

LINK BETWEEN MARKET RETURN, GOVERNANCE AND EARNINGS MANAGEMENT: AN EMERGING MARKET PERSPECTIVE

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Abstract

This paper investigates the impact of earnings management on market return (by the proxies of discretionary accruals and earnings response coefficient/CAR regarded as accounting and market based earnings quality, respectively) along with a number of moderating (both governance and financial) variables in an emerging market context. Indonesia. Building on extant literature and using panel data approach, it examines 52 manufacturing firms listed on the Indonesia stock exchange during 2007 to 2010 periods. Applying Modified Jones Model to measure earnings management, our regression analysis reveals that earnings management has significant negative influence of market return. Of the moderating variables, board size, leverage and firm size are showing significant effects on market return, but not the institutional ownership. Again, observing the use of moderator effects on earnings management, our findings confirm that board size has more predictive power than institutional ownership in deterring earnings management and weaken the association between earnings management and market return. Similarly, leverage has strengthened the relation between earnings management and market return showing more exposure to earnings management while firm size showing a tendency to weakening earnings management, on the contrary. These results have enormous implications for Indonesian corporate sector and policy makers in adopting appropriate governance measures to constrain earnings management and improve quality of earnings.

Keywords: Earnings Management, Earnings Quality, Corporate Governance, Indonesia.

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1. Introduction

High quality earning whether market or accounting oriented is important in modern corporate environment in which equity ownership is separated from control of corporate decisions. Agency theory explains the conflict of interests which are the effect of separation between ownership and control (Jensen and Meckling, 1976 and Fama and Jensen, 1983b). Moreover, the separation between ownership and control also results in an asymmetric information problem between executives and shareholders. An information asymmetry usually appears when information is not equally available to all participants. In effect, managers have more information than owners to pursue their own interests at the cost of owners, and sometimes they prefer to distort information in their interests. Gitman and Madura (2001) contend that some executives may try to access some information about the firm which makes them getting more benefits than shareholders. As

agents, the executives prepare financial statements to discharge their stewardship and principals reward the agents using the information provided. Earning is one of the important information in the financial statement. Earning should represent actual condition of the firm to increase or decrease economics value for the investors. Moreover, earning is used as a tool to predict the management performance in using company resources and the future company prospect as well. Therefore, the occurrence of earning manipulation in the financial statement may arise to protect the interest of the executives at the cost of the firm. If earning as a part of financial statement does not represent the real economics condition of the company, earning quality whether accounting and market based becomes weak to support investors' decision making process. This is, however, considered as a failure of financial reporting system to protect the interest of investors and other stakeholders.

Although stewardship theory suggests that executives' behaviour does not depart from the

interests of the principals even when the interests of the executives do not coincide with the interests of the owners (Davis et al., 1997), it is evident that the use of financial information, such as earnings, in many contractual agreements might provide the executives' an incentive for earnings management which ultimately leads to lower quality of earnings, irrespective of market or accounting oriented. Because, the usage of accrual based accounting contributes to the propensity of earning management as it does not require the physical evidence of cash in recording the transactions (Sulistyanto, 2008). The assumption that earnings management is an opportunistic behaviour of managers as indicated in Healy and Wahlen (1999) that when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers, it can be argued in line with agency theory that earnings management is an agency cost detrimental to shareholders as well as other stakeholders. To mitigate this problem and ensure that alignment of interests exists between executives and shareholders, significant monitoring mechanisms such as corporate governance are installed within the firm (Shleifer and Vishny, 1986). Because, corporate governance is a set of mechanisms to monitor and ratify managerial decisions and ensure the efficient operation of a corporation on behalf of its stakeholders (Donnelly and Mulcahy, 2008). It is the subset of a firm's contracts that help align the actions and choices of managers with the interest of shareholders (Armstrong et al., 2011). Boediono (2005) document that earning quality is influenced by the occurrence of earning management and corporate governance mechanisms, particularly managerial ownership, institutional ownership and board size mechanisms. Good corporate governance system is very useful to protect the stakeholder interest in the company which consists of institutional ownership and board of director.

Given the above mentioned context, this study is motivated to investigate the impact of earnings management on market return along with a number of moderating (both governance and financial) variables in an emerging market context. Indonesia. In this case, we use discretionary accruals and earnings response coefficient/CAR as the proxies for, respectively, earnings management and market return (for market-oriented earnings quality). Our specific research questions are whether earnings management affect significantly market return (earning quality); whether corporate governance mechanisms and firm financials have significant impact on market return (earning quality) and finally whether corporate governance mechanisms and firm financials can effectively mediate or not the effect of earning

management on market return (earning quality) by constraining earnings management behaviour.

The remainder of this paper is divided into five sections. Section 2 considers literature review, conceptual framework and hypotheses development, section 3 describes research method for data sources and sample selection, variable measurement and operation, and data analysis and model development. Results and discussion are addressed in section 4 and section 5 denotes conclusion and implication of the study.

2. Literature Review and Hypotheses Development

The relationship between market return (i.e. earnings quality), governance and earnings management can be explained by agency theory. The agency relationship contributes to the problems of conflict of interest for the separation of ownership and control and information asymmetry. Conflict of interest occurs when an agent acts to fulfill their own personal interest when making economic decisions while ignoring the implications for shareholders. It is based on the idea that managers who are not owners will not watch over the affairs of a firm as diligently as the owners (Chrisman, Chua, and Litz, 2004). Moreover, the agents have the advantage of having more or better information than the principal does (Ross, 1973). Information asymmetry represents the gap between the amounts of information held by management and that held by market participants (Fields et al., 2001). Therefore, the degree of information asymmetry will be higher if the quality of information is low and stakeholders will be poorly informed about the business. So, managers tend to become involved in opportunistic behaviour (i.e. earnings management and flawed disclosure) that potentially increases a firm's agency cost. In other words, the asymmetric information between the agent and principals give an opportunity to the managers maximizing their interest by conducting earning management. Eisenhardt (1989) stated that the agency theory uses three human characteristic assumptions, that is : (1) human has a *self interest*, (2) human has a limited thought about the future perception (*bounded rationality*), and (3) human generally tries to averse the risk (*risk averse*). Healy and Palepu (2001) outline several solutions to the agency problem, such as appropriate contractual incentives, effective monitoring function of the board of directors and capital market players etc. to reduce conflict of interests by controlling managerial behaviour. This implies that both internal and external governance processes are important in solving agency problems.

