IBM, and Eastman Kodak in 1980s made massive unprofitable investments out of FCFs in industries with excess capacity. Using the sample of larger firms, he finds that these firms have inefficiencies in capital expenditures and R&D spending decisions that cause the firms to earn returns below those on marketable securities. This empirical finding proves that managers tend to hoard the free cash flows rather than distributing them to shareholders since their compensation depends on the firm's growth, and accordingly they are encouraged to overinvest in cash or capital expenditures. Several empirical findings corroborate this evidence. Free Cash Flow Theory, e.g., Rajan et al. (2000), asserts that firms having large amount of free cash flows are inclined to engage more in corporate diversification that reduces firm value. Weisbach (1988), Christie and Zimmerman (1994), and Gul (2001) show that agency problems in high FCF firms manifest in the choice of FIFO inventory method in order to increase operating income. This non-value maximizing behavior purports to attain higher compensation and secure their jobs. Therefore, based on previous empirical studies (e.g., Jensen 1986; Weibach 1988; Lehn and Poulsen 1989; Agrawal and Jayaraman 1994; Christie

and Zimmerman 1994; Rajan et al. 2000; Gul 2001; Kim and Lee 2003), we employ a proxy for the agency problem as follows:

$$\text{Agency Problem} = \frac{\text{(FCFF)}}{\text{Total Assets}} \dots (3)$$

While free cash flow is calculated using the following formula:

$$FCFF_t = EAT_t + Depr_t$$
$$- Capex_t - (NW_t - NW_{t-1})$$
$$\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

where:

t = year *t*

t-1 = year *t-1*

$FCFF_t$ = Free Cash Flow to the Firm

EAT_t = Earnings after Tax

$Depr_t$ = Depreciation

$Capex_t$ = Capital Expenditures

NW_t = Net Working Capital in year *t*

NW_{t-1} = Net Working Capital in year *t-1*

The probability of bankruptcy is measured by the Z-Score, which is a multidimensional measure for bankruptcy formulated by Altman (1968) based on the financial ratios of a firm. The value above 2.99 reflects the lower probability of financial distress while the value below 1.80 indicates the higher probability of financial distress. We use this measurement due to two reasons. *First*, in Indonesia, the empirical study to test the predictive ability of the Altman's Z-score (Altman 1968) was conducted by Hadad et al. (2003). Their sample included 32 listed companies on the Jakarta Stock Exchange (i.e., it consisted of 16 companies still active on the stock exchange and 16 companies already delisted from the stock exchange) over 1999-2002. The result shows that Altman's Z-score has predictive power (see Table 2). The predictive accuracy is greater than 70 percent (i.e., 74.5% accuracy rate of three years, 77.3% accuracy rate of two years, and 78.1% accuracy rate of one year prior to bankruptcy.) *Second*, Pongsatat et al. (2004) investigate the comparative ability of Ohslon's Logit Model and Altman's Z-Score Model for predicting the bankruptcies of large and small firms in Thailand. A matched pair sample of 60 bankrupt and 60 non-bankrupt firms were examined over the years 1998-2003. They conclude that while each of the two methods has a predictive ability when applied to Thai firms, there is no significant difference in respective predictive abilities of Altman's (1968) model and Ohlson's (1980) model, either for large-asset or for small-asset Thai firms. Hence, even though the Altman's Z-score raises critiques about the selection of the relatively best financial ratios to detect the probability of bankruptcy and how much weight should be given to each of the chosen financial ratio, the above studies show that this measurement has a relatively good predictive ability.

Table 2. **The Comparison of Correct Estimates between Output Discrimi-
nant Analysis and Logistic Regression**

Correct Estimates	Discriminant (%)	Logistics (%)
3 years before bankrupt	74.5	80.99
2 years before bankrupt	77.3	85.54
1 year before bankrupt	78.1	86.72

Source: Hadad et.al 2003

The measurement of Altman's Z-score is given by the following formula.

$$Z = 3.3 \frac{EBIT}{Total\,Assets} +$$
$$1.2 \frac{Net\,Working\,Capital}{Total\,Assets} +$$
$$1.0 \frac{Sales}{Total\,Assets} +$$
$$0.6 \frac{Market\,Value\,of\,Equity}{Book\,Value\,of\,Debt} +$$
$$1.4 \frac{Accumulated\,Retained\,Eranings}{Total\,Assets}$$
$$\dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

