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Board Independence and the Efficiency of Internal Capital  
Markets

By

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# Board Independence and the Efficiency of Internal Capital Markets

Mohammad Hani Zantout

## **ABSTRACT**

This paper focuses on the effect of increased board independence on the efficiency of internal capital markets in diversified firms. We find that the increase in board independence post-SOX may have moved firms away from their optimal board structure. Our results suggest that, relative to the pre-SOX period, increased board independence post-SOX had a negative effect on diversified firms' excess value and internal capital market efficiency. This suggests that firms may not have benefited from the move towards higher independence in the post-SOX era. Mutual back scratching and socialization within the firm may explain the ineffectiveness and inefficiency of increased board independence in diversified firms.

Keywords: Board Independence, Internal Capital Markets, Sarbanes-Oxley Act, Endogeneity.

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# Chapter One

## Introduction

Ever since the corporate scandals of the early 2000s and the consequent imposition of the Sarbanes-Oxley Act (SOX) and NYSE/NASDAQ listing rules, firms were obliged to have a majority of independent directors serving on their boards. Guo and Masulis (2013) find that boards have become larger and more independent post-SOX.

The question of whether increased board independence is beneficial for the firm has been widely discussed in the literature. While inside directors are thought to be better advisors because they have more firm-specific information, independent directors are thought to be better monitors because of their independence from CEOs. That is, outsiders are more capable of disciplining managers if necessary (Weisbach, 1988). Outsiders also have reputation concerns which may align their interests with those of the shareholders (Fama and Jensen, 1983). However, outsiders' ability to monitor effectively can be compromised due to their holding of little stake in the company which creates free rider problems. In addition, Brick et al. (2006) suggest that socialization and mutual back-scratching may describe the relationship between independent directors and top management. These issues raise concerns about whether having more independent directors on corporate boards leads to better monitoring. Bhagat and Black (1999) find

that firms with "supermajority-independent boards" are less profitable. They suggest that having a moderate number of independent directors may still be beneficial.

Although many studies exist that link board composition with monitoring and firm performance, it is difficult to establish a causal link between board composition and better monitoring (Guo & Masulis 2013). The capability of corporate boards monitor effectively may be due to factors other than its observable attributes. This endogeneity issue remains a problem for corporate governance researchers (Adams, Hermalin, & Weisbach, 2010). To overcome this problem, we take advantage of an exogenous shock, SOX, which causes a change in board composition. Firms are required by SOX and the new exchange listing rules to have (i) boards with a majority of independent directors, (ii) nominating, audit, and compensation committees which are fully independent, and (iii) to hold regular executive meetings solely attended by independent directors (Guo & Masulis 2013).

This paper focuses on the effect of increased board independence, due to the passage of SOX in 2002, on the efficiency of internal capital markets in diversified firms. Shin and Stulz (1998) find that diversified firms treat segments with better investment opportunities in a similar fashion to other segments, which suggests that internal capital markets are inefficient. Scharfstein & Stein (2000) who present a theoretical model which implies some kind of socialism in the allocation of capital within the firm. The misallocation of capital is partly due to an agency problem between the shareholders and the firm's headquarters. Thus, the internal capital market will fail if the ineffective corporate governance structure allows the manager to misallocate corporate resources and pursue his/her own objectives at the expense of shareholders.

Therefore, firms with a better governance structure and more effective monitoring are expected to have a more efficient internal capital market.

In this paper, we split our sample into 2 sub-periods: (i) Pre-SOX (1996 – 2001); and (ii) Post-SOX (2003-2008). In addition, we split our sample into two subsamples: (i) Firms that were not in compliance with the independence requirements prior to SOX and became complying afterwards; and (ii) Firms that were already in compliance with the new requirements before SOX.

