

Board Characteristics and Economic Value Added: Controlling for Endogeneity

Ali Mohammed Hamid and Ashraf Salem Abdulkafie

Dr.abdulkafie71@gmail.com

Faculty of Economic, Sirte University

Abstract

The characteristics of board of directors play a significant role in corporate governance and it is considered a major internal tool along with ownership characteristics to mitigate agency conflicts among management and owners as well as between controlling shareholders and minority shareholders by monitoring duties. This study investigates the association between board ownership, board characteristics and economic value added (EVA) after controlling the endogeneity problem that occur in governance studies. By using panel technical approach, the paper examines 468 observations of Saudi listed firms during 2010 to 2015. This paper applies the generalized method of moments (GMM) approaches to test the effects of the characteristics of board of directors and board ownership on economic value added (EAV) in Saudi listed firms. The results show that board size, the number of non-executive directors and audit committee independence were positively associated with economic value added, whereas board ownership, frequency of board meetings and CEO duality were found to be negatively related. Using EVA as performance measurement may be more useful than other performance measurements in a fluctuating market. The results have useful recommendations for shareholder, management and investors in Saudi environment.

Keywords: Endogeneity, board ownership, board characteristics, economic value added, emerging market

1. Introduction

The emergence of corporate governance has driven by the East-Asian financial break-down in the last decade, which in turn causes a decrease in the value of firms (Bae, Baek, Kang, & Liu, 2012). The recent global financial crises have provided further impetus to the growing literature on corporate governance. It is conceived that good governance plays an effective role in company management, producing reliable financial information, building investor confidence and attraction of investments. Furthermore, good governance also plays a key role in providing transparency and accountability of company management to mitigate conflicts of interests. The main objective of the corporate governance is to regulate and monitor the

relationships between managers and owners as well as between majority shareholders and minority shareholders of the corporation. On the type of relationship that exists between the two parties, there could be conflicts of interests between them especially if the managers' interest fails to align with that of the owners. As a result, a separation of ownership and control in a corporation could lead to agency problems (Jensen & Meckling, 1976) . To address this, most countries including, Saudi Arabia have instituted corporate governance to protect shareholders' and other stakeholders' interests as well as the value of the companies. Board of directors also is the primary internal governance mechanisms that may be able to supervises management (Brennan, 2006). Board characteristics play a significant role in protecting minority shareholders' interests as well as in monitoring management to mitigate agency conflicts, then enhancing the value to all stakeholders. Economic value added (EVA) is referred to as economic profit. It is very important to investors, management and other shareholders because it is using as an indicator of how profitable firm projects are and it therefore serves as a reflection of management performance (Sharma & Kumar, 2010). It is also an important indicator of a country's economic well-being and the growth of the economy. This research seeks to test the relationship between family ownership, board characteristics and corporate value is measured by economic value-added EVA. Most studies have examined the relationship among corporate governance mechanisms and corporate value (Bianco & Casavola, 1999; Brown & Caylor, 2009; Douglas, 2011; A. A. Drakos & F. V. Bekiris, 2010; Haniffa & Hudaib, 2006). Empirical studies have used differences performance measures related to corporate governance. Some studies used accounting-based measures, such as return on assets (ROA), return on equity (ROE), they may give misleading signals concerning value relevance, innovation etc., so researchers and other stakeholders often use market-based measures, such as Tobin's Q, market return etc. Recent research has clearly shown significant effect of corporate governance practices on economic value added in both developed and developing countries. Bayrakdaroglu, Ersoy, and Citak (2012) found that a significant positive relationship between foreign ownership and EVA. However, CEO duality is found to increase EVA. In Saudi context, there is a few of studies have examined the relationship between corporate governance and EVA as a measure to evaluate corporate performance. Therefore, findings of this study could be contributed to expand the literature in corporate governance. Corporate governance principle indicted that economic value added is a one of important objectives for management and shareholders. Saudis corporate governance code were suggested that corporate governance principle have helping firms to achieve the best performance with a good management, so this lead to increase economic value added as well as increasing their competitiveness.

The Kingdom of Saudi Arabia KSA is of interest because it has concentrated shareholding like other developing country. Most of Saudi listed firms are family owned or controlled. It is one of the emerging markets has taken considerable progress with respect to corporate governance practices. It has largest market by capitalization in Golf countries as compared to other Middle East countries (Alsaed, 2006). Corporate governance in Saudi Arabia is not yet well developed. Although the Saudi Stock Market (SSM) was issued some new rules in 2008

and 2010. It is evident that stock markets of Saudi Arabia is more active in the Gulf Cooperation Council (GCC) (Abraham & Seyyed, 2006; Bley & Chen, 2006). However, Saudi government has taken several steps for capital market development in recent years (Alsaeed, 2006). Yet it is still far from corporate governance practices in developed markets. In addition, Saudi Stock Market has also made implemented many policies and best practices in an attempt to protect monitory shareholders as well as provide legal framework to enhance the human resource management. Saudi Capital Market also has developed in recent years such as 2006, 2008 and 2009, which article 9 of corporate governance regulations added a new three aspects for article 9. As a result, the Saudi capital market was developed rapidly compared to other Arab country and it's useful to examine whether these changes or amendments are play an important role in improving the effectiveness of corporate governance as well as improving economic performance. Saudi has emerged as the largest emerging equity markets among Gulf Cooperation Council (GCC). In literature, several studies have been examined the relationship between governance and corporate performance in developed and developing markets. Alhassan, Bajaher, and Alshehri (2015) in their study, examined the relationship between the board size, board composition, board meeting and economic performance in Saudi listed Banks. However, there are limited empirical evidence in Saudi environment using economic value-added EVA as measure of the corporate value in the possible relationship between family ownership, board characteristics and corporate value. Therefore, this research contributes the knowledge about whether family ownership and characteristics of board of directors are creating economic value added in Saudi listed firms, and provides an overview of the effectiveness of board structure in Saudi context.