Further, firm size is measured by the log of total assets (Titman and Wessels 1988; Rajan and Zingales 1995; Lee and Kwok 1988; Burgman 1996; Che et al. 1997; Doukas and Pantzalis 1997), and the profitability of firm is measured by return on assets (ROA) as defined by Doukas and Pantzalis (2003). The formulae of the two measures are given respectively as follows:

$$SIZE = Log\,(Total\,Asssets)\dots(6)$$

$$ROA = \frac{Net\,Income}{Total\,\,Assets}\dots\dots\dots(7)$$

Data Analysis

This study uses two models. The *first model* is to analyze capital structure determinants regardless of multinationality. On the other hand, the *second model* is relevant to identifying the significance of capital structure determinants of MNCs relative to DCs. We utilize the dichotomous variable and dichotomous interaction variables for multinationality. The relationship among research variables are summarized in Figures 2 and 3. We employ the method of Pooled Least Squares (PLS), Fixed Effects Model (FEM), and Random Effects Model (REM) to examine both models.

Both models reveal a row in the following regression formula.

$$\Delta DAR = \beta_0 + \beta_1 (FCFF/TA)_{it} +$$
$$\beta_2 (Z\text{-}Score)_{it} +$$
$$\beta_3 [Log (TA)]_{it} +$$
$$\beta_4 (ROA)_{it} + \varepsilon_{it} ....(8)$$

where:

i	=	firm i,
t	=	year t,
ΔDAR	=	Change in debt to total assets ratio,
$(FCFF/TA)_{it}$	=	Free cash flows to Total assets,
$Z\text{-}SCORE_{it}$	=	Altman's Z-score,
$Log (TA)_{it}$	=	Log of total assets.

$$\Delta DAR = \beta_0 + \beta_1 (FCFF/TA)_{it} +$$
$$\beta_2 (Z\text{-}Score)_{it} +$$
$$\beta_3 [Log (TA)]_{it} +$$
$$\beta_4 (ROA)_{it} +$$

$$\beta_5 (DUMMY)_t +$$
$$\beta_6 [(FCFF/TA)_{it} * D_t +$$
$$\beta_7 (Z\text{-}SCORE_{it} * D_t) +$$
$$\beta_8 [Log (TA)_{it} * D_t] +$$
$$\beta_9 (ROA_{it} * D_t) + \varepsilon_{it}$$
$$.............................(9)$$

where:

i	=	firm i,
t	=	year t,
ΔDAR	=	Change in debt to total assets ratio,
$(FCFF / TA)_{it}$	=	Free cash flows to Total assets,
$Z\text{-}SCORE_{it}$	=	Altman's Z-score,
$Log (TA)_{it}$	=	Log of total assets,
$DUMMY_{it}$	=	Dummy variable,
		$D_t = 1$, if an MNC firm,
		$D_t = 0$, otherwise.