Our results show that firms experienced an increase in board independence post-SOX, which is consistent with similar findings in the literature (e.g. Guo & Masulis, 2013; Dah, Frye, & Hurst, 2014). We also find that this increase, which is due to the imposed regulations, may have moved firms away from their optimal board structure. We document a negative effect of board independence on diversification and internal capital market efficiency in the post-SOX period relative to the pre-SOX period. This demonstrates that firms did not benefit from the move towards higher independence in the post-SOX era. This applies to both subsamples: (i) firms that were previously compliant; and (ii) those that weren't compliant with the mandates.

Mutual back scratching and socialization could be the reasons behind this negative effect. The move towards higher independence post-SOX may have allowed CEOs and top management to hire independent directors who fit the legal description of independent directors but were linked to management in other ways (Romano, 2004). Moreover, Linck, Netter, and Yang (2008) propose that a one-size-fits-all regulation may be inefficient and could move firms away from their optimum board

composition. Dah, Frye, and Hurst (2014) suggest that the legislation may have had unintended implications on already compliant firms.

The rest of this paper is organized as follows: section 1 reviews the literature, section 2 explains the sample and the used methodology, section 3 presents descriptive statistics, section 4 discusses the results of the study, and section 5 concludes.

# Chapter Two

## Literature Review

### 2.1. Board Independence

The role of the board of directors could be divided into two main functions: Monitoring and Advising (Linck et al. 2008; Raheja 2005; Adams & Ferriera 2007).

Weisbach (1988) argues that outside directors are more effective at monitoring because they are independent from CEOs and are therefore capable of challenging them. He shows that CEOs are more likely to resign following poor performance in companies with outsider-dominated boards. Similarly, Fama and Jensen (1983) state that outsiders usually maximize shareholder wealth when performing monitoring functions. They argue that this is due to reputation concerns that drive outsiders to monitor better.

Some studies argued that board independence is beneficial to shareholders during corporate takeovers. For example, Brickley et al. (1994) examine stock market reactions during corporate takeovers; they document a positive stock reaction after the adoption of a poison pill when outside directors are the majority. Brickley et al. (1994) conclude that independent directors serve the interests of shareholders during such takeovers. Similarly, Cotter et al. (1997) find that firms with a majority of outside directors benefit more from tender offers. They also find that shareholders gain more benefits in the presence of a poison pill when the board is dominated by outside directors.

On the other hand, some studies show that the presence of independent directors is not beneficial for the firm. For example, Bhagat and Bolton (2008) find that an increase of independent directors can lead to worse performance. Outside directors are also said to be worse at the advising role than inside directors. This is due to the fact that insiders are more knowledgeable when it comes to firm-specific information (Fama & Jensen, 1983; Raheja 2005). In addition, Maug (1997) contends that the benefits of increased board independence may not outweigh the costs where there is high information asymmetry.

Several studies suggest that there are free rider problems associated with independent directors. Harris and Raviv (2008) suggest that it is sometimes more beneficial to have boards dominated by insiders because of these free rider problems. Similarly, Perry (2000) states that outside directors may have lower incentives to monitor effectively because they hold little stake in the company. Jensen (1993) states that it is the CEO who determines what information will be given to the board. Adams and Ferreira (2003) state that managers face a trade-off when disclosing information to the board. If they present the board with the needed information, they will receive better advice. But if they do, the board will be better informed of the managers' abilities.

Brick et al. (2006) contend that outside directors and CEOs are involved in mutual back scratching where they exchange can exchange favours. They document a positive relationship between both the compensations of the CEOs and the directors. Also, they find that excessive compensation for both parties lead to low performance.

There are also problems associated with the CEOs and management of the company being able to influence the recruitment of outside directors (Crystal, 1991). Hermalin and Weisbach (1998) state that the CEO and board members have latitude in the selection process of board directors. This raises question on whether independent directors are truly independent. In the case where regulations force firms to maintain a certain number of independent directors, firms could hire directors that fit the legal description of independent directors, but may still be connected to the CEO in other ways (Romano, 2004).