The extant literature emphasizes that the quality of earnings is very important to users of financial information because reported earnings are considered to be the premier information in financial statements. Salvato and Moores (2010) confer that high quality

accounting information on attributes such as earnings is essential for firms to access equity and debt markets. The informative function of earnings means that it is often used as a basis to describe the financial performance of a firm. Earnings quality can be observed where earnings are regarded as having high in quality, i.e. the more accurate and timely that reported earnings reflect expected future dividends, the higher the quality of earnings. Dechow and Schrand (2004) contend earnings to be high in quality when they accurately reflect the company's current operating performance, are good indicators of future operating performance and are a good summary measure for assessing firm value. This is consistent with the objectives of financial analysts and investors to evaluate the performance of the company, to assess the extent to which current earnings indicates future performance and determine whether current stock price reflects intrinsic firm value (Dechow and Schrand, 2004). Again, financial information users consider earnings quality as the absence of earnings management, because intentional manipulation of earnings by managers may distort the usefulness of earnings to users. Managers may manage earnings for a number of reasons relating to capital market motivations, compensation and bonus as well as debt contracts, which might result in low quality of earnings. This implies earnings that are persistent and predictable may not be of high quality if it is a result of earnings management. That is, the lower the earnings management, the higher the earnings quality and vice versa. According to Schipper and Vincent (2003), the importance of earning quality can be explained from two perspectives, first, the contracting perspective and second, investment perspective. From the former perspective, low quality of earnings may result in unintentional wealth transfers, i.e. overcompensation to the managers if earnings are overstated. From the latter perspective, poor quality of earnings is problematic as it can mislead investors, resulting in misallocation of resources (Myers et al., 2003; Schipper and Vincent, 2003). Therefore, it is very important for the reported earnings to be of high quality. Because, prior literature documents that high earnings quality would ultimately increase market liquidity (Young and Guenther, 2003), attractiveness of stocks to outside investors, lower cost of debt (Salvato and Moores, 2010) and cost of capital (Leuz and Verrecchia, 2000; Salvato and Moores, 2010).

2.1 Earning Management and Earning Quality

Within the framework of agency theory, earnings management has been viewed as a form of agency cost as it causes information asymmetry and reduces principals' understanding of a firm's performance which subsequently influences their investment decisions (Davidson et al., 2004). It views earnings management activity as a result of the misalignment

of interest between agent and principal that ultimately leads to the agency cost (Davidson et al., 2004). Most prior studies acknowledge that earnings management is opportunistic rather than beneficial (e.g. Siregar and Utama, 2008; Burgstahler and Dichev, 1997; Balsam et al., 2002; Yu, 2008). To date, numerous examples in the literature support the notion that earnings management is opportunistic (e.g. Jones, 1991; Teoh et al., 1998; Healy and Wahlen, 1999). Managers are motivated to manipulate earnings for a number of reasons as identified in prior literature, such as to hype the stock price especially before initial public offerings (Friedlan, 1994) and prior to seasoned equity offerings (Jo and Kim, 2007; DuCharme et al., 2004; Teoh et al., 1998; Rangan, 1998), to avoid reporting losses (Bustaghlar and Dichev, 1997; DeGeorge et al., 1999; Charoenwong and Jiraporn, 2009), to smooth earnings volatility (Cormier et al., 2000) and to influence contractual outcomes from import relief (Jones, 1991). In contrast, a smaller body of literature claims that earnings management is beneficial because it is not harmful to a firm's value (e.g. Jiraporn et al., 2008). Prior literature argues that inflated earnings potentially reduce the earnings informativeness, impairing the earnings and stock price correlation. Earnings management leads to earnings mispricing by the market players and, consequently, distorts the capital market's information and system. Given that the earnings are correlated to the share price (Su, 2003; Easton and Harris, 1991; Chan and Seow, 1996; Alford et al., 1993; Easton and Zmijewski, 1989), inflating earnings will result in an incremental increase in the share price (Healy and Wahlen, 1999). Consequently, investor's decision making is influenced by inaccurate earnings; stock price may be overvalued. Therefore, most literature assumes that earnings management is detrimental to firm value as well as earnings quality. Some studies find that firms which alter discretionary accruals before security offerings eventually suffer a lower and abnormal stock return (e.g. Teoh et al., 1998; Rangan, 1998).

Earning quality could be defined as the ability of earning information in giving response to the market. In other words, the reported earning has a response power. The power of market reaction to the earning information is reflected on the degree of earnings response coefficients (ERC). High ERC means the reported earning has high quality. In the context of agency theory, managers choose certain accounting methods to get the earning that is suitable to their motivation. Of course, this condition affects the quality of reported earning, because earning may not necessarily reflect the real economic performance. Thus, the first hypothesis is formulated as follow :

H₁: Earnings management significantly affects earning quality.

2.2 Corporate Governance and Earning Quality

The importance of corporate governance to ensuring effective monitoring has been widely discussed in the prior literature. Corporate governance is the system through which the behavior of a company is monitored and controlled (Cheung and Chan, 2004). Corporate governance structures aim to mitigate the agency problem. Baek et al. (2009) point out that sound governance processes are one of the mechanisms that are potentially relevant to reducing agency cost. John and Senbet (1998) state that corporate governance encompasses a set of mechanisms by which shareholders' exercise control over corporate insiders and management to protect their interests. Corporate governance acts as a set of controls that govern the behavior of managers, define their discretionary powers, and serve to offset potential losses due to the conflict of interest between shareholders and managers (Bozec and Bozec, 2007).

According to Ho and Wong (2001), the adoption of good governance mechanisms provides an "intensive monitoring package" for a firm to reduce opportunistic behaviors and information asymmetry (Leftwich, Watts, and Zimmerman, 1981; Welker, 1995). Having good corporate governance promotes transparency and accountability in the firm's information; which subsequently has a positive impact on the level of earnings quality (Johnson et al., 2002). Strong corporate governance is expected to be able to protect stakeholders interests, curb agency conflicts and limit agency costs (Haniffa and Hudaib, 2006). Bathala and Rao (1995) state that corporate governance could act to reduce a manager's self-interest in the principal-agent relationship. Low self interest will increase the likelihood of a manager giving high quality disclosures to shareholders in order to reduce information asymmetry (Kanagaretnam et al. 2007).

There are numerous studies on earnings quality and corporate governance in the academic journals. Such studies become sufficiently robust corporate governance to ensure high quality of corporate financial reports. Prior studies document that low quality of earnings is systematically related to weaknesses in the oversight of management. A firm's governance attributes are supposed to be effective in enhancing the quality of earnings as a monitoring mechanism. To overcome the problem of earnings management, some studies (e.g., Xie et al. 2003; Kent et al. 2010) view internal corporate governance as a credible tool for deterring earnings management. Dechow, Sloan and Sweeney (1996) highlight that the establishment of governance processes is essential to maintain the credibility of firms' financial statements and safeguard against earnings manipulation. This study assumes that as part of firm's governance practices, both internal and external monitoring effects, respectively, by institutional ownership and

board of directors are effective in reducing earnings management and improving earnings quality.

2.2.1 Institutional Ownership and Earning Quality

Institutional ownership has the ability to control management through an effective monitoring process, therefore it can constrain earning management by supporting management to report the real financial condition. Institutional monitoring process supports the company to report good quality of income. The percentage of stock ownership by institutions affects the financial reporting process which enable the management team making actualisation in accordance with their interest (Boediono, 2005).

Osma and Noguera's (2007) find that institutional investors are more influential in reducing earnings management. Hashim (2004) find evidence that institutional ownership affect earning quality positively. It implies that more concentrated ownership in the hands of institutional investors has more incentive to monitor company activities. The involvement of institutional investor not only improve good corporate governance practices, but also contribute to the better quality of reporting mechanism. Thus, the second hypothesis could be formulated as follow:

H_{2a}: Institutional ownership significantly affects earning quality.