Figure 2. **The Relationships among Research Variables in Model 1**
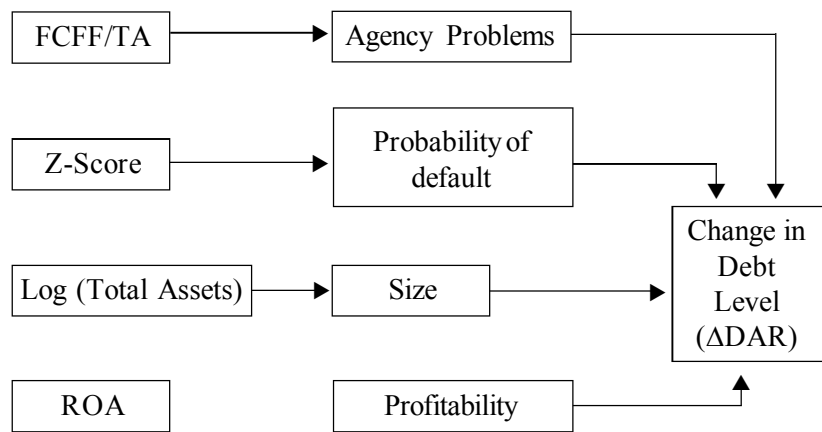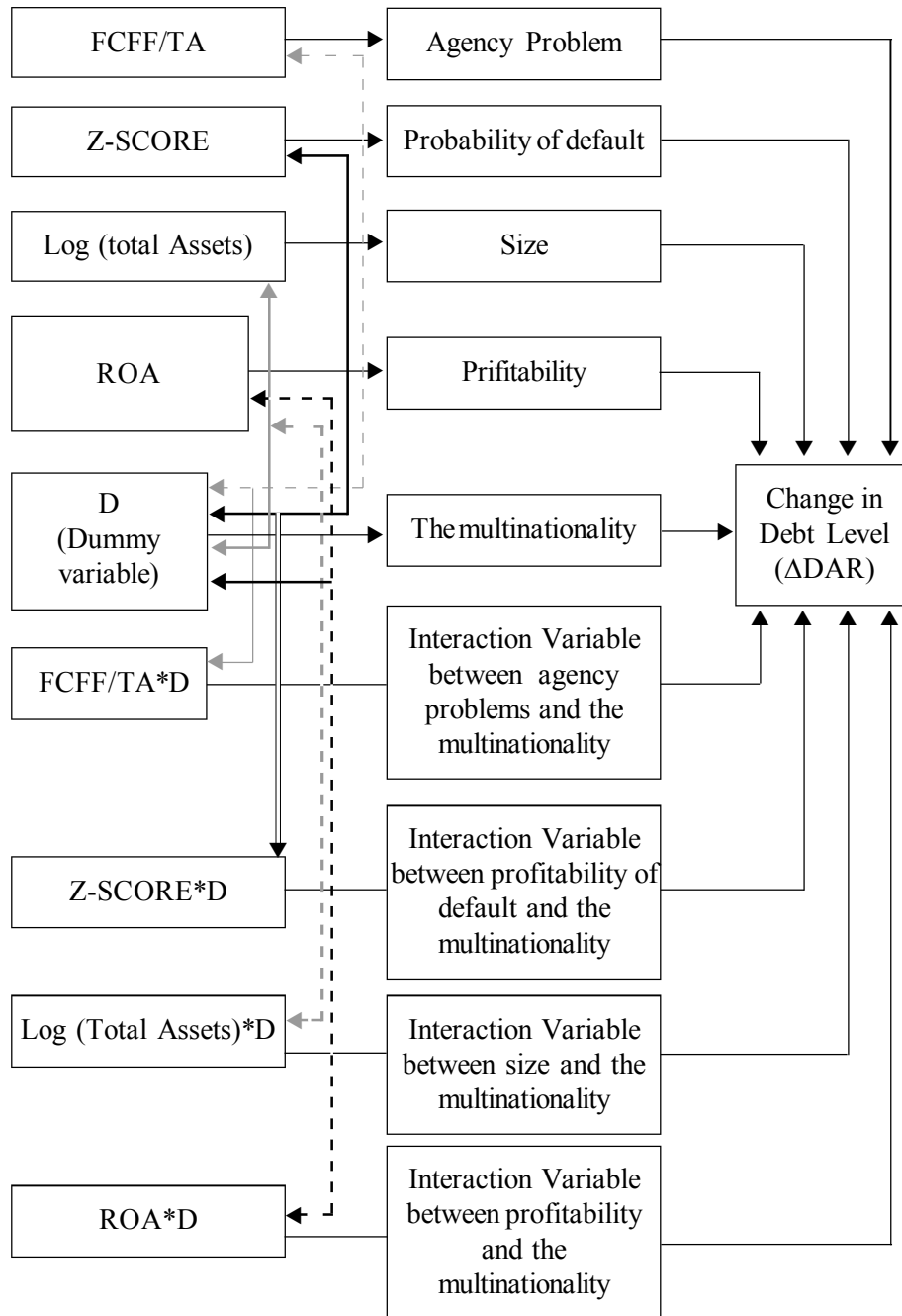
Figure 3. **The Relationships among Research Variables in Model II**

Results

Descriptive Analysis

Predicated on the results of descriptive statistics in Table 3, we provide evidence that MNCs have an average change in debt level of 1.11, which is higher than that of DCs (0.85). We employ the t-test for equality means to examine the mean difference of the changes in debt levels of both firms as shown in Table 4.

Based on Table 4, the average change in MNCs' debt level is not significantly different from that of DC. This result is not consistent with the hypothesis II.5, i.e., the change in MNCs' debt level is higher than that of DCs. However, a regression analysis is needed to confirm this hypothesis further.

Furthermore, Pearson correlation analysis as shown in Table 5 depicts several findings. *First*, Z-score value is positively related to ÄDAR (p-value = 0.000). Higher Z-score value implies a lower probability of default, thereby increasing the change in debt level. *Second*, log (TA) is negatively related to ΔDAR (p-value = 0.005). Thus, firm size is negatively related to the change in debt level. *Third*, DFCFF is positively related to ΔDAR (p-value = 0.047). Therefore, a positive relationship between agency problems and the change in debt level becomes stronger for MNCs. Fourth, DZSCORE is positively related to ÄDAR (p-value = 0.000). In other words, the positive relationship between Z-score (or the negative relationship between the probability of bankruptcy) and the change in debt level is stronger for MNCs.