On the other hand, Fama and Jensen (1983) state that the influence insiders and CEOs have on the hiring of outside directors could have positive effects on the firm. Inside managers can use their superior information about the firm to nominate outsiders with specific skills and knowledge that can assist the company in areas where they are needed.

Given the conflicting evidence concerning the presence of independent directors, some studies have suggested that there may be an optimal level of independent directors. Bhagat and Black (1999) find that firms with "supermajority-independent boards" are less profitable than other firms. They suggest that having a moderate number of independent directors may still be beneficial. Similarly, Linck et al. (2008) state that there is no optimal board composition for all firms. The board's composition is determined by the tradeoff between the costs and benefits of increased monitoring and advising. Linck et al. (2008) suggest that the composition of the board is directly related to firm complexity.

The determinants of board composition have been discussed in the literature. Boone et al. (2007) present three hypotheses which try to explain board composition and size. The first hypothesis, dubbed the *scope of operations hypothesis*, states that the firm's size, age, and complexity affects the board of directors' size and independence. As firms grow and become more complex, they need larger, more independent boards that are capable of performing their monitoring duties. Outside directors may bring in special expertise as the firms becomes more complex and branches out into new sectors.

The second hypothesis, called the *monitoring hypothesis*, states that the board's size and composition is determined by the conditions in which the firm operates. If the firm operates in environments where the cost of monitoring is high, they are more likely to have smaller boards with few independent directors. This may be the case in high growth firms and firms with high information asymmetry.

The third hypothesis, the *negotiation hypothesis*, suggests that the board structure is a result of negotiations between the CEO and outsiders. If CEOs are hard to replace, they have considerable influence over outside directors. CEOs in that position are capable of placing insiders or affiliated outsiders on the board.

## **2.2. Sarbanes-Oxley and Board Independence**

The aim of Sarbanes-Oxley act of 2002 (SOX) was to enhance the efficacy of the firms' corporate governance and to diminish managerial engagement in fraudulent activities. One of the major implications of SOX is the increase in the participation of independent directors on corporate boards. SOX can be considered as an exogenous

shock that altered board structures. Guo and Masulis (2013) state that such shocks are useful for researchers because they provide an escape from endogeneity problem which occurs when studying firms' boards of directors. They also describe how firms met the new regulations; they show that 5% of firms added more outside directors, 3% removed inside directors, and 92% did both. Guo and Masulis (2013) also look at the relationship between forced CEO turnover and board and nominating committee independence. They conclude that more independence leads to better CEO monitoring and discipline.

Consistent with the traditional roles of outside and inside directors, Baldenius et al. (2011) show that the increase (decrease) in outsiders (insiders) as a result of SOX has increased monitoring and decreased advising functions in firms. Linck et al. (2008) state that boards increased in size, independence, and work post SOX. They suggest that regulations that impose the same requirements on board structure for all firms may be ill-conceived and might have moved boards away from their optimal compositions. In addition, Coles et al. (2008) state that "regulations prohibiting large boards and a high fraction of insiders on the board could destroy value". Finally, Dah, Frye, and Hurst (2014) look at the effect of SOX on firms which were already compliant with the new regulations. They suggest that the legislation may have had unintended implications on already compliant firms.

### **2.3. Diversification and Internal Capital Markets**

The issue of whether diversification destroys value has been under heavy debate in the corporate finance literature. The prevailing trend in the 50s and 60s was towards diversification (Berger and Ofek, 1995). This trend later reversed in the 90s as

researchers argued that diversification is negatively related to firm value (Graham, Lemmon, & Wolf, 2002).

In an attempt to estimate the effect of diversification on firm value, Berger and Ofek (1995) examine the different segments in a diversified firm and compare the sum of the stand-alone values of those segments with the value of the firm as a whole. They find that the net effect of diversification does reduce firm value; the major costs of diversification coming from cross subsidization and overinvestment. Similar studies have been made by Lang and Stulz (1993) and Servaes (1996) who also find a discount due to diversification.