This paper differs from previous studies and contributes to the literature in a number of ways. First, this study is the first to measure corporate value by economic value added of Saudi listed firms and examines whether board ownership and other board characteristics including board size, board independence, frequency of board meeting, CEO duality and audit committee independence are creating value of the firm. No previous study has attempted to measure corporate value by using economic value added in the Saudi Arabia context, although a Saudi Arabia is an OECD nation with a relatively small stock market and small number of companies. Saudi Arabia based companies are more prone to agency problem that between controlling shareholders and minority shareholders, it is more likely to occur in Saudi Arabia companies than in those of other OECD countries. To date much of the empirical research on economic value added and its relationship with corporate governance has focused on the developed countries only. This paper is motivated by the fact that no research has yet been done for Saudi Arabia listed firms. Second, unlike previous empirical studies that used return on assets ROA, return on equity ROE and Tobin's Q as performance measure, this study employs economic value added as measurement of firm performance to examine the effect of board characteristics on corporate value due to the EVA may be more useful than other performance measurements in a fluctuating market. Third, unlike prior studies, this study also contributes to develop methodological over prior governance studies that address endogeneity. As this study employs the generalized method of moments (GMM) approach to control for endogenous relations between board ownership, board characteristic, and economic value added in emerging markets.

The remainder of the paper is structured as follows: section 2 briefly reviews the literature review and hypothesis development. Section 3 proposes the regression model and explains the data and the variables used in the study. Section 4 presents findings of empirical testing and section 5 provides discusses the results and provides some conclusions.

2. Literature Review and Hypotheses Development

Agency theory stems from economic theory and overpowering corporate governance literature, explaining agency problems that arise due to the division of ownership and control. It explains relationships where the interests of the parties collide, and can be settled by responsible monitoring and a well-planned compensation system (Davis, Schoorman, & Donaldson, 1997). Two factors contribute to the prominence of agency theory: Firstly, the agency theory reduces the corporation to two participants, managers and shareholders. Secondly, it accepts human beings as self-interested (Daily, Dalton, & Cannella, 2003). In the literature, there are two different agency conflicts types; first type of agency conflicts arises from conflicts among owners (principal) and managers (agent), which managers might have different objectives from those of the owners (Jensen & Meckling, 1976). A second type of agency conflicts arises from conflicts between controlling shareholders (principal) and minority shareholders (principle) (Shleifer & Vishny, 1986).

Eisenhardt (1989) outlines two streams of agency theory that have formed over time. Firstly, Principal-agent relationship: Principal-agent research is concerned with a general theory of the principal-agent relationship with more focus on the general theoretical implications than the positivist stream. Secondly, agency theory and the firm: a positivist perspective: Positivist researchers focus on identifying circumstances in which the principal and agent may have goals that conflict with each other and then form limitations to the agent's self-serving behavior. This stream has focuses on the principal-agent relationship in the firm between shareholders and managers.

The agency relationship describes the link between those who provide corporate finances and those who manage the firm's affairs. Jensen and Meckling (1976) states that the agency relationship may be likened to a contract where the principals engage the agent for the performance of a service on their behalf, involving the distribution of authority over decision making to the agent, supporting the division and management of control in the board of directors, using incentives for compensation.

Eisenhardt (1989) find that agency problems arise when the goals of the principal and agent are conflicting and it's financially or otherwise difficult for the principal to clarify the actions of the agent. However, the principal cannot verify that the agent is behaving in an appropriate manner. Shleifer and Vishny (1997) look at the problem in the context of a manager that claims funds from investors for his own personal gain. They highlight that although the financier needs the manager for specialized human capital to create more funds, the manager, without enough capital of his own to invest or to cash in, needs the financier's funds. But, financiers have difficulty in assuring that managers do not use their funds inappropriately and/or waste them on unnecessary projects (Shleifer & Vishny, 1997). Using Jensen and

Meckling (1976) work, E. Fama and M. Jensen (1983) explain the organization's survival by both separating ownership and control and recognizing factors that aid the survival. They focus on the survival of organizations where agents are not given a substantial share of the wealth that results from their decisions. Companies need to control their agency problem for cost management and efficient operation (E Fama & M Jensen, 1983).

Another type of agency conflicts arises from conflicts between controlling shareholders (principle) and minority shareholders (principle). This occurs when controlling shareholders have dominated to control and make decisions that decrease firm' value as well as impact on interests' minority shareholders (Villalonga & Amit, 2010). In developing countries, where ownership is concentrated in the hand of the founding families, agency conflicts do not only arise from the conflicts between shareholders (principle) and managers (agents) but also arise from conflicts between controlling shareholders and minority shareholders. Although controlling shareholders have an interest in protecting their wealth by making sure that firm is well managed, the presence of controlling shareholders are also associated with possible costs as they have incentives to extract private benefits from the firm at the expense of all other stakeholders (Shleifer & Vishny, 1986). In Saudi Arabia, like other developing countries, most companies are owned by family members where the controlling family members are involving in decision-making positions as well as membership in board of directors. The high level of concentration ownership of Saudis' firms offer opportunities for controlling shareholders to expropriate minority shareholders which lead to principal-principal conflicts due to the less of investor protection compared to developed countries. Regarding to agency problems in Saudi Arabia context, the study considers the problems between founding family control and minority shareholders. The conflict among large dominating, such as the family ownership and the minority shareholders, who are normally expected to act in the best interests of all shareholders. Therefore, it is important to consider the implications of this type of agency problem on the relationship between board characteristics, board ownership and economic value added.

Board Ownership

Regarding to the effect of board ownership on corporate value, some studies have examined the relation between them and the results are also inconclusive. The first argument is alignment effect that board ownership had a significant positive effect on corporate value. The significant positive relationship between managerial ownership and corporate performance was reported in Chung and Pruitt (1996) in U.S. Palia and Lichtenberg (1999) also find that managerial ownership has a positive impact on firm performance. Thomsen and Pedersen (2000) investigate the association between concentration ownership and economic performance. By using 435 largest European firms for the period from 1990 to 1995, suggesting that shares owned by largest shareholders is positively related to economic performance. Kaserer and Moldenhauer (2008) find a significant positive relationship between managerial ownership and corporate performance, as measured by stock price performance as well as by Tobin's Q, based on 245 German companies from 2000 to 2003. Almudehki and Zeitun (2012) explore the effect of different ownership dimensions (board ownership; foreign ownership, institutional ownership, and ownership concentration) on the

corporate performance of 29 firms listed on Doha Stock Exchange during the period 2006–2011. They found that board ownership, foreign ownership and concentration ownership have a significant positive effect on firm performance. Ahmed Sheikh, Wang, and Khan (2013) argue that increasing the proportion of board ownership led to more alignment effect and better corporate value. Similarly, Zeitun (2014) focuses on the Gulf Cooperation Council GCC markets, and found that ownership structure, ownership concentration, and state ownership are positively affect the performance of firms in the these markets. Nonetheless, they also found that institutional and foreign ownership have no impact on corporate performance of these firms. Arouri et al. (2014) report different results for 58 banks operating in the GCC markets. They found a positive impact of family, foreign, and institutional ownership on bank performance, but no impact of state ownership on bank performance. Chou (2015) investigates the influence of managerial ownership on firm performance among 1156 effective observations for 2004-2007 periods in Taiwan. Applying Fixed-effect panel data regression model the study finds that managerial ownership can improve corporate performance, thus concludes that managerial ownership enhances the performance of a firm, which is consistent with the convergence-of-interest's argument.