2.2.2 Board of Director Size and Earning Quality

The managers' conflicts of interest are mitigated through governance attributes, which have the potential to control and monitor by the board. Boards of directors play important roles in monitoring. "Broadly speaking, the monitoring function requires directors to scrutinize management to guard against harmful behaviour, ranging from shirking to fraud" (Linck et al., 2008, p. 311). According to García Lara et al. (2007) strong corporate governance promotes efficient monitoring by the board of directors, those results in higher financial statement transparency and lower accounting manipulation. The board of directors receives authority over the internal control of the firm from shareholders. They are responsible for monitoring management to ensure that it acts in the shareholders' best interests. Although the board delegates most decision and control functions to top management, the board retains ultimate control (Beasley, 1996). Thus, the board of directors plays an important role in monitoring the quality of earnings reported to the public.

Linck et al. (2008, p. 311) point out that "[a] firm's optimal board structure is a function of the costs and benefits of monitoring and advising given the firm's characteristics, including its other governance mechanisms". The size of boards is important in determining the effectiveness of board

monitoring function. The board of directors should carefully determine the optimum number of board members to ensure that there are enough members to discharge responsibilities and perform related duties. The studies show that firms that report high quality earnings are more likely to have smaller board (Eisenberg, Sundgren, and Wells, 1998; Mak and Kusnadi, 2005; Vafeas, 2000; Yermack, 1996). Although some studies argue that larger boards are better as they have greater capability to safeguard shareholder interest (Zahra and Pearce II, 1989), a broader range of experience (Xie et al., 2003), and varied expertise (Rahman and Ali, 2006), there are also empirical studies that show that smaller boards are more effective than large boards ensuring higher firm value (Eisenberg et al., 1998), more informative (Vafeas, 2000), better communication and more timely decision-making (Karamanou and Vafeas, 2005), more coordinating directors efforts (Eisenberg et al., 1998; Jensen, 1993; Yermack, 1996).

The board of director is appointed by stockholders as their representative to manage the company. Board composition and size have relation with earning management practice. It is because of the earning management practice has relation with financial statement that present useful earning for the investors on investment decision making. Therefore, in order to get the best decision, earning should be qualified. Kao and Chen (2004) report that large board size is associated with higher earnings management, and small board size is associated with lower earnings management. Ismail et al. (2008) find evidence that board of director size positively affect earning quality. It is because the board of director has an important role to monitor the earning reporting mechanism. Based on this finding, the third hypothesis is formulated as follow :

H_{2b}: Board of director size significantly affects earning quality.

2.3 Firm-specific Attributes and Earning Quality

2.3.1 Financial Leverage and Earning Quality

Leverage is a ratio that is derived from total liabilities divided by total assets. This ratio shows the amount of company assets that is funded by liabilities. The higher leverage, the higher is the risk for investors. So, investors demand more return from highly levered firms. Therefore, it can be concluded that higher ratio of leverage tends to push to more practices in earning management (Herawati, 2008). Moradi (2010) document that the volatility of earning response coefficient (ERC) as a proxy of earning quality, depends on the volatility of financial leverage. Financial leverage is assumed as a relevant information on unpredicted market reaction to the

company earning. Thus, the fourth hypothesis could be formulated as follow :

H_{2c}: Financial leverage significantly affects earning quality.

2.3.2 Company Size with Earning Quality

Company size is a basis that shows the company's ability in managing the business. The higher company size is, the more capable the company is in managing business activities. In relation to agency theory, managers have more information than the owners. Therefore, managers try to show good performance to the owners to maintain their position. This condition encourages managers to do more earning management. Thus, high company size tends to push to more earning management, in which will gear the low earning quality.

Pagulung (2006) found that leverage has significant relationship with 5 attributes of earning quality. Then, sales and company size has significant relationship with 5 attributes of earning quality. Other variables, such as : operating cycle, performance, and industries classification show the attributes of earning quality that has relationship with accrual quality, liquidity, and factorial earning quality. Thus, the fifth hypothesis could be formulated as follow :

H_{2d}: Company size significantly affects earning quality.

2.4 Good Corporate Governance can Weaken the Effect of Earning Management on Earning Quality

Previous research supports the proposition that corporate governance is beneficial in reducing managers' propensity to manipulate earnings. Bedard et al. (2004) study reports that board size and ownership by non-executive directors reduce downward earnings management. Zhang et al. (2007) report a positive association between blockholder ownership and earnings management. Heflin and Shaw (2000), however, document that both internal and external blockholders are effective in reducing information asymmetry and market liquidity in a firm, thus suggesting that blockholders, regardless of type, have the effect of improving disclosure quality.

It is widely believed that a small board is more effective in monitoring a firm's activity (Coles et al., 2008). Board size is an important determinant of earnings management in Taiwan (Kao and Chen, 2004), it has no significant effect in Malaysian firms (Rahman and Ali, 2006). A higher number of board members will stimulate a higher number of independent directors on the board, with vast range of experience and knowledge (e.g. Linck et al., 2008; Xie et al., 2003; Dalton et al., 1999) and, thereby, increase the board's capability in constraining

earnings management. On the contrary, Zhao and Chen (2008) document that lower fraud and accruals are associated with a staggered board (which is a proxy for weak governance), thus suggesting that strong board governance is not always effective in constraining managers' propensity to manipulate earnings.

The qualified earning is an earning from reporting mechanism that earning management does not occur. Good corporate governance can minimize the earning management practice in the company. Chtourou and Bedard (2001) report that the characteristic of board of director has an important effect to the quality of financial statement. Basically, experienced and independent board of director can reduce the earning management practice. Beside that, the institutional investor has a right to control the company managers. This condition is expected to improve the quality of reporting process on earning, which in turn reduce the extent of earning management (Moradi and Nezami, 2011). Thus, the hypotheses could be formulated as:

H_{3a}: Institutional ownership can weaken the effect of earnings management on earning quality.

H_{3b}: Board of director size can weaken the effect of earning management on earning quality.

2.5 Firm-specific Attributes can Strengthen the Effect of Earning Management on Earning Quality performance

A financial statement is a tool for analyzing company performance and result of operation. This information is very useful to the user's in decision making process. From different types of information in the financial statement, earning information is very important for users (Beattie et al. 1994). Financial statement analysis could be done by evaluating the financial ratios to the earning quality. Pedwell et al. (1994) argue that large company has more predictable

permanent earning process and has more resources to make good estimation on high earning quality. Many previous studies document evidence that there are significant relationship between earning management, estimation of earning quality and company size in Australia (Anis, 2010). Astuti (2002) find that financial leverage positively affect earning management. According to Astuti (2002) managers conduct earning management aiming to avoid breach of debt covenant, which intern impacts on earning quality. Therefore, high leverage tend to motivate managers to engage in earning management which ultimately affect earning quality. Thus, the hypotheses could be formulated as:

H_{4a}: Financial leverage can strengthen the effect of earning management on earning quality.

H_{4b}: Size of the company can strengthen the effect of earning management on earning quality.

2.6 Conceptual Framework

The conceptual framework of this research is displayed in the following 3 figures. The main variables of interest are the relationship between market return as the proxy for earning quality and earning management. In this process, considering the importance of corporate governance and firm-specific attributes, moderating effects of them are taken into account separately. Figure-1 shows the total structure of the regression model while Figure-2 and Figure-3 indicate mediating effect of specific variables for corporate governance and firm-specific attributes, respectively. In regards to corporate governance, institutional ownership and board of director size are adopted in the model to observe their effects on earning quality through earnings management (Figure-2). Again, financial leverage and firm size are considered as important firm-specific attributes to detect their effects on earning quality through earnings management (Figure-3).