Scharfstein and Stein (2000) try to explain how divisional managers are able to use rent seeking to exact large benefits from the CEO in the form of more capital allocation to their divisions. They state that managers in weaker divisions are more likely to resort to rent seeking because the opportunity cost for them to do so is lower. Their results imply a sort of socialism in diversified firms, where weaker divisions are subsidized by stronger ones. Similarly, Rajan, Servaes, and Zingales (2000) show that funds flow to the most inefficient division when there is diversity of resources and opportunities among divisions in a diversified firm.

There are also concerns on whether the diversification discount is endogenous. For example, Sautner and Villalonga (2010) look at the relationship between corporate diversification, corporate ownership, and the efficiency of firms' internal capital markets. They used tax changes in Germany as an exogenous shock to measure the relationship. They find that firms with concentrated ownership have more efficient

internal capital markets and are less diversified. These results suggest that the misallocation of capital in internal capital markets is partly due to poor corporate governance, as suggested by Scharfstein and Stein (2000).

On the other hand, several studies have argued that diversification may not necessarily destroy value. Hyland and Diltz (2002) state that diversified firms may have traded at a discount compared to their specialized counterparts before becoming diversified. They also find no additional value destruction after the firms diversify. Similarly, Campa and Kedia (2002) argue that the observed discount to diversified firms may not mean that diversification destroys value. The discount may be due to firm specific characteristics that cause firms to diversify. After controlling for such characteristics, they find that the evidence for the existence of a diversification discount becomes weaker. In general, these findings suggest that the correlation between diversification and firm value may not indicate a causal relationship, but rather the result of firms reacting to their environment.

Billet and Mauer (2000) look at the relationship between firm value and the value of internal capital markets. They use an event study methodology where they look at the market reaction after the announcement of tracking stock equity restructurings. This allows them to observe directly the market's assessment of the firm's internal capital market. Billet and Mauer (2000) find positive stock reactions to tracking stock announcements. They also find that there is a strong positive relationship between such reactions and proxies for internal capital market value.

At the international level, Lins and Servaes (1999) show that a significant diversification discount exists in the U.K. and Japan, but not in Germany. This suggests that there are international differences between the interaction of corporate governance mechanisms and the effect of diversification on value.

Some studies questioned the method used for measuring the diversification discount. Graham, Lemmon, and Wolf (2002) showed that business units that were acquired by diversifying firms were valued at a discount, and consequently contributed to the discount observed by studies in the 90s. Whited (2001) shows that the observed inefficiency in internal capital markets in many studies is due to measurement errors. Villalonga (2004) argues that the observed discount may be due to the way COMPUSTAT identifies segment data. Instead of using segment data from COMPUSTAT, she constructs business units based on the BITS database. This reveals a diversification premium instead of a discount compared to non-diversified firms.

In relation to corporate governance, Anderson, Bates, Bizjak, and Lemmon (1998) find that more diversified firms have CEOs with higher pay levels and lower performance incentive based compensation. They also show that, compared to more focused firms, diversified firms tend to have more outsiders on the board, a higher rate of managerial turnover, and a similar turnover sensitivity to stock performance. Their findings provide no evidence that the failure of corporate governance mechanisms is associated with the decision to diversify. They also find no relation between corporate governance and value loss from diversification. On the other hand, Datta, D'Mello, and Iskandar-Datta (2009) show evidence that CEO equity-based compensation can improve

internal capital market efficiency. Their results suggest that CEO compensation can be used to ameliorate the diversification discount.

Other papers have looked at how capital allocation decisions are made inside diversified companies. Stein (1997) examined the role of the corporate headquarters in the allocation of capital in internal capital markets. He finds that managers' self interest and empire-building behavior may not completely be a bad thing for the firm. Corporate headquarters can act as a special type of intermediary that can efficiently allocate funds inside the firm by engaging in winner picking. He also shows that there is a trade off when it comes to increasing the size of internal capital markets: more projects means more raised money, but this may lead to weaker monitoring.