In contrast, some empirical studies supported the second argument which is entrenchment viewpoint that board ownership had a significant negative or no significant effect on corporate value, such as E. Fama and M. Jensen (1983), Morck, Shleifer, and Vishny (1988), Cho (1998), Holderness, Kroszner, and Sheehan (1999), Wei, Xie, and Zhang (2005), Ahmed Sheikh et al. (2013) and Sheikh and Khan (2016). More recently, Zhang and Erasmus (2016) also investigate the linkage between ownership structure and corporate performance of 153 firms listed on the Shenzhen Stock Exchange for 2010 to 2012 in China, and found that managerial ownership has a negative effect on the performance of a firm. In addition, several studies have reported that managerial ownership does not affect corporate' value. For example, Morck et al. (1988) and Cho (1998) find insignificant relationship between managerial ownership and corporate performance. Loderer and Martin (1997) find similar findings, indicating that there is no significant association between managerial ownership and corporate value. Sulong and Ahmed (2011) find that managerial ownership and ownership concertation have no significant impact on firm value in Malaysia. In the context of the Gulf Cooperation Council (GCC), Arouri, Hossain, and Muttakin (2011) investigate the impact of ownership and board structure on the performance of banks by using a sample of 27 banks from the GCC countries in 2008. The findings indicated that there is a positive relationship between foreign ownership and bank performance measured by return on assets. In addition, it also discovered that insider ownership and institutional ownership not have a significant negative effect on bank performance. Ruan, Tian, and Ma (2011) examine the influence of managerial ownership on firm value among China's civilian-run firms listed on the Chinese Stock Market for 2002 to 2007. The study found that managerial ownership is not significantly related to firm value. This result is similar to the results obtained by Bayrakdaroglu et al. (2012) in Istanbul Stock Exchange. In Indonesia, Henryani and Kusumastuti (2013) investigate the impact of ownership pattern on economic value added.

By using 61 listed firms on Indonesia Stock Exchange from 2007 to 2011, they found that managerial and state ownership are insignificantly related to economic value added, but institutional ownership has a significant positive effect on economic value added. More recently, based on 850 state-owned listed enterprises from 2009 to 2014 in China's Shanghai and Shenzhen Stock Exchange Xia and Cheng (2016) reported that ultimate ownership has no significant effect on corporate performance in state-owned enterprises. Based on the above argument, this leads to the following hypothesis:

H1: *There is a significant positive association between board ownership and economic value added.*

Board Size

Board size is considered as the one of primary internal corporate governance mechanisms (Bonn, Yoshikawa, & Phan, 2004). Based on prior studies, some studies provided evidence that board size is positively associated with economic value added as proxied by Tobin's Q. It plays a key role in enhancing and improving economic value added. Nicholson and Kiel (2007) find a significant positive relationship between board size and corporate performance, indicating that a greater number of directors contributes in improving economic value added. This finding is confirmed by Ahmad, Kodwani, and Upton (2016) argue that board size is most effective monitoring mechanism and is positively related with economic value added. Daniel, Coles, and Naveen (2008) find that complex firms tend to have larger boards, and it is likely to improve corporate performance. By using 219 Canadian firms, Adjaoud, Zeghal, and Andaleeb (2007) revealed that board size had a significant positive impact on economic value added (EVA) and market value added (MVA), but no significant relation to accounting-based performance. Danoshana and Ravivathani (2013) using data from 2008 to 2012 revealed a significant relationship between board size, audit committee size and economic value added. The results of the study suggested that board size and audit committees size had a greater impact on corporate performance in Sri Lanka. It was clear from the study that increases in board size and audit committees size positively impacted on the firm's financial performance. Recent study by Bansal and Sharma (2016) investigated the impact of board size and characteristics of audit committee on firm value of 235 listed firms in National Stock Exchange NSE 500 in India from 2004 to 2013. Applying a fixed effect panel data technique, they also find consistent results across different measures of performance. In particular; board size and CEO Duality have a significant positive effect on corporate performance.

Conversely, Yermack (1996) and Eisenberg, Sundgren, and Wells (1998) find that smaller board size is related with higher economic value added. Consistent with these results, Yermack, Mak and Kusnadi (2005) reported that board size have a negative effect on firm value as measured by Tobin's Q. Guest (2009) examines the influence of board size on firm performance among 2746 listed firms for 1981-2002 periods in UK. The study finds that board size has a negative impact on economic value added. Furthermore, Gill and Mathur (2011) argue that larger board size has a negative effect on value firm in Canada. This result is confirmed by Kumar and Singh (2013) revealed a significant negative relationship between

board size and firm value. More recently, Arora, Arora, Sharma, and Sharma (2016) showed that board size significantly negative affects firm performance.

Furthermore, other studies have examined the relationship between board structure and firm value and their results reported no significant relation. For instance, Coles, McWilliams and Sen (2001) reported that board structure is not significantly related to firm value. Similarity, Bayrakdaroglu et al. (2012) examined the association between board size and value-based performance as measured by economic value added (EVA), market Value added (MVA) and cash value added (CAV). The results indicate that board size has no significant relation to any performance measures. In the context of Saudi Arabia, Al-Matari, Al-Swidi, and Fadzil (2012) examined the relationship between board structure, audit committee characteristics and corporate performance and the results are not in line with the agency theory, showing boards structure and audit characteristics are not significantly related to performance. In addition, Ghabayen (2012) investigated the association between board characteristics, such as board size, audit committee size, audit committee composition and board composition with the firm performance by using a sample of 102 non-financial Saudi listed companies. The study found that audit committee size, audit committee composition and board size have no influence on firm performance. Hence, the following hypothesis is expected:

H2: *There is a significant positive association between board size and economic value added.*