Table 3. **Descriptive Statistics**

Variable	MNC		DC	
	Mean	**Std**	**Mean**	**Std**
ΔDAR	1.11	5.93	0.85	4.98
FCFF/TA	0.02	0.12	0.03	0.12
ZSCORE	3.78	6.54	2.48	3.00
LTA	8.85	0.42	8.94	0.54
ROA	1.85	7.94	4.08	7.94

Table 4. **t-tests for the Equality of Means of the Changes in Debt Level**

Group Statistics

DUMMY		N	Mean	Std. Deviation	Std. Error Mean
ΔDAR	1	240	1.113	5.932	.383
	0	165	.853	4.976	.387

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (1-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
ΔDAR	Equal variances assumed	0.936	0.334	0.462	403	0.323	0.260	0.563	-0.846	1.366
	Equal variances not assumed			0.477	387.332	0.317	0.260	0.5446714	-0.8113	1.331

Table 5. **Pearson Correlation Analysis**

Correlations

		ΔDAR	FCFF	ZSCORE	LTA	PROF	DUMMY	ΔFCFF	ΔZSCORE	ΔLTA	ΔPROF
ΔDAR	PearsonCorr	1	0.059	0.237**	-0.127**	0.001	0.023	0.083*	0.230**	0.017	0.024
	Sig (1-tailed)		0.120	0.000	0.005	0.488	0.322	0.047	0.000	0.368	0.314
FCFF	PearsonCorr		1	0.359**	0.166**	0.561**	-0.020	0.750**	0.285**	-0.007	0.479**
	Sig (1-tailed)			0.000	0.000	0.000	0.347	0.000	0.000	0.444	0.000
ZSCORE	PearsonCorr			1	-0.023	0.366**	0.118**	0.392**	0.911**	0.119**	0.427**
	Sig (1-tailed)				0.322	0.000	0.009	0.000	0.000	0.008	0.000
LTA	PearsonCorr				1	0.229**	-0.095*	0.140**	-0.015	-0.045	0.130**
	Sig (1-tailed)					0.000	0.028	0.002	0.383	0.183	0.005
PROF	PearsonCorr					1	-0.137**	0.470**	0.271**	-0.125**	0.734**
	Sig (1-tailed)						0.003	0.000	0.000	0.006	0.000
DUMMY	PearsonCorr						1	0.119**	0.347**	0.997**	0.147**
	Sig (1-tailed)							0.008	0.000	0.000	0.002
ΔFCFF	PearsonCorr							1	0.423**	0.135**	0.649**
	Sig (1-tailed)								0.000	0.003	0.000
ΔZSCORE	PearsonCorr								1	0.348**	0.465**
	Sig (1-tailed)									0.000	0.000
ΔLTA	PearsonCorr									1	0.162**
	Sig (1-tailed)										0.001
ΔPROF	PearsonCorr										1
	Sig (1-tailed)										

**. Correlation is significant at the 0.01 level (1-tailed). *. Correlation is significant at the 0.05 level (1-tailed).

Tests for Models I and II

Before conducting the regression analysis, we examine the assumptions in the multiple linear regression. To overcome the heteroskedasticity problem in both models, we use the White heteroskedasticity-consistent standard errors and variances.

Furthermore, to see whether there is an autocorrelation problem, we employ the Durbin-Watson (DW) test. The Durbin-Wation (DW) value for Model 1 is 2.33 whereas for Model 2 is 2.37. Based on the indicators used in the DW values between -2 to +2 for the two models, we may conclude that both models are free from the autocorrelation problem.

Multicollinearity tests are conducted with the indicator values of VIF (Variance Inflation Factor), and VIF values for all variables in the two models are under 10. Thus, the model is free from multicollinearity.

Model I Regression Analysis

The regression results for Model 1 in Table 6 show that agency problems and profitability do not affect the change in debt level. Accordingly, hypotheses I.1 and I.4 are not supported.