Figure 1. Relationship between market return (i.e. earning quality), corporate governance, earning management and firm-specific attributes

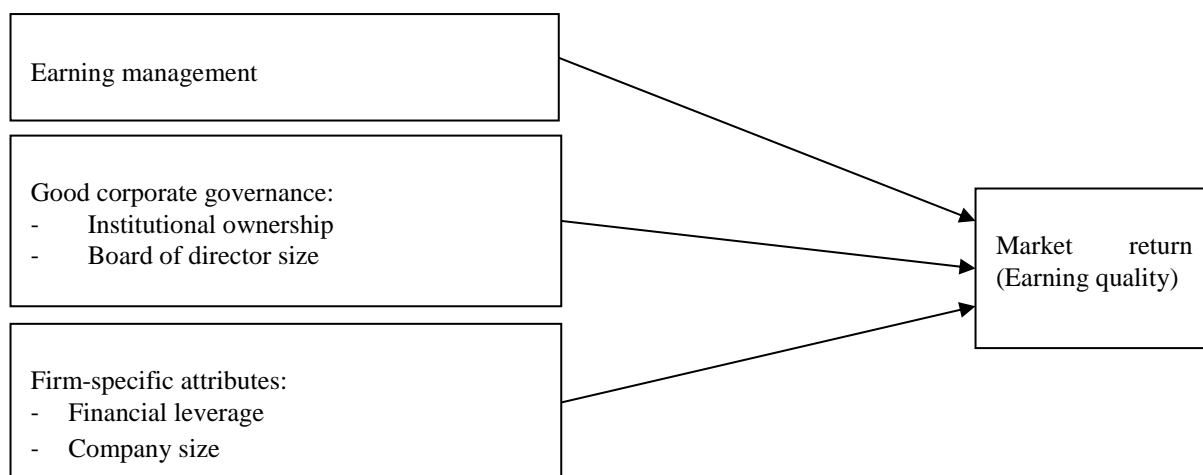


Figure 2. Moderating good corporate governance in the effect of earning management on earning quality

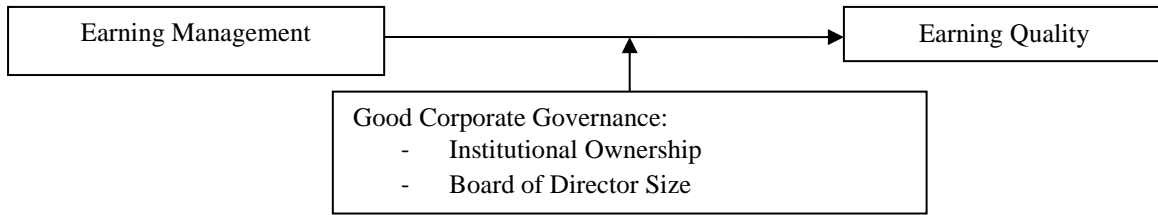
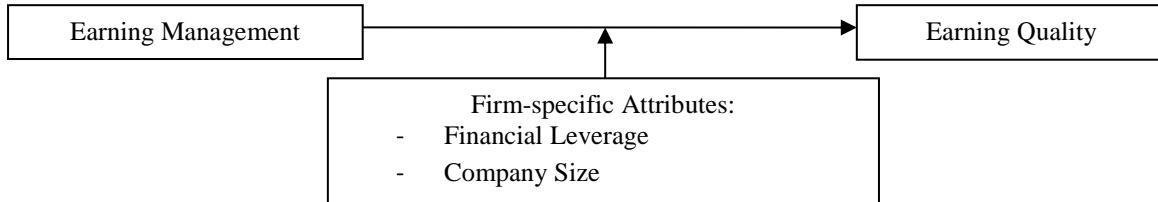


Figure 3. Moderating firm-specific attributes in the effect of earning management on earning quality.



3. Research Method

3.1 Sampling Method and Data Sources

The sampling method is purposive sampling with the criteria as follow: (1) manufacturing firms listed on the Indonesian Stock Exchange during the period of 2007-2010; (2) issue of audited annual report with 31 December year-end and (3) reported earning during that period. In regards to data sources, this research has used secondary data that could be accessed from Indonesian capital market linked websites, such as: www.idx.co.id, www.yahoofinance.com and www.duniainvestasi.com.

3.2 Variables Operation and Measurement

a. Dependent Variable (Y):

The dependent variable of this research is earning quality. Scott (2003) explained that Earnings Response Coefficient (ERC) could be proxy for earning quality, which is a measurement of market return based on available market data. ERC is a coefficient gathered from the regression between the proxy of stock price and accounting earning after controlling annual return.

ERC is calculated with the formula as follow :

$$CAR_{it} = CAR_{i-t-5} + \sum_{t=-5}^{+5} AR_{it}$$

where:

CAR_{it} : Commulative abnormal return of the company i in 5 days after publication of accounting earning;
 AR_{it} : Individual abnormal return of the company on period t-day

$$AR_{it} = R_{it} - RM_t$$

where:

AR_{it} : Individual return of the company on period t-day

R_{it} : Individual actual return of the company on period t-day

RM_t : Market return on period t-day

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}}$$

where:

R_{it} : Individual actual return of the company on period t-day

P_{it} : Stock closing price of the company on period t-day

P_{it-1} : Stock closing price of the company on period t-1 day

$$RM_t = \frac{CSPI_{it} - CSPI_{t-1}}{CSPI_{t-1}}$$

where:

RM_t : Market return on the day of t

$CSPI_{it}$: Composite stock price index on the day of t

$CSPI_{t-1}$: Composite stock price index on the day of t-1

$$UE_{it} = \frac{EAT_{it} - EAT_{it-1}}{|EAT_{it-1}|}$$

where:

UE_{it} : Unexpected EAT of the company i at the eriod of t

EAT_{it} : EAT (Earning after tax) of the company i at the eriod of t

EAT_{it-1} : EAT (Earning after tax) of the company i at the eriod of t-1

$$RT_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}}$$

where:

RT_{it} : Annual return of the company i at the period of year t

P_{it} : Stock closing price of the company i at the period of year t

P_{it-1} : Stock closing price of the company i at the period of year $t-1$

$$CAR_{it} = \alpha_0 + \beta_1 UE_{it} + \beta_2 RT_{it} + \varepsilon_{it}$$

where:

CAR_{it} : Cumulative abnormal return of the company i during 5 days before and after the publication of financial statement

UE_{it} : Unexpected earnings on the company i on the period of t

RT_{it} : Annual return of the company i on the period of t

β : The value of earning response coefficient (ERC)

b. Independent Variables (X):

1) Earning Management (X_1)

Discretionary accruals as a proxy of earning management was calculated by Modified Jones Model (Dechow et al., 1995) with the formula as follow:

$$TAC = NI_{it} - CFO_{it} \quad (1)$$

Total accrual (TA) that is estimated with Ordinary Least Square as follow:

$$\frac{TA_{it}}{A_{it-1}} = \beta_1 \left(\frac{1}{A_{it-1}} \right) + \beta_2 \left(\frac{\Delta Rev_{it}}{A_{it-1}} \right) + \beta_3 \left(\frac{PPE_{it}}{A_{it-1}} \right) + \varepsilon \quad (2)$$