Board Independence

Previous studies that have empirically examined the association between independence of board of directors and firm value provide mixed results. Hossain, Prevost, and Rao (2001) and Abidin, Kamal, and Jusoff (2009) reported that board independence has a significant positive effect on economic value added, suggesting that independent board members have more expertise and knowledge which might be helpful in decision making. Wintoki, Linck, and Netter (2010) investigate the impact of board independence on economic value added. Applying a fixed effect and Generalized Method of Moments GMM methods they found that board independence predicts Tobin's Q with fixed firm effect. However, by using GMM approach the results show that board independence has no significance relationship with economic value added. By using 252 US firms, El Mir and Seboui (2008) investigate whether characteristics of board and ownership structure could enhance the relationship between Economic Value Added (EVA) and Created Shareholder Value (CSV). The findings revealed that board independence, Big-6, financial expert have a significant positive relation with the different between economic value added and created shareholder value (CSV-EVA). However, board size, CEO duality, board ownership have a negative significant relationship with different between EVA and CSV. Indicating that board characteristics are played a significant role in exploring the different between CSV and EVA. Lei and Song (2012) suggested that firms with higher proportion of board independence are more likely to have higher economic value added. Similarity, a positive significant relation between board

independence and firm performance is also found by Leung, Richardson, and Jaggi (2014). More recently, Lago-Peñas, Rivo-López, and Villanueva-Villar (2016) examined the effects of corporate governance on value creation, based on all the listed firms at the Spanish Stock Exchange between 2004 and 2012. The results shown that board size and board independence have a significant positive effect on value creation.

In contrast, Agrawal and Knoeber (1996), Klein (1998) and Bhagat and Black (2002) found a negative and significant correlation between board independence and firm performance. Researchers such as Shan and McIver (2011), Koerniadi and Tourani-Rad (2012) and Leung et al. (2014) argued that board independence has a negative effect on corporate performance due to the non-executives' directors might not have more information about the firm. Other studies reported that board independence has no significant relationship with firm value. For example, Hermalin and Weisbach (1991) and Mehran (1995) find no relationship between board independence and economic value added. More recently Zabri, Ahmad, and Wah (2016) reported no significant association between board independence and corporate performance, however, monitoring function to control the actions of managers is considered as one of the primary elements of organizational effectiveness. Therefore, the number of non-executive directors increase leading to increased oversight which reduces agency problem and increases firm value.

Another characteristic of board of directors is board composition, which has been studied in relation to economic performance by several researchers. However, a clear relationship has not been dawning across these studies. For example, Abdullah (2006) and (Klein, 1998) have found a negative relationship between board composition and economic performance. Similarity, Kumar and Singh (2013) examine the relationship between board size and economic value added, using 176 Indian firms over the period from 2008 to 2009. The results revealed that board size have a significant negative effect on economic value added. On the other hand, Hossain et al. (2001) have found a positive relationship between board composition and economic performance. Meanwhile, Guest (2009) and Ehikioya (2009) have not found a significant relationship between board composition and economic performance. Therefore, the following hypothesis is formulated as:

H3: *There is a significant positive relationship between board independence and economic value added.*

Frequency of Board Meetings

Like independence of the board of directors, the number of board meeting plays an important role in enhancing the supervisory and regulatory functions of the board as well as helping the board to have better control of the firm and thereby improving the firm value. Previous studies provide mixed findings regarding the existence of a clear relationship between board meeting and firm value. For example, some studies found that the frequency of board meetings have significant positive relationship with corporate performance (Khanchel El Mehdi, 2007; Rainsbury, Bradbury, & Cahan, 2008). García-Ramos and García-Olalla (2011) found a significant positive relationship between the number of board meeting and corporate performance in Europe. More recently Arora et al. (2016) showed that frequency of board meeting significantly positive affects firm performance.

In contrast, the number of board meeting was found negatively associated to corporate performance (Vafeas, 1999). Recently Rodriguez-Fernandez, Fernandez-Alonso, and Rodriguez-Rodriguez (2014) found that the number of board meeting is negatively related to firm value in Spain. Similar result was found in Malaysia by Ahmed Haji (2014). The author examined the impact of characteristics of board of directors and ownership types on economic value added before and after revised code in Malaysian firms. The study point out that the number of board meeting has a significant negative effect on economic value added, while other board structure, namely, board size and board independence are found insignificant in all multiple regression models in explaining the economic value added of Malaysian firms before and after the revised code. Furthermore, no significant relationship between the number of board meeting and corporate performance was found in India by (Jackling & Johl, 2009). Following these prior studies, the fourth hypothesis in Saudi context proposed as follows:

H4: *There is a significant positive relationship between frequency of board meetings and economic value added.*

CEO Duality

CEO duality means that the position of the Chief Executive Officer (CEO) and the board chairperson are duties by the one person. Several empirical studies have examined the relation between CEO duality and economic value added and provided mixed evidence in the literature. One argument revealed that CEO duality has a positive impact on economic value added. For example, Brickley, Coles, and Jarrell (1997) argue that costs were higher in firms with separation CEO and board chairman. Ramdani and Witteloostuijn (2010) in studying how board independence and CEO duality affected economic value added for companies listed on the stock exchanges in Indonesia, Malaysia, South Korea and Thailand from 2001 to 2002. The results reported that CEO role duality positively affects economic value added. Gill and Mathur (2011) indicated that CEO duality has a significant positive related to firm value in Canada. Rouf (2014) examined the impact of governance variables on firm value in Bangladesh and found a positive relationship between CEO duality and firm value.

In contrast, some studies fama and Jensen (1983) and Jensen, (1993) argued that the CEO duality had a negative impact on economic value added and supported agency theory. Goyal and Park (2002) reported that firms with combined positions CEO and board chairman have a lower performance than firms with separated positions CEO-chairman. More recently, Duru, Iyengar, and Zampelli (2016) investigated the dynamic relationship between CEO duality and firm value of 6848 firm-year observations in U.S. from 1997 to 2011. Applying a dynamic GMM techniques, they found that CEO duality was negatively associated with economic value added. Rutledge, Karim, and Lu (2016) reported a negative relationship between CEO duality and economic value added. Finally, several studies have revealed that CEO duality does no influence economic value added. For example, Daily and Dalton (1992) found no significant relationship between CEO duality and corporate performance. Abdullah (2004) examined the effects of board independence and CEO duality on a firm's performance for all

companies listed on the Main Board of the Kuala Lumpur Stock Exchange for the period between 1994 and 1996, and found CEO duality is not significant related to economic value added. According to agency theory, firms with separating the role of CEOs and chairman have a better performance. To examine the above argument in Saudi context the fifth hypothesis is proposed as follows:

H5: *There is a significant negative relationship between CEO duality and economic value added.*

Audit Committee Independence

Effective corporate governance through the audit committee seeks to protect the interests of the shareholders. An audit committee is defined as ‘a sub-committee of largely non-executive directors whose work encompasses matters relating to audit, financial reporting and internal control (Brierley & Gwilliam, 2002, p. 288). Audit committees have three important functions: to ensure the integrity of the financial reports of the company, to manage the external auditors and to oversee the internal controls that operate the company (Rezaee, Olibe, & Minmier, 2003). Carcello and Neal (2003) suggested that audit committee with higher proportion of independence has more effective monitoring of financial reporting. Klein (1998) argued that audit committee independence might be valuable board members. By showing a significant positive association between the percentage of outside of directors on audit committee and firm performance. Chan and Li (2008) examined the relationship between independence of audit committee and firm value with a sample of Fortune 200 companies and found that independence of audit committee have a positive impact on economic value added. Suggesting that expert-independent directors on board and in the audit committee enhances and improves firm value. Amer, Ragab, and Shehata (2014) examine the influence of characteristics of audit committee on firm performance measured by Return on equity (ROA), return on equity (ROE) and Tobin’s Q among 50 listed firms for the 2004-2012 periods in Egypt. Applying GLS regression, the study finds that audit committee independence can improve corporate performance, thus concludes that audit committee independence and other audit committee attributes enhance performance of a firm.

Al-Mamun, Yasser, Rahman, Wickramasinghe, and Nathan (2014) examine the relationship between characteristics of audit committee and economic value added of 75 listed firms over the period 2008-2010 in Malaysia. The results showed that audit committee independence has a significant positive relation with economic value added, whereas a significant negative association was found between audit quality and economic value added. In Saudi Arabia, Ghabayen (2012) examined the relationship between audit committee size, composition and corporate performance on 102 Saudi Arabian companies. Using return on assets as a measure of corporate performance. They found that the size and composition of the audit committee had no effect on the performance of the company. However, in a wider context of a review of 250 research papers in this area, Carcello, Hermanson, and Ye (2011) suggest that effective audit committees improve the level of internal control. Effectiveness is measured according to the degree of independence in the composition of the committee and their level of financial expertise while company performance is determined by the absence of fraudulent reporting, the presence of going concern reporting and the degree of internal controls (Carcello et al.,

2011). This disparity between research in the wider sphere indicates the danger of a too narrow measure of company performance and the need for more research in the Saudi Arabian context. More recently, Bansal and Sharma (2016) reported that audit committee independence and frequency audit meetings are insignificant relationship to corporate performance. In Saudi context, Concerning Governance Regulations recommended Article (14): Audit Committee, states that the board of directors shall set up an audit committee and executive board members are not eligible for audit committee membership. The Audit Committee should consist of at least three (3) members, of whom a member should be an expert in financial and accounting matters. The relationship between the number of non-executive directors in an audit committee and economic value added has been reported in prior studies. Therefore, the sixth hypothesis of this paper is proposed as follows:

H6: *There is a significant positive relationship between audit committee independence and economic value added.*

3. Methodology and Data

Data and Sample

The sample of this study consists of 78 non- financial firms listed on Saudi Stock Exchange (Tadawul). Table 1 presents detail of the sample selection. The sample was from non-financial listed firms because these firms are the top companies in Saudi Arabia. These firms have good access to capital and other resources necessary not only for survival but also for improving their performance and competitive position. The sample excluded financial firms due to the differences in the regulating. In addition, some firms were dropped out due to these firms did not have information on key dependent and explanatory variables of this study.

Table 1: Distribution of Sample Size

Industry	Freq.	Percentage (%)
Building & Construction	108	23.07
Petrochemicals and Cement	96	20.52
Energy, Telecommunication & transport	36	7.69
Food Industry	66	14.1
Media and publication & Tourism	66	14.1
Industrial & Multi-investments	96	20.52
Total	468	100.00

The data for this study comes from multiple sources of secondary data. The base data comes from the companies' annual reports, which has all the annual reports of the study period of listed firms. Six years of companies' annual reports were downloaded over 2010 to 2015. In addition, DataStream database was used to collect the data on Tobin's Q and control variables. Another data resource also was Saudi Stock Exchange (Tadawul). For age data,

this study also accessed the firms' websites for checking the validity of the data. Information about firm age was collected from the website of firms.

Model Specification

Unlike previous studies, this paper employed economic value added (EVA) as market-based measures. This paper adopted economic value-added measure for many reasons. Firstly, the accounting measures which are used might recent years are not enough and sufficient to face the challenges in markets. It also exhibition that they reflect only historical performance and not future performance. Therefore, economic value added as economic value added measure is necessary and better for firm to create value for shareholders (Al Mamun, Entebang, & Mansor, 2012). Secondly, accounting base-measures are one of the most common performance measures that they are criticizing because they do not consider the total cost of capital and as for unduly influencing with accrual-based accounting conventions, whereas EVA which is calculated by taking into consideration the difference between after-tax operating profits and the total cost of capital, is treated as a measure of economic value added. Thirdly, in the literature, some studies have examined the relationship between characteristics of board of directors and economic value added in developed and developing markets. However, there is a few studies that uses economic value added as performance measure in particular in emerging markets such as Saudi market.

Empirical studies that examined the relationship between board ownership, characteristics board of directors and economic value added have reported that there is an endogeneity problem, which independent variables are related with error term in regression method. With endogeneity problem, the findings of regression might unobserved heterogeneity as well as bias findings. Therefore, this paper employed GMM method. In order to examines the relationship between board ownership, characteristics board and economic value added, we employ a system GMM panel specifications to get more efficient estimations. GMM was introduced and developed by several authors Arellano and Bond (1991) and Arellano and Bover (1995), and since has become one of the most widely used methods of estimation for models in accounting, economics and finance. To test the hypotheses of the study, the following regression model is developed:

$$\text{Economic value added (EVA)} = \alpha + \beta_1 \text{L.EVA}_{i-1} + \beta_2 \text{BO} + \beta_3 \text{BS} + \beta_4 \text{BIND} + \beta_5 \text{BM} + \beta_6 \text{CEO duality} + \beta_7 \text{ACIND} + \beta_8 \text{X} + \mu$$

Where economic value added EVA is a dependent variable, and L.EVA_{i-1} is its lagged economic value added. Board ownership BO and characteristics of board of directors, such as (Board size BS, board independence BIND, frequency of board meeting BM, CEO duality and audit committee independence ACIND) are independent variables, while X is a vector of other explanatory and control variables (firm size, liquidity, leverage, sales growth, firm risk and firm age) and μ is the error term.