Z-score has a positive influence on the change in debt level, and this is significant at 5 percent level. Because a greater value of Z-score indicates a lower probability of default, then the regression result basically shows a positive effect. This result is consistent with hypothesis I.2, i.e., there is a negative influence of the probability of default on the change in debt level. As mentioned above, the capital structure decisions of firms depend on the benefits and costs of using more debt. Less debt is used if the cost of bankruptcy is higher than the tax shield benefit or other benefits of using more debt (Kim and Sorensen 1986; Graham 2000).

Table 6. **PLS Statistical Outputs for Model I**

Variable	Coefficient	t-Statistic	Sig 1-tailed
C	11.507	2.122	0.017
FCFF	1.526	0.575	0.283
ZSCORE	0.260	2.131	0.017 **
LTA	-1.263	-2.116	0.018 **
PROF	-0.060	-1.112	0.133
R-squared:	0.076		
Adjusted R-squared:	0.066		
F-statistic:	8.168		
Prob(F-statistic):	0.000 ***		
Durbin-Watson stat:	2.131		

*** significant at 1 percent level; ** significant at 5 percent level; * significant at 10 percent level

Firm size negatively affects the change in debt level, which is significant at 5 percent level. Therefore, the hypothesis I.3 is substantiated. Hence, the result supports Rajan and Zingales (1995) who find that informational asymmetries among insiders in a firm and in the capital markets are lower for large firms. Therefore, large firms should be more capable of issuing informationally sensitive securities like equity, and accordingly should have a lower debt level.

Overall, we conclude that factors affecting the change in debt level in Indonesian firms without considering the multinationality are the probability of bankruptcy and firm size. On the

other hand, agency problems and profitability do not affect the change in debt level. In other words, hypotheses I.2 and I.3 are supported whereas hypotheses I.1 and I.4 are not evidenced.

Model II Regression Analysis

The results of Model II in Table 7 show that only firm size has a negative influence on the change in debt level, and this is marginally significant at 10 percent level. Meanwhile, agency problems, the probability of bankruptcy, and profitability do not affect the change in debt level. Therefore, only hypothesis II.3 is supported while hypotheses II.1, II.2, and II.4 are not supported.

Table 7. **PLS Statistical Outputs for Model II**

Variable	Coefficient	t-Statistic	Sig 1-tailed
C	13.303	1.515	0.065
FCFF	-0.160	-0.064	0.475
ZSCORE	0.097	0.462	0.322
LTA	-1.416	-1.498	0.067 *
ROA	-0.008	-0.242	0.404
DUMMY	-0.792	-0.068	0.473
DFCFF	4.469	0.728	0.233
DZSCORE	0.198	0.787	0.216
DLTA	0.015	0.011	0.495
DROA	-0.107	-1.016	0.156
R-squared:	0.083		
Adj. R-squared:	0.062		
F:	3.978		
Sig. F:	0.000 ***		
Durbin Watson:	*2.133*		

*** significant at 1 percent level; ** significant at 5 percent level; * significant at 10 percent level

Previous empirical studies that investigated the capital structures of domestic and multinational corporations (e.g., Titman and Wessels 1988; Rajan and Zingales 1995; Lee and Kwok 1988; Burgman 1996; Che, Cheng, He, and Kim 1997; Doukas and Pantzalis 1997) controlled for size factor. As pointed out by Rajan and Zingales (1995) in Chkir and Cosset, the effect of size is ambiguous. Larger firms tend to be more diversified and therefore are less likely to go bankrupt. This being the case, size should have a positive effect on leverage. However, if size is a proxy for the financial information, outside investors should prefer equity relative to debt, and size should result in a lower change in debt level for MNCs. Based on the empirical studies on firms in Indonesia, we conclude that size is a proxy for the financial information, so the influence of size on the change in debt level is negative.

In addition, multinationality apparently does not influence the change in debt level. In other words, the change in MNCs' debt level is not relatively different from that of DCs. Thus, hypothesis II.5 is not substantiated. We conclude that multinationality in Indonesia does not affect leverage. Furthermore, multinationality does not influence the relationship of agency problems, the probability of bankruptcy, size, and profitability to the change in debt level. In other words, hypotheses II.6, II.7, II.8, and II.9 are not supported.

Sensitivity Analysis

Alternative Statistical Tests for Models I and II

This research uses panel data, so the use of Pooled Least Squares (PLS) does not consider the differences among observations and across years since the intercepts and the slopes of the model are assumed to be equal. Therefore, to accommodate the flaw of PLS, we employ the Fixed Effects Model (henceforth FEM) and the Random Effects Model (henceforth REM).