With the regression coefficient as above, nondiscretionary accruals (NDA) is as follow:

$$NDA_{it} = \beta_1 \left(\frac{1}{A_{it-1}} \right) + \beta_2 \left(\frac{\Delta Rev_{it}}{A_{it-1}} - \frac{\Delta Rec_{it}}{A_{it-1}} \right) + \beta_3 \left(\frac{PPE_{it}}{A_{it-1}} \right) \quad (3)$$

Then discretionary accruals (DA) could be calculated as follow:

$$DA_{it} = \frac{TA_{it}}{A_{it-1}} - NDA_{it} \quad (4)$$

where:

$Dait$: Discretionary accruals of the company i at the period of t

NDA_{it} : Nondiscretionary accruals of the company i at the period of t

TA_{it} : Total accrual of the company i at the period of t

NI_{it} : Net earning of the company i at the period of t

CFO_{it} : Cash flow from operating activities of the company i at the period of t

A_{it-1} : Total assets of the company i at the period of $t-1$

ΔRev_{it} : Income alteration of the company i at the period of t

PPE_{it} : Fixed assets of the company i at the period of t

ΔRec_{it} : Alteration of receivables company i at the period of t

ε : Error term

c. Moderating Variables:

Moderating variable is a variable that strengthen or weaken the relationship between one variable to another variable. The moderating variables on this research are:

a) Institutional ownership is a percentage of voting right owned by the institutions. According to Suyono (2011), institutional ownership is measured by:

$$\begin{aligned} \% \text{ Institutional Ownership} \\ = \\ \frac{\text{number of stock by institution}}{\text{total outstanding stocks}} \times 100\% \end{aligned}$$

b) Board of Director Size (X_3)

Board of director size is measured by the number of board of director members on the company (Boediono, 2005).

c) Financial Leverage (X_4)

Financial leverage is measured by Debt Ratio, with the formula as follow:

$$\text{Debt Ratio} = \frac{\text{Total Liability}}{\text{Total Assets}}$$

d) Company Size (X_5)

Company size is an indication of the company capabilities to manage the stockholders investment by improving their welfare. The logarithm of total assets can be used as a proxy for company size (Pagulung, 2006).

$$\text{Company Size} = \ln_ \text{Total asstes}$$

3.3 Data Analysis

The data analysis is consisted of descriptive statistic (i.e. mean, maximum, minimum, and deviation standard of the variables), classical assumption test for multiple regression (i.e. normality, multicollinearity, heteroskedasticity and autocorrelation) and regression for moderation absolute difference. The test of hypotheses 1 and 2 is done with multiple linear regression, meanwhile hypotheses 3 and 4 with regression for moderation absolute difference.

Regression equation model for hypotheses 1 and 2 is as follows:

$$Y = a + b_1 EM + b_2 IO + b_3 BDS + b_4 FL + b_5 CS$$

where:

- Y = Earning quality
- α = Constant
- EM = Earnings management
- IO = Institutional ownership
- BDS = Board of director size
- FL = Financial leverage
- CS = Company size

Regression equation model for hypothesis 3 is as follows:

$$Y_1 = a + b_1EM + b_2KI + b_3DW + b_4|ZEM - ZKI| + b_5|ZEM - ZDW| + e$$

Regression equation model for hypothesis 4 is as follows:

$$Y_2 = a + b_1EM + b_6LK + b_7UP + b_8|ZEM - ZLK| + b_9|ZEM - ZUP| + e$$

where:

- Y₁ = Earning quality
- Y₂ = Earning quality
- α = Constant
- EM = Earnings management
- IO = Institutional ownership
- BDS = Board of director size
- FL = Financial leverage
- CS = Company size
- ZEM = Variable of earnings management from the result of standard value
- ZIO = Variable of institutional ownership from the result of standard value
- ZBDS = Variable board of director size from the result of standard value
- ZFL = Variable of financial leverage from the result of standard value
- ZCS = Variable company size from the result of standard value

|ZEM – ZIO| = The different of absolute value between institutional ownership and earnings management (measured by absolute value from the deviation between EM and IO)

|ZEM – ZBDS| = The different of absolute value between board of director size and earnings management (measured by absolute value from the deviation between EM and BDS)

|ZEM – ZLK| = The different of absolute value between financial leverage and earnings management (measured by absolute value from the deviation between EM and FL)

|ZEM – ZCS| = The different of absolute value between company size and earnings management (measured by absolute value from the deviation between EM and CS)

4. Results and Discussion

4.1 Sampling Procedure and Statistical Descriptive

The purposive sampling of this research are based on the following criterias: (1) the number of manufacturing companies listed on Indonesian Stock Exchange (IDX) in 2007-2010 periods were 145 companies, (2) 17 companies were delisted during these periods, (3) 23 companies did not issue the annual report for the year-end 31 December, (4) 45 companies did not report earning, and (5) 8 companies did not have sufficient data for this research. Therefore, final sample size of the study reduced to 52 companies or 208 firm years for 4-year periods.

The result of descriptive analysis that includes minimum value, maximum value, mean, standard deviation of the variables of earning quality (ERC), earnings management, institutional ownership, board of director size, financial leverage, and company size are presented in Table 1 as follows:

Table 1. Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
EM	208	0.1241	0.14003	-0.66	0.80
IO	208	0.7076	0.19775	0.03	0.98
BDS	208	4.7019	2.00425	2.00	10.00
FL	208	0.3981	0.19417	0.05	0.97
CS	208	27.6074	1.35027	24.85	31.49
EQ (ERC)	208	0.0701	0.10383	-0.17	0.77
Valid N (listwise)	208				

Table-1 shows average earnings management in Indonesian companies is around 12% which is much higher than the developed economies, but similar to other emerging countries in Asian region. Mean value of market return (ERC) as proxy for earnings quality

is 7% which is quite low as compared to developed economies. This implies that stock market in Indonesia is not adequately developed yet to ensure symmetric information flow in the market. As a result, there remains incentive for company managers

to use information for their own interest as reflected in high levels of earnings management, an indicator of agency costs. In regards to governance variables, average institutional ownership is 71% which indicate high concentration of ownership and average board of director size is 5 which a minimum of 2 and maximum of 10 members. The mean value of financial leverage is 40% indicating that firms are not highly levered. Similarly, mean company size is 28% (log of total assets) which suggest that Indonesian companies are not large scale companies in size with the exception of a few companies.

4.2 Classical Assumption Test for Multiple Regression

As mentioned earlier, these tests are consisted of normality, heteroskedasticity, multicollinearity and autocorrelation (These results are not shown here for brevity, but will available from the authors when requested. See Appendix 1). Normality test with the value of asymp. sig. (2-tailed) for unstandardized variable is 0.205, which is higher than α (0.05),

therefore, all data in this research have normal distribution. Heteroscedasticity test shows that the significant value for all variables are higher than α (0.05). This means that there are no heteroscedasticity in this test. Multicollinearity test also shows that the results of VIF for all variables are smaller than 10 meaning that there are no multicollinearity between independent variables in this model. Finally, autocorrelation test shows the value of Durbin-Watson is 2.172, $d_U = 1.77$, $d_L = 1.53$. It implies that the value of DW is between d_U and $4 - d_U$, i.e., there is no autocorrelation in this model.