Consistent with O'Byrne (1996), this study divided EVA by total assets due to the most independent variables in our model are comparative indices and EVA is an absolute index. If EVA is the dependent variable, the difference in the amount of dependent and independent

variables will be very large and the error will be huge. In order to increase the reliability of the model and the comparability of the results, we refer to method of O'Byrne's (1996) he divided EVA by total asset. EVA/Total Assets as the dependent variable to reflect the company's value creation.

Table 2: Variables Description

Variables measures	Description
Dependent variables	
Economic value added (EVA)	Calculated as net profit after tax - (weighted average cost of capital * capital + invested capital).
Independent variables	
Board Ownership (BO)	The total percentage of shares held by board of directors.
Board size (BS)	Number of board of directors' members.
Board independence (BIND)	The ratio of the number of non-executive directors to the total number of directors on the board.
Frequency of board meetings (BM)	It as the numbers of board directors meeting during the financial year.
CEO duality (CEO duality)	A dummy variable taking the value 1 if the firm's CEO is the chairman of the board of directors, otherwise 0.
Audit committee independence (ACIND)	The percentage of the independent directors on the audit committee.
Control Variables:	
Firm Size (FS)	Calculated as the natural logarithm of the total assets.
Liquidity (Liquid)	Calculated as the natural logarithm of the current assets scaled by current liabilities.
Leverage (Leverage)	Calculated by total liabilities over total assets.
Sales Growth (GROWTH)	Calculated as current sales – previous sales / previous sales
Company risk (BETA)	Standard deviation of earnings (Beta). Calculated as the historical beta local index.
Firm Age (FAGE)	Age of the company since established.
Year Dummy (YEAR)	6-years dummies
Industry Dummy (SECTOR)	Industry classification of Saudi Stock Exchange for Saudi industries non-finance listed companies.

Empirical Results

Table 3 presents descriptive statistics for all variables of economic value added, family ownership, characteristics of board of directors and control variables for Saudis listed firms. First part is for economic value added was measured by economic value added, second part is for family ownership and characteristics of board of directors' variables and the last part is

for control variables. As reported in the table, the mean and median value of cost of economic value added (EVA) is 0.009 and -0.01.

With respect to board ownership and characteristics of board of directors' variables, Table 3 shows board ownership and characteristics of board of directors' variables. For the mean proportion of board ownership (BO) has reached to 0.44, which shows clearly that board ownership is a clear phenomenon in Saudis listed firms. This may due to the large family ownership which appears clearly in the Saudis industrial firms. The board size (BS), board independence (BINDEP) and board meetings (BM) show that on average, the average board size is 8 directors on the board which are reflective of the size of the Saudis listed firms. The board size in Saudis Listed firms seems to play a significant role to mitigate agency conflicts and the average board independence is 0.38 with median 0.40, which among the board members, 40% are non-executive board members in the Saudis Listed firm. The mean (median) number of Saudis firms' board meeting during the year financial is 4.94 (5). In term of CEO duality (CEO Duality), table shows that the mean of the CEO duality is 0.41 in Saudis Listed firm's sample have a same position for a chairman and the chief executive officer. Moreover, table 5.1 shows that the mean value of the proportion of audit committee independence (ACINDEP) in the Saudis firm's sample is 0.18.

Correlation Matrix Analysis of variables

The Table 4 presents the correlation between the economic value-added measurement, board ownership, board characteristics and control variables. The literature review show that multicollinearity problems are exists when the independent variables are highly correlated with ($r = 0.90$) and above. As a result, table 4 shows that most independent variables are statistically significant with low relationship, this indicative that the multicollinearity problem might not appear between independent variables. To confirm, this study used the Variance Inflation Factors of variables (VIF) to determine if the multicollinearity problem exists between independent variables. The results show the variance inflation factors is less than 10, indicating there is no multicollinearity problem between independent variables for Saudis listed firms.

Table 3: Statistics of the relationship between family ownership, board characteristics and economic value added of Saudi Listed Firms

Variables	Mean	Sd.	p25	p50	p75	Min	Max	Skewness	Kurtosis
EVA	0.009	0.600	-0.05	-0.01	0.04	-2.93	4.02	-0.13	15.60
BO	0.44	0.17	0.31	0.42	0.56	0.12	0.91	0.47	2.53
BS	8.41	1.50	7.00	9.00	9.00	5.00	12.00	0.11	2.48
BINDEP	0.38	0.17	0.20	0.40	0.50	0.10	0.80	0.47	2.51
BM	4.94	1.43	4.00	5.00	6.00	2.00	9.00	0.28	3.55
COE duality	0.41	0.49	0.00	0.00	1.00	0.00	1.00	0.36	1.13
ACINDEP	0.18	0.07	0.10	0.20	0.20	0.10	0.40	0.82	3.96
FS	14.58	1.58	13.46	14.59	15.30	10.89	18.53	0.18	2.80
Liquid	1.36	0.51	1.04	1.26	1.61	0.17	3.14	0.85	3.91
Leverage	0.38	0.28	0.14	0.33	0.59	0.01	0.99	0.60	2.17
GROWTH	2.79	5.3	-3.17	4.00	9.09	-100	100	-0.75	11.01
BETA	0.96	0.30	0.75	0.93	1.17	0.13	1.86	0.33	3.02
FAGE	26.41	12.49	18.00	24.00	34.00	4.00	59.00	0.59	3.04

Table 4: Pearson Correlation Matrix for variables

Variables	EVA	BO	BS	BINDEP	BM	COE duality	ACINDEP	FS
EVA	1.000							
BO	-0.047	1.000						
BS	-0.059	0.151***	1.000					
BINDEP	0.049	0.100**	0.307***	1.000				
BM	-0.028	0.089**	0.200***	-0.033	1.000			
COE duality	-0.167***	0.042	0.162***	-0.030	-0.480***	1.000		
ACINDEP	0.014	0.111***	0.094**	0.350***	0.103**	-0.094**	1.000	
FS	-0.106**	0.284***	0.356***	0.164***	0.225***	0.005	0.012	1.000
Liquid	0.050	-0.035	0.197***	-0.083*	-0.071	0.033	-0.164***	-0.038
Leverage	-0.092**	0.070	0.068	-0.074	-0.101**	0.114***	-0.101**	0.162***
GROWTH	-0.039	-0.027	-0.018	-0.040	-0.087	0.145***	0.063	-0.023
BETA	-0.194	-0.065	-0.043	0.055	-0.061	0.087*	-0.023	-0.022
FAGE	0.322	-0.074	-0.005	0.059	0.183	-0.262***	0.237***	-0.176***

Correlation Cont.