The statistical outputs of FEM and REM for Model I are shown in Tables 8 and 9. Based on PLS and REM, the Z-score has a positive influence on the change in debt level (significant at 5% level for FEM and 1% level for REM) while LTA has a negative influence (significant at 5% level for FEM and REM). Thus, hypotheses I.2 and I.3 are supported.

Based on the previous three models, we use the Chow test, the Hausman test, and the Breusch-Pagan test to determine the best prediction model. Chow test is used to determine whether PLS or FEM is better. The hypothesis is stated as follows:

H0: Use Common / Pooled Least Squares (PLS)

H1: Use Fixed Effects Model (FEM)

Meanwhile, Hausman test is utilized to decide on whether REM or FEM model is better. The hypothesis is stated as follows:

H0: Use Random Effects Model (REM)

H1: Use Fixed Effects Model (FEM)

Table 8. **The Statistical Outputs of Fixed Effects Model and Random Effects Model for Model I**

	Variable Fixed Effects Model (FEM)			Random Effects Model (REM)		
	Coeff.	t-stat.	Sig 1-tailed	Coeff.	t-stat.	Sig 1-tailed
C	16.932	1.931	0.027	11.507	2.118	0.017
FCFF	3.700	1.233	0.109	1.526	0.710	0.239
ZSCORE	0.231	2.020	0.022 **	0.260	2.708	0.004 ***
LTA	-1.866	-1.866	0.031 **	-1.263	-2.082	0.019 **
ROA	-0.069	-1.224	0.111	-0.060	-1.112	0.133
R-squared:	0.198			R-squared : 0.076		
Adj. R-squared:	0.027			Adj. R-squared: 0.066		
F:	1.156			F: 8.168		
Sig. F:	0.201			Sig. F: 0.000 ***		
Durbin Watson:	2.182			Durbin Watson: 1.893		

*** significant at 1 percent level
** significant at 5 percent level
* significant at 10 percent level

Table 9. **Summary of Coefficient Signs for PLS, FEM, and REM Tests for Model I**

Variable	Expected Coefficient DDAR	PLS DDAR	Fixed Effect Model (FEM) DDAR	Random Effect Model (REM) DDAR
FCFF	+	-	-	-
ZSCORE	+[a]	+**	+**	+***
LTA	-	-**	-**	-**
ROA	-	-	-	-

[a] Because higher z-score value shows lower likelihood probability of default then the influence of z-score to change in debt level is positive. This does not imply contradiction to hypothesis stated above, i.e. the higher likelihood probability of default so the change in debt level will be lower.

*** significant at 1 percent level
** significant at 5 percent level
* significant at 10 percent level

The output statistics of Chow test in Table 10 show that the p-value for the cross-section F is 0.9157, thereby concluding that the PLS model is better than the FEM. Meanwhile, Hausman test in Table 11 describes that the p-value for the cross-section random is 1.0000; accordingly, the REM model is found to be better than the FEM.

Furthermore, we conduct the Breusch-Pagan test to examine whether REM is better than PLS. Based on Greene (1993) and Lloyd, Morrissey, and Osei (2008), the Breusch-Pagan test examines whether there is variation within groups in the random effects model. The hypotheses given are $H_0 : \sigma^2_\alpha = 0$, and H_1: otherwise. The statistical test is given as follows:

$$B = \frac{B}{2(T-1)} \left[\frac{\sum_i (\sum_t \hat{u}_{it})^2}{\sum_i \sum_t \hat{u}^2_{it}} \right]^2 - 1$$

where u_{it} is the residual of regression of x_{it} on $y_{it.}$ This statistic is distributed as a chi-squared with the degree of freedom of one. If H_0 is accepted, then we cannot reject the hypothesis that the slope coefficient of REM does not diverge from that of PLS ($\beta_{GLS} = \beta_{OLS}$). Based on the PLS residuals, the result obtained by the Breusch-Pagan test statistics for Model I is as follows:

$$\frac{405(5)}{2(3-1)} \left[\frac{1.427 \times 10^{-24}}{11534.98} \right]^2 - 1 = 506.25$$

Table 10. **Chow Test for Model I**

Redundant Fixed Effects Tests
Pool: FEM1
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.757643	(67,333)	0.9157
Cross-section Chi-square	57.461491	67	0.7906

Table 11. Hausman Test for Model I

Correlated Random Effects - Hausman Test
Pool: REM1
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	4	1.0000

Critical values of 5 percent and 1 percent of the chi-squared distribution with one degree of freedom are 3.842 and 6.635, respectively. Accordingly, they are statistically significant at 5 percent and 1 percent levels, respectively. Therefore, we conclude that REM is better than PLS model. However, based on previous discussion, the result of REM is not different from that of PLS, i.e., Z-score has a positive influence on the change in debt level whereas size has a negative influence on the change in debt level. Hence, we confirm hypotheses I.2 and I.3.