4.3 Findings on Hypotheses Testing and Discussion

The regression results from the Table 2 above shows that earning management affects negative significantly market return (ERC) as the proxy for earning quality, which implies that the higher is earnings management, the lower is the earnings quality or market return and vice-versa.

Table 2. Summary of Multiple Linear Regression Test

No.	Variable	Regress. Coeff	t _{statistic}		t _{tabel}	Sig.
1	Earning Management (X ₁)	-0.156	-2.291	<	-1.984	0.023
2	Institutional Ownership (X ₂)	-0.065	-0.955	>	-1.984	0.341
3	Board of Director Size (X ₃)	0.296	3.472	>	1.984	0.001
4	Financial Leverage (X ₄)	0.221	3.115	>	1.984	0.002
5	Company Size (X ₅)	-0.170	-2.061	<	-1.984	0.041
Constant		= -0.00000000004				
Adjusted R Square		= 0.078				
F _{hitung}		= 4.503				

Therefore, as per expectation the first hypothesis is accepted, meaning that the earning is the principal factor that an investor mainly consider in decision making process. The amount of reported earning could be an indication for earning management that may reduce the earning quality and harm the investors' interest. In this case, investors should take care to the earning management practices by not relying straight on to the reported earnings. This finding of the study is in-line with Boediono (2005) that earning management negative significantly affects earning quality.

The result of second hypotheses test (a) shows that the institutional ownership does not significantly affect earning quality. It means this hypothesis is rejected. This result implies that the existence of institutional ownership can not guarantee earning quality that is reported by the company. It is because the existence of institutions is in place formally, but they give up the monitoring process to the board of director. This finding is in accordance with the study of Rachmawati and Triatmoko (2007).

The finding of second hypothesis test (b) showed that board of director size has positive significant effect on earning quality as per expectation. It means this hypothesis is accepted. This signifies that investors' believe that the existence of board of director can effectively monitor the management activities, thus constrain the extent of earning management practices and improve earning quality. This finding is consistent with Ismail et al (2008) that board of directors has an important role in monitoring the reported earning quality.

The result of second hypothesis test (c) confirms that the financial leverage can positively influence earning quality. It means this hypothesis is accepted. Investors believe that debts are used to support the operating activities in the best way, so the reported earning provides relevant information in investment decision making process. This finding is in-line with Moradi et al, (2010), Jang and Sugiarto (2007) as well as the trade-off theory in the capital structure stating that leverage as a proxy of capital structure has positive impact on earning quality.

The result of second hypothesis test (d) shows that the company size has negative impact on earning quality. It means this hypothesis is accepted. This indicates that the bigger the company size, the less possibility of getting more qualified information relating to its activities including reported earnings. In case of profit announcement when investors consider that earning has low predictive power and/or

less useful to predict future earning, that may implicate to low earning response coefficient (ERC). This finding in-line with Collins and Kothari (1989) that company size has negative relationship with ERC.

The third hypotheses testing used regression for moderating variables, and the result is as follow:

Table 3. Summary of Regression for Moderating Variables on the Impact of Good Corporate Governance to the Relationship between Earning Management and Earning Quality

No.	Variable	Regress. coefficient	t _{statistic}		t _{table}	Sig.
1	Earning Management (X ₁)	-0.124	-1.734	<	-1.660	0.084
2	Institutional Ownership (X ₂)	-0.050	-0.691	>	-1.660	0.491
3	Board of Director Size (X ₃)	0.178	2.427	>	1.660	0.016
4	Moderate_1 (X ₁ -X ₂)	0.024	0.285	<	1.660	0.776
5	Moderate_2 (X ₁ -X ₃)	-0.073	-0.812	>	-1.660	0.481
	Constant	= 0.060				
	Adjusted R Square	= 0.029				
	F _{statistic}	= 2.246				

The result of third hypothesis testing (a) shows that the institutional ownership does not adequately weaken the relationship between earning management and earning quality. It is because the value of t_{statistic} moderate_1 (X₁-X₂) is smaller than t_{table} and the significance value 0.776 is higher than α (0.05). Thus, this hypothesis is rejected. Institutional ownership faces difficulties in getting information from the company management to play a role in controlling and detecting earning management. Another reason is that institutional ownership is more focused on current income (Porter, 1992; Mas'ud, 2003), therefore, this condition allows company management an opportunity to conduct earning management in the short term.

The result of third hypothesis (b) shows that the board of director size cannot adequately weaken the relationship between earning management and earning quality. This is because the value of t_{statistic} moderate_2 (X₁-X₃) is higher than -t_{table} and the significance value 0.481 is higher than α (0.05). Thus, this hypothesis is also rejected. Because the effectiveness of the board of director is affected by many factors, such as board of director size and composition, equalitable appointment system, profile of board members, competency and independence of members. These factors are not owned by all companies, so company management tends to do earning management for their personal interest. (Anand, 2008).

Although both hypotheses are rejected individually based on the statistical criteria, it is,

however, evident that both governance variables have some moderating effects, though not significant, on constraining earnings management to affect earnings quality. Because, Table-3 above reveals that earnings management can negatively affect earning quality at 10% level of confidence, which is weaker than the effect reported in Table-2. Given that there is no change in the findings of institutional ownership and board of director size in Table-2 and Table-3 in influencing earning management (i.e. insignificant relation with earnings quality), still there is significant change in earnings management influencing earnings quality in Table-2 (i.e. it has strong significant negative relation with earnings quality at 5% level of confidence) and Table-3 (i.e. it has either no significant relation with earnings quality or weak significant negative relation with earnings quality at 10% level of confidence). Therefore, it can be argued that both institutional ownership and board of director can jointly deter earnings management to some extent that leads to improving earnings quality as reflected in Table-3 comparing with Table-2. Thus, we conclude that institutional ownership and board size have weakened the association between earnings management and earnings quality, indicating that corporate governance variables can deterring constrain earnings management. However, the weakening effect is much higher for board of director size than institutional ownership.

The fourth hypotheses testing used regression for moderating variables, and the result is as follow:

Table 4. Summary of Regression for Moderating Variables on the Impact of firm-specific Attributes to the Relationship between Earning Management and Earning Quality

No.	Variable	Regress. Coeff.	t _{statistic}		t _{table}	Sig.
1	Earning Management (X ₁)	-0.169	-2.359	<	-1.660	0.019
2	Financial Leverage (X ₄)	-0.138	-1.942	<	-1.660	0.053
3	Company Size (X ₅)	0.001	0.011	>	1.660	0.992
4	Moderate_3 (X ₁ -X ₄)	0.090	1.014	<	1.660	0.312
5	Moderate_4 (X ₁ -X ₅)	-0.032	-0.372	>	-1.660	0.710
Constant =		-0.052				
Adjusted R Square =		0.028				
F _{statistic} =		2.175				

The result of fourth hypothesis (a) shows that financial leverage cannot strengthen the relationship between earning management and earning quality. This is because the value of $t_{\text{statistic}} \text{ moderate}_3$ (X₁-X₄) is smaller than t_{table} and the significance value 0.312 is higher than α (0.05). Thus, this hypothesis is rejected. Because the investors may have assumption when the company has big amount of debt that company management use that fund in supporting company operational activities. This activity tends to reduce the possibility of earning management practices.