	Liquid	Leverage	growth	BETA	Fage
Liquid	1.000				
Leverage	0.057	1.000			
GROWTH	-0.104**	0.046	1.000		
BETA	0.152***	0.030	-0.031	1.000	
FAGE	-0.065	-0.183**	-0.055	-0.196***	1.000

*** Denotes correlation is significant at the 0.01 level (2-tailed); ** Denotes correlation is significant at the 0.05 level (2-tailed);
 * Denotes correlation is significant at the level 0.10 level (2-tailed). All variables are as previously defined.

Endogeneity Analysis

This paper employed regressions using both the pooled OLS and GLS regression. However, OLS and GLS regressors may suffer from time-varying country effects and endogeneity problems. In the literature, especially in empirical studies that examined the effects of the characteristics of the board of directors on corporate value, endogeneity issues are raised and addressed. A number of studies, such as Himmelberg, Hubbard, and Palia (1999), Lefort and Urzúa (2008), Guest (2009), A. Drakos and F. Bekiris (2010), Liu, Miletkov, Wei, and Yang (2015) recognize the joint-endogeneity issues and address the relationship between board ownership, characteristics of directors and economic value added, which independent variables are related with error term in regression method. With endogeneity problem, the findings of regression might unobserved heterogeneity as well as bias findings. Based upon the literature review and previous empirical studies, board ownership, board size and board independence are endogenous variables. The results of endogeneity test show that the P-value of the test results of EVA was ≤ 0.005 , this means that there is an endogeneity issues and suggested that the OLS and GLS regressions results may not be reasonable. Thus, based on the results, there was a need to apply the GMM test to examine the relationship between board ownership, board characteristics and EVA in Saudi market. The null hypothesis of the Durbin and Wu–Hausman tests is that the variable under consideration can be treated as exogenous. Hence, both test statistics are highly significant, so this study rejected the null hypothesis of exogeneity and it must continue to treat variables as endogenous.

System GMM regression results of the relationship between board ownership, board characteristics and economic value added. Table 5 shows the system GMM regression results of the effects of family ownership and characteristics of board of directors on economic value added (EVA).

Table 5: Dynamic GMM estimator’s results of the relationship board ownership, board characteristics and economic value added (EVA) for Saudis listed firms (2010-2015)

Independent Variables	Dependent variable EVA		
	OLS Model	GLS Model	GMM Model
BO	0.119 (0.85)	0.056 (1.25)	-1.054*** (-9.25)
BS	0.016 (0.69)	0.035*** (3.89)	0.510** (2.33)
BINDEP	0.050 (0.24)	0.046** (2.76)	0.253*** (6.74)
BM	-0.043** (-2.09)	-0.031*** (-3.88)	-0.170*** (-4.88)
CEO duality	-0.165** (-2.44)	-0.102*** (-4.86)	-0.482*** (-7.35)
ACINDEP	0.391	0.071	1.253*

	(0.73)	(0.41)	(1.81)
FS	-0.116*** (-3.88)	-0.071*** (-7.88)	0.008 (0.67)
Liquid	-0.087* (-1.83)	-0.076*** (-3.82)	0.003 (0.17)
Leverage	-0.047 (-0.50)	-0.011 (-0.42)	-0.050* (-1.66)
GROWTH	-0.000 (-0.32)	-0.000 (-0.07)	0.001*** (6.31)
BETA	-0.312*** (-3.06)	-0.116*** (-3.68)	-0.013 (-0.43)
FAGE	0.013*** (4.66)	0.007*** (5.54)	0.005*** (5.23)
_Cons	2.270*** (4.64)	1.128*** (7.23)	-0.004 (-0.02)
L.EVA			0.785*** (12.66)
L.BO			0.922*** (10.68)
L.BS			0.198*** (4.49)
L.BINDEP			0.103*** (4.65)
Year-Dummy	Yes	yes	yes
Indus-Dummy	yes	yes	yes
N	468	468	390
Adjusted R-squared	0.269		
F-Test	4.718		
P-Value	0.0000		
Wald Chi2		213.533	
P-value		0.0000	
Hansen's J static (P-value)			0.669
AR (1) test (P-value)			0.045
AR (2) test (P-value)			0.346

Note: ***, **, * represents statistical significance at 0.01, 0.05 and 0.10 levels, respectively. All variables are as previously defined. Hansen test of over-identification is under the null hypothesis that all instruments are valid. AR (1) and AR (2) are tests for first-order and second-order serial correlation in the first-differenced residuals, under the null hypothesis of no serial correlation.

Table 5 presents the results of the GMM estimations of the effect of board characteristics on economic value added as measured by economic value added (EVA) for Saudi listed firms. It contains lagged dependent and endogenous independent variables as instruments. Table 5 shows that the Hansen's J statistic test of over identification P-value is 0.669. This non-significant

statistic indicates that the instruments are valid. As such, this study cannot reject the null hypothesis that the instruments used are not valid. Furthermore, the findings of AR (1) and AR (2) tests show no autocorrelation due to the P-value of AR (1) being significant and P-value of AR (2) being no significant.

The results of Table 5 show that previous EVA (L.EVA), previous board ownership (L.BO), board size (L.BS) and previous board independence (L. BINDEP) all have a positive significant relation with current EVA at the 1 percent level of confidence. In addition, board size (BS) has a significant positive effect on EVA at the 5 percent level of confidence. Board independence (BINDEP) has a positive significant relation with EVA at the 1 percent level of confidence, and audit committee independence (ACINDEP) has a significantly positive effect on EVA at the 10 percent level of confidence. These findings are as per expectation and consistent with prior studies.

In contrast, board ownership (BO), CEO duality (CEO duality) and board meetings (BM) appear to have a strong significant negative effect on EVA at the 1 percent level of confidence. However, the findings on board meetings (BM) remain unclear. With respect to the control variables, the above table shows that firm age (FAGE) and growth (GROWTH) have a significant positive relationship with EVA at the 1 percent level of confidence, while leverage (Leverage) has a negative relationship at 10percent level of confidence.