The tests of FEM and REM are also conducted for Model II, but the statistical test for FEM cannot be run as the statistical output shows a near singular matrix. Meanwhile, the result of REM in Table 12 shows that size has a negative effect on the change in debt level, and it is significant at 10 percent level. Furthermore, we employ the Breusch-Pagan test to determine whether PLS or REM is better.

Based on the PLS residuals, the result obtained by the Breusch-Pagan test statistic for Model II is as follows:

$$\frac{405\,(5)}{2\,(3-1)} \left[\frac{1.427 \times 10^{-25}}{11440.39} \right]^2 -1 = 506.25$$

Table 12. **The Statistical Outputs of REM Test for Model II**

Variable	Coefficient	t-Statistic	Sig 1-tailed
C	13.303	1.496	0.068
FCFF	-0.160	-0.088	0.465
ZSCORE	0.097	0.924	0.178
LTA	-1.416	-1.457	0.073 *
ROA	-0.008	-0.263	0.396
DUMMY	-0.792	-0.077	0.470
DFCFF	4.469	0.969	0.167
DZSCORE	0.198	1.091	0.138
DLTA	0.015	0.013	0.495
DROA	-0.107	-0.941	0.174
R-squared:	0.083		
Adj. R-squared:	0.062		
F:	3.978		
Sig. F:	0.000***		
Durbin Watson:	*1.883*		

Table 13. **Summary of Coefficient Signs for PLS and REM for Model II**

Variable	Expected Coefficient	PLS	Fixed Effect Model (FEM)	Random Effect Model (REM)
	DDAR	DDAR	DDAR	DDAR
FCFF	+	-	-	-
FCFF	+	-	-	
ZSCORE	+	+	+	
LTA	-	-*	-*	
ROA	-	-	-	
Dummy	+	-	-	
DFCFF	+	+	+	
DZSCORE	+a	+	+	
DLTA	-	+	+	
DROA	-	-	-	

a Because higher z-score value shows lower likelihood probability of default then the interaction variable betweeen dummy variable and z-score is positive. The argumentation is MNCs expected to have a lower probability of bankruptcy than DCs.

*** significant at 1 percent level

** significant at 5 percent level

* significant at 10 percent level

We thus conclude that REM is better than PLS, but the significances of coefficients as summarized in Table 13 are low, indicating that only size has a negative influence on the change in debt level. Multinationality in fact does not affect the change in debt level and the determinants of the change in debt level.

Overall, when we exclude the multinationality variable from the model, the coefficients on Z-score and size are significantly positive and negative, respectively, while the coefficient on agency problems and profitability are not significantly different from zero.

Therefore, in general the change in debt level is negatively affected by the probability of bankruptcy and size. However, when we include the multinationality and its interaction with the determinants in the regression, the probability of bankruptcy turns out to be insignificant whereas size remains significant.

The Determinants of the Change in Debt Level for MNCs and DCs

Based on Model I, we use the full sample of both MNCs and DCs to analyze the determinants of capital structure for Indonesian firms in gen-

eral. In this section, we examine the capital structure determinants for MNCs and DCs separately using REM. The results in Table 12 show that when the sample is divided into MNCs and DCs, significant differences in the determinants appear. For MNCs, the results show that: (1) Z-score has a positive influence on the change in debt level (significant at 1% level); (2) size has a negative influence on the change in debt level (significant at 10% level); and (3) profitability has a negative influence on the change in debt level (significant at 5% level). Therefore, hypotheses I.2, I.3, and I.4 are substantiated. On the contrary, for DCs none of the independent variables is significant in determining the change in debt level. Although these results show that the determinants of capital structure in Indonesia differ, depending upon whether the firm is a domestic or a multinational corporation, the results do not directly indicate if the influences of the determinants are significantly different between MNCs and DCs. The next test (Model 2) attempts to do this by combining MNCs and DCs in one regression, and examines if the coefficients on independent variables are significantly different between MNCs and DCs.