The result of fourth hypothesis testing (b) also shows that firm size cannot strengthen the relationship between earning management and earning quality. This is because the value of $t_{\text{statistic}} \text{ moderate}_4$ (X₁-X₅) is higher than $-t_{\text{table}}$ and significance value 0.710 is higher than α (0.05). Therefore, this hypothesis is also rejected. This implies that investors are very careful in making investment decision making as they rely on both financial and non financial information. That is, company size cannot be used to evaluate the existence of earning management practices that can reduce earning quality. This finding is consistent with Sulistiyono (2010).

Again, similar to Table-3, although both hypotheses are rejected individually based on the statistical criteria, it is, however, evident that both firm-specific variables have some moderating effects, though not significant, on strengthening earnings management to affect earnings quality. Because, Table-4 above reveals that earnings management can negatively affect earning quality at a slightly lower level than in Table-2 at 5% level of confidence. Also importantly, in Table-4 the findings of both financial leverage and firm size are different from that of in Table-2. It appears that the significant influence of financial leverage on earnings quality has shifted from positive to negative sign, in one hand, the significant negative influence of firm size on earnings quality has shifted to insignificant relation with positive sign, on the other. This indicates that high financial leverage may decrease earnings quality as managers may engage in more earnings management not to violate debt covenants. Again, increased firm size may keep the firm in a position to disseminate information to

keep investors updated and contain reputation in the market, but still have resource limitation to do so adequately. As a result, firm size lacks its influence to positively affect earnings quality. Thus, we conclude that leverage has strengthened the relation between earnings management and market return, implying that high leverage is more exposed to earnings management. On the other hand, firm size remains indifferent in strengthened the relation between earnings management and earnings quality although it shows a tendency to weakening earnings management with positive but insignificant relationship with earnings quality.

5. Conclusion

This study investigates the impact of earnings management on earnings quality along with a number of moderating (both governance and financial) variables in an emerging market context - Indonesia. We use discretionary accruals following Modified Jones Model and earnings response coefficient/CAR as the proxies for, respectively, earnings management and earnings quality (i.e. for market return). It examines 4 different types of hypotheses (9 hypotheses in total) on a sample of 52 manufacturing firms listed on the Indonesia stock exchange during 2007 to 2010 periods. Our regression results in Table-2 reveal that earnings management has significant negative influence of market return, confirming hypothesis 1 as expected. Of the moderating variables, good corporate governance variables proxied by institutional ownership and board of director size and firm-specific attributes proxied by financial leverage and company size also have significant effect on earning quality, except institutional ownership variable. This confirms hypothesis 2 partially for corporate governance variables and completely for firm-specific variables. Again, observing the use of moderator effects on earnings management, Table-3 rejects hypothesis 3 statistically, but denotes that while both institutional ownership and board size have some weakening effect of the association between earnings management and market return, board size has more power to deterring earnings management than institutional ownership.

Similarly, Table-4 also rejects hypothesis 3 statistically, but indicates that leverage has strengthened the relation between earnings management and market return showing more exposure to earnings management by changing sign of significant influence from positive to negative between Table-2 and Table-4, whereas firm size remains indifferent showing a tendency to weakening earnings management by changing level of significance and sign from negative significant to positive insignificant between Table-2 and Table-4.

The results of this study have several implications for Indonesian corporate sector and policy makers in adopting appropriate governance measures to constrain earnings management, for instance ineffectiveness of external monitoring by institutional owners, effective monitoring of board with small size, negative signal of leverage in the market, and positive indication of firm size in disseminating reliable financial information in the market etc. Given that this type of study is new showing the relationship between earnings management and market return along with governance and firm-specific moderating variables, the study does, however, assume a number of limitations, such as small sample size and period of years undertaken, a few variable in this model, low value of Adjusted R² etc. It is expected that future research can overcome these limitations by taking larger sample size and time periods as well as adding more variables such as board of director members' appointment equality system, competency and independency that could be measured with secondary and questionnaire based primary data (Anand, 2008).

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Appendix 1. Classical Assumption Test for Multiple Regression

Figure 1. Normality test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		208
Normal Parameters ^{a,b}	Mean	.6933
	Std. Deviation	.3518
Most Extreme Differences	Absolute	.074
	Positive	.074
	Negative	-.058
Kolmogorov-Smirnov Z		1.067
Asymp. Sig. (2-tailed)		.205

- a. Test distribution is Normal.
 b. Calculated from data.

Figure 2. Multicollinearity test

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	Collinearity Statistics	
		B	Std. Error	Beta	Tolerance	VIF
1	(Constant)	-.00000000004	.067			
	EM	-.156	.068	-.156	.964	1.037
	IO	-.065	.068	-.065	.953	1.050
	BDS	.296	.085	.296	.613	1.630
	FL	.221	.071	.221	.886	1.128
	CS	-.170	.083	-.170	.654	1.529

a. Dependent Variable: EQ

Figure 3. Heteroscedasticity test
Regression

Variables Entered/Removed ^b				Model Summary				
Model	Variables Entered	Variables Removed	Method	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	CS, EM, IO, FL, BDS ^a	.	Enter	1	.175 ^a	.030	.006	.7280

a. All requested variables entered.

b. Dependent Variable: ABRESID

a. Predictors: (Constant), CS, EM, IO, FL,

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.362	5	.672	1.269	.279 ^a
	Residual	107.047	202	.530		
	Total	110.409	207			

a. Predictors: (Constant), CS, EM, IO, FL, BDS

b. Dependent Variable: ABRESID

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.604	.050		11.962	.000
	EM	-.090	.052	-.123	-1.748	.082
	IO	.004	.052	.005	.068	.946
	BDS	.087	.065	.118	1.339	.182
	FL	.079	.054	.108	1.473	.142
	CS	-.067	.063	-.092	-1.077	.283