4. Discussion and Conclusion

Some studies have examined the relationship between board ownership and economic value added, inconclusive results. The literature provides two arguments for the relationship; the convergence effect and the entrenchment effect. Jensen and Meckling (1976), Hiraki, Inoue, Ito, Kuroki, and Masuda (2003), Stouraitis, Cheung, Chen, and Wong (2005) and Ahmed Sheikh et al. (2013) argue that a high level of board ownership can lead to more interest alignment and better economic value added. However, other studies argue that increasing the proportion of board ownership leads to lower economic value added (Ahmed Sheikh et al., 2013; Cho, 1998; E. Fama & M. Jensen, 1983). In the final results of this study, board ownership appears to have a significant negative relationship with economic value added (measured by EVA) in Saudi listed firms. This result supports the entrenchment viewpoint that increasing the proportion of board ownership could reduce economic value added in Saudi listed firms. An explanation for this result could be the nature of board ownership in Saudi listed firms, where managers can maximise their benefits rather than shareholders' interests. These findings are consistent with previous studies (Ahmed Sheikh et al., 2013; Cho, 1998; E. Fama & M. Jensen, 1983; Zhang & Erasmus, 2016). Based on this finding, the first hypothesis H1 is rejected.

Consistent with evidence from prior studies (e.g. Adjaoud et al., 2007; Ahmad et al., 2016; Bansal & Sharma, 2016; Danoshana & Ravivathani, 2013; Nicholson & Kiel, 2007), this study found that board size has a significant positive effect on economic value added of Saudi listed firms. The positive relationship between board size and economic value added implies that large number of boards might enhance economic value added and another reason of result could be that, when board member has more business experience, high skills and professional networks that might add considerable resources. Another possible explanation for this result could be that board size in Saudi listed firms' range from 5 to 12 directors, with 8 being the average; this suggests that most Saudi listed firms have sufficient directors. According to this result, second hypothesis H2 is accepted. Like a number of previous studies that have examined the effect of outside of directors on economic value added and they found a strong positive effect of non-executive directors (e.g. Abidin et al., 2009; El Mir & Seboui, 2008; Lei & Song, 2012; Leung et al., 2014), the research showed that board independence has a significant positive relationship with economic value added of Saudi listed firms. A possible explanation for this finding could be that non-executive directors is considered as one of the important factors of board characteristics mechanisms that could affect monitoring function in Saudi market, hence improving economic value added and this finding is in the line with agency theory. Therefore, the third hypothesis H3 is accepted.

Despite the literature supported argument that the frequency of board meeting plays a significant role in enhancing the supervisory and regulatory functions of board of directors, in this study, frequency of board meetings had a significant negative relationship with economic value added in Saudi listed firms. A possible explanation for this finding may be that frequency of board meetings might not affect the ability of board of directors to make decisions that helpful in improving and creating value of firm. Another explanation for this result could be that the very high family ownership in Saudi listed firms, which can interfere with the effectiveness of board of directors, and therefore, the board meetings might play a weakly role in supporting the effectiveness of board of directors in Saudi listed firm. This result is consistent with the finding of Vafeas (1999) and Ahmed Haji (2014) whose reported that the number of board meeting had a significant negative associated with economic value added. While this research predicted that the frequency of board meetings is significantly related with economic value added. The negative sign coefficient of this variable rejected the forth hypothesis H4. Consistent with the prior studies that have test the effect of CEO duality on economic value added and have found a significant negative effect (Boubakri, Cosset, & Guedhami, 2005; Duru et al., 2016; E. Fama & M. Jensen, 1983; Goyal & Park, 2002), this research provides that Saudi listed firms where the CEO and Chairman are same person have significantly lower economic value added. The reason of this finding could be that the CEOs may be loaded by several responsibilities, and then they face more difficulty in managing the various employees' expectations in developing markets (Singh & Newberry, 2008). Another reason could be that the evidence of the negative relationship of the CEO duality and economic value added

from this study supports the agency theory perspectives, which states that economic value added will better with the separation of the CEO and chairman roles in Saudi listed firms. Based on this finding fifth Hypothesis H5 is accepted. The non-executive directors on audit committee also plays an important role in creating firm value and implementing corporate governance principles. Corporate governance regulations in the kingdom of Saudi Arabia recommend that the audit committee members must work autonomously, and they carry out their duties with more experience in fields of economic, finance and accounting. Consistent with number of prior studies (Al-Mamun et al., 2014; Amer et al., 2014; Carcello & Neal, 2003; Chan & Li, 2008), this research revealed that the number of non-executive directors on audit committee had a significant positive associated with economic value added. One reason for this finding could be that the non-executives' directors of audit committee in Saudi listed firms might have more knowledge and more experience. Another possible expiation for this result could be that audit committee independence affects boards' ability to providing more effectiveness of board of directors and creating firm value. Therefore, last hypothesis H6 is also supported.

The findings of the dynamic GMM regression provided a significant association between board characteristics and economic value added in the Saudi market. The results revealed that board size, the number of non-executive directors and audit committee independence have a significant positive effect on economic value added. In contrast, board ownership, frequency of board meetings and CEO duality have a significant negative effect on economic value added. More specifically, the effect of the characteristics of the board of directors, board ownership was found to have a significant negative relationship with economic value added showing the entrenchment effects. The negative sign of board ownership may be caused by the nature of the ownership structure in Saudi listed firms, where dominating owners as families are in management positions and exposed to potential agency problems leading to a decrease in economic value added. This finding is consistent with Wei et al. (2005) and Ahmed Sheikh et al. (2013). Again, both CEO duality and frequency of board meetings have a significant negative relationship with economic value added. In contrast, a significant positive relationship was found between board size, board independence, audit committee independence and economic value added in Saudi listed firms. Finally, the results of the dynamic GMM regression showed that lagged economic value added (L.EVA) have a strong positive effect on current economic value added as measured by EVA. Similarly, lagged endogenous variables (board ownership, board size and board independence) have a significant positive effect on current EVA. The paper indicates that when the economic value-added measurement is used, both board ownership and board characteristics have either positive or negative significant effects on economic value added in Saudi listed firms. Employing EVA as a economic value added measurement may be more useful than other performance measurements in a fluctuating market.

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