Table 14. **The Determinants of Changes in Debt Level for MNCs and DCs**

Variable	MNC			DC		
	Coeff.	t-stat.	Sig 1-tailed	Coeff.	t-stat.	Sig 1-tailed
C	12.511	1.554	0.061	13.303	1.956	0.026
FCFF	4.309	1.057	0.146	-0.160	-0.045	0.482
ZSCORE	0.294	4.612	0.000 ***	0.097	0.684	0.248
LTA	-1.401	-1.541	0.063 *	-1.416	-1.869	0.032 **
PROF	-0.115	-1.837	0.034 **	-0.008	-0.135	0.447
R-squared:	0.108			R-squared:	0.029	
Adjusted R-squared:	0.093			Adjusted R-squared:	0.005	
F-statistic:	7.135			F-statistic:	1.212	
Prob(F-statistic):	0.000 ***			Prob(F-statistic):	0.308	
Durbin-Watson stat:	2.126			Durbin-Watson stat:	2.146	

*** significant at 1 percent level
** significant at 5 percent level
* significant at 10 percent level

The Determinants of the Change in Debt Level with Each Individual Interactive Variable

We also conduct an analysis of including an interactive term MNC*X into the regression, where X repre- sents each individual change in debt level determinant in the regression. So, we test separate regressions that in- clude one interactive variable at a time using the REM. Based on results in Table 15, we find that: (1) Z-score has

Table 15. **The Determinants of Change in Debt Level by Including an Interactive Variable at a Time**

Independent Variable	Dependent Variable : DDAR			
	(1)	**(2)**	**(3)**	**(4)**
Intercept	12.048	12.867	10.753	11.809
	(0.025)**	(0.013)**	(0.130)	(0.026)**
FCFF	0.220	1.822	1.636	1.690
	(0.446)	(0.199)	(0.239)	(0.224)
ZSCORE	0.261	0.115	0.267	0.272
	(0.002)***	(0.148)	(0.003)***	(0.004)***
LTA	-1.295	-1.353	-1.157	-1.287
	(0.022)**	(0.015)**	(0.127)	(0.023)**
ROA	-0.066	-0.062	-0.064	-0.043
	(0.103)	(0.1046)	(0.111)	(0.094)*
Dummy	-0.403	-0.783	2.016	-0.224
	(0.294)	(0.075)	(0.436)	(0.374)
DFCFF	2.670			
	(0.035)**			
DZSCORE		0.169		
		(0.165)		
DLTA			-0.265	
			(0.422)	
DROA				-0.040
				(0.287)
Adjusted R²	0.063	0.065	0.063	0.063
Prob(F-Statistic)	0.000***	0.000***	0.000***	0.000***

*** significant at 1 percent level; ** significant at 5 percent level; * significant at 10 percent level

a positive influence on the change in debt level, and it is significant at 1 percent level in three out of four equations; (2) size has a negative influence on the change in debt level, and it is significant at 5 percent level in three out of four equations; and (3) profitability has a negative influence on the change in debt level, and it is marginally significant at 10 percent level in one out of four equations. Meanwhile, the change in debt level is not influenced by the multinationality since the statistical outputs of four equations show that multinationality is not significant. Finally, only the interactive variable between multinationality and agency problems in the first equation is significant, meaning that a positive impact of the agency problems and the change in debt level is more pronounced for MNCs than DCs. It signifies that hypothesis II.6 is supported.

Conclusion

This study aims at investigating whether: (1) the change in debt level is affected by agency problems, the probability of bankruptcy, size, and profitability; (2) the change in debt level is influenced by multinationality (i.e., MNCs or DCs), and (3) there is an influence of multinationality on the relationship of agency problems, the probability of bankruptcy, size, and profitability to the change in debt level.

The results of this study provide evidence that in general the change in debt level is negatively affected by the probability of default (thereby positively affected by Z-score) and also negatively affected by size. However, when the sample is divided between MNCs and DCs, the results show that the change in debt level for MNCs is positively influenced by Z-score but negatively influenced by size and profitability. Meanwhile, for DCs none of the variables significantly affects the change in debt level.

The results of the second model indicate that only size has a negative influence on the change in debt level. Meanwhile, multinationality does not affect the change in debt level and the relationship of agency problems, probability of default, size, and profitability to the change in debt level. Nevertheless, when we run a separate regression which includes an interactive variable at a time, the results show that the probability of default has a positive influence on the change in debt level (in three out of four equations), size has a negative influence on the change in debt level (in three out of four equations), and profitability has a negative influence on the change in debt level (in one out of four equations). In fact, in the first equation, we find that the positive impact of agency problems on the change in debt level is more pronounced for MNCs than DCs.

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