a. Dependent Variable: ABRESID

Figure 4. Auto-correlation test
Durbin Watson

n	k' = 1		k' = 2		k' = 3		k' = 4		k' = 5		k' = 6	
	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU
6	0,610	1,400	-	-	-	-	-	-	-	-	-	-
7	0,710	1,356	0,467	1,896	-	-	-	-	-	-	-	-
8	0,763	1,332	0,559	1,777	0,368	2,287	-	-	-	-	-	-
9	0,824	1,320	0,629	1,699	0,455	2,126	0,296	2,586	-	-	-	-
10	0,879	1,320	0,697	1,641	0,525	2,016	0,376	2,414	0,243	2,822	-	-
11	0,927	1,324	0,658	1,604	0,595	1,928	0,444	2,283	0,316	2,645	0,203	3,005
12	0,971	1,331	0,812	1,579	0,658	1,864	0,512	2,177	0,379	2,506	0,268	2,832
13	1,010	1,340	0,861	1,562	0,715	1,816	0,574	2,094	0,445	2,390	0,328	2,692
14	1,045	1,350	0,905	1,551	0,767	1,779	0,632	2,030	0,505	2,296	0,389	2,572
15	1,077	1,361	0,946	1,543	0,814	1,750	0,685	1,977	0,562	2,220	0,447	2,472
16	1,106	1,371	0,982	1,539	0,857	1,728	0,734	1,935	0,615	2,157	0,502	2,388
17	1,133	1,381	1,015	1,536	0,897	1,710	0,779	1,900	0,664	2,104	0,554	2,316
18	1,158	1,391	1,046	1,535	0,933	1,696	0,820	1,872	0,710	2,060	0,603	2,257
19	1,180	1,401	1,074	1,536	0,967	1,685	0,859	1,848	0,752	2,023	0,649	2,206
20	1,201	1,411	1,100	1,537	0,998	1,676	0,894	1,828	0,792	1,991	0,692	2,162
21	1,221	1,420	1,125	1,538	1,026	1,669	0,927	1,812	0,829	1,964	0,732	2,124
22	1,239	1,429	1,147	1,541	1,053	1,664	0,958	1,797	0,863	1,940	0,769	2,090
23	1,257	1,437	1,168	1,543	1,078	1,660	0,986	1,785	0,895	1,920	0,804	2,061
24	1,273	1,446	1,188	1,546	1,101	1,656	1,013	1,775	0,925	1,902	0,837	2,030
25	1,288	1,454	1,206	1,550	1,123	1,654	1,038	1,767	0,953	1,986	0,864	2,012
26	1,302	1,461	1,224	1,553	1,143	1,652	1,062	1,759	0,979	1,873	0,897	1,992
27	1,316	1,469	1,240	1,556	1,162	1,651	1,084	1,753	1,004	1,861	0,925	1,974
28	1,328	1,476	1,255	1,560	1,181	1,650	1,104	1,747	1,028	1,850	0,951	1,958
29	1,341	1,483	1,270	1,563	1,198	1,650	1,124	1,743	1,050	1,841	0,975	1,944
30	1,352	1,489	1,284	1,567	1,214	1,650	1,143	1,739	1,071	1,833	0,998	1,931
31	1,361	1,496	1,297	1,570	1,229	1,650	1,160	1,735	1,090	1,825	1,020	1,920
32	1,373	1,502	1,309	1,574	1,244	1,650	1,177	1,732	1,109	1,819	1,041	1,909
33	1,383	1,508	1,321	1,577	1,258	1,651	1,193	1,730	1,127	1,813	1,061	1,900
34	1,393	1,514	1,333	1,580	1,271	1,652	1,208	1,728	1,144	1,808	1,080	1,891
35	1,402	1,519	1,343	1,584	1,283	1,653	1,222	1,726	1,160	1,803	1,097	1,884
36	1,411	1,525	1,354	1,587	1,295	1,654	1,236	1,724	1,175	1,799	1,114	1,877
37	1,419	1,530	1,364	1,590	1,307	1,655	1,249	1,723	1,190	1,795	1,131	1,870
38	1,427	1,535	1,373	1,594	1,318	1,656	1,261	1,722	1,204	1,792	1,146	1,864
39	1,435	1,540	1,382	1,597	1,328	1,658	1,273	1,722	1,218	1,789	1,161	1,859
40	1,442	1,544	1,391	1,600	1,338	1,659	1,289	1,721	1,230	1,786	1,175	1,854
45	1,475	1,566	1,430	1,615	1,383	1,666	1,336	1,720	1,287	1,776	1,238	1,835
50	1,503	1,585	1,462	1,628	1,421	1,674	1,378	1,721	1,335	1,771	1,291	1,822
55	1,528	1,601	1,490	1,641	1,452	1,681	1,414	1,724	1,374	1,768	1,334	1,814
60	1,549	1,616	1,514	1,652	1,480	1,689	1,444	1,727	1,408	1,767	1,372	1,808
65	1,567	1,629	1,536	1,662	1,503	1,696	1,471	1,731	1,438	1,767	1,404	1,805
70	1,583	1,641	1,554	1,672	1,525	1,703	1,494	1,735	1,464	1,768	1,433	1,802
75	1,598	1,652	1,571	1,680	1,543	1,709	1,515	1,739	1,487	1,770	1,458	1,801
80	1,611	1,662	1,586	1,688	1,560	1,715	1,534	1,743	1,507	1,772	1,480	1,801
85	1,624	1,671	1,600	1,696	1,575	1,721	1,550	1,747	1,525	1,774	1,500	1,801

Figure 5. Distribution of t

<i>df</i>	$\alpha = 0,05$	$\alpha = 0,025$	<i>df</i>	$\alpha = 0,05$	$\alpha = 0,025$
1	6.3138	12.709	51	1.6753	2.0076
2	2.9200	4.3027	52	1.6747	2.0066
3	2.3534	3.1824	53	1.6410	2,0057
4	2.1318	2.7764	54	1.6736	2,0049
5	2.0150	2.5706	55	1.6730	2,0040
6	1.9432	2.4469	56	1.6725	2,0032
7	1.8946	2.3646	57	1.6720	2,0025
8	1.8595	2.3060	58	1.6716	2,0017
9	1.8331	2.2622	59	1.6711	2,0010
10	1.8125	2.2281	60	1.6706	2,0003
11	1.7959	2.2010	61	1.6702	1,9996
12	1.7823	2.1788	62	1.6698	1,9990
13	1.7709	2.1604	63	1.6694	1,9983
14	1.7613	2.1448	64	1.6690	1,9977
15	1.7531	2.1314	65	1.6686	1,9971
16	1.7459	2.1199	66	1.6683	1,9966
17	1.7396	2.1098	67	1.6679	1,9960
18	1.7341	2.1009	68	1.6676	1,9955
19	1.7291	2.0930	69	1.6672	1,9949
20	1.7247	2.0860	70	1.6669	1,9944
21	1.7207	2.0796	71	1.6666	1,9939
22	1.7171	2.0739	72	1.6663	1,9935
23	1.7139	2.0687	73	1.6660	1.9930
24	1.7109	2.0639	74	1.6657	1.9925
25	1.7081	2.0595	75	1.6654	1.9921
26	1.7056	2.0555	76	1.6652	1.9917
27	1.7033	2.0518	77	1.6649	1.9913
28	1.7011	2.0484	78	1.6646	1.9908
29	1.6991	2.0452	79	1.6644	1.9905
30	1.6973	2.0423	80	1.6641	1.9901
31	1.6955	2.0395	81	1.6639	1.9897
32	1.6939	2.0369	82	1.6636	1.9893
33	1.6924	2.0345	83	1.6634	1.9889
34	1.6909	2.0322	84	1.6632	1.9886
35	1.6896	2.0301	85	1.6630	1.9883
36	1.6883	2.0281	86	1.6628	1.9879
37	1.6871	2.0262	87	1.6626	1.9876
38	1.6860	2.0244	88	1.6624	1.9873
39	1.6849	2.0227	89	1.6622	1.9870
40	1.6939	2.0211	90	1.6620	1.9867
41	1.6829	2.0195	91	1.6618	1.9864
42	1.6820	2.0181	92	1.6616	1.9861
43	1.6811	2.0167	93	1.6614	1.9858
44	1.6802	2.0154	94	1.6612	1.9855
45	1.6794	2.0141	95	1.6611	1.9853
46	1.6887	2.0129	96	1.6609	1.9850
47	1.6779	2.0117	97	1.6607	1.9847
48	1.6772	2.0106	98	1.6606	1.9845
49	1.6766	2.0096	99	1.6604	1.9842
50	1.6590	2.0086	100	1.6602	1.9840