Finally, Shin and Stulz (1998) find that investment by a segment in a diversified firm is dependent on its own cash flows and the cash flows of other segments in the firm, but more so on its own cash flows. They also find that a segment's sensitivity to its cash flows and the cash flows of other segments does not depend on its investment opportunities. Their results are consistent with Scharfstein and Stein's (2000) proposition that segments are treated alike in diversified firms.

# Chapter Three

## Methodology, Descriptive Statistics, and Results

### 3.1. Sample and Methodology

This paper examines the impact of board independence on internal capital market efficiency for the time period 1996 – 2008. Data for this research is collected from the Compustat, ExecuComp, and RiskMetrics databases. We split the sample into 2 sub-periods: (i) Pre-SOX (1996 – 2001); and (ii) Post-SOX (2003-2008). SOX is represents an exogenous shock that led to an increase in the percentage of independent directors present on the board. In addition, we split our sample into two subsamples: (i) Firms that were not in compliance with the independence requirements prior to SOX and became complying afterwards; and (ii) Firms that were already in compliance with the new requirements before SOX. Furthermore, industry fixed effect is used to control for industry specific attributes. Industry is defined following Fama & French (1997) industry classification.

We employ Berger and Ofek's (1995) method for determining whether diversification enhances firm value. This method entails calculating the imputed values of a given firm's segments and comparing the sum of those values to the value of the firm.

Equation (1) illustrates how we compute the imputed value which is the sum of the values of the segments treated as standalone firms  $I(V)$ .  $AI_i$  is the value of the accounting item (sales, assets, or EBIT) which is used in the valuation multiple. And  $Ind_i \left( \frac{V}{AI} \right)_{mf}$  represents the multiple of total capital to an accounting item (sales, assets, or EBIT) for the median single-segment firm in segment  $i$ 's industry.

$$(1) \quad I(V) = \sum_{i=1}^n AI_i * (Ind_i \left( \frac{V}{AI} \right)_{mf})$$

After calculating the imputed value, we proceed to calculate the excess value of the firm  $EXVAL$  which is the natural log of the firm's total value divided by its imputed value. If  $EXVAL$  is positive, diversification is said to enhance firm value (i.e. the sum of the values of the segments is greater than that of their stand-alone counterparts).

$$(2) \quad EXVAL = \ln \left( \frac{V}{I(V)} \right)$$

We also measure the internal capital market efficiency following Rajan, Servaes, and Zingales (2000).

$\frac{I_j}{TA_j}$  and  $\frac{I_{SS}}{TA_{SS}}$  represent the investment rate of a segment in a diversified firm and that of a single segment firm in the same industry. We look at the difference between these two rates in equation (3).

$$(3) \quad \frac{I_j}{TA_j} - \frac{I_{SS}}{TA_{SS}}$$

Due to the fact that the difference may represent exchanged resources among segments in a diversified firm, we adjust this equation as follows:

$$(4) \quad \frac{I_j}{TA_j} - \frac{I_{SS}}{TA_{SS}} - \sum_j W_j \left( \frac{I_j}{TA_j} - \frac{I_{SS}}{TA_{SS}} \right)$$

Equation (4) would be positive if the segment in a diversified firm received a subsidy, and negative if funds are transferred to other segments.  $W_j$  is segment  $j$ 's share of the total assets of the firm.

The sum of the absolute value of all transfers and subsidies in a given firm is the size of the internal resource allocations in that firm. Because we are using ROA, financial segments are not included. Equation 4 is weighed by the difference between  $ROA_j$  and the average ROA of the other segments in the firm. Finally, the weighted subsidies and transfers are added for all segments in the firm and are standardized by total assets:

$$(5) \quad \frac{\sum_j TA_j (ROA_j - \overline{ROA}) \left( \frac{I_j}{TA_j} - \frac{I_{SS}}{TA_{SS}} - \sum_j W_j \left( \frac{I_j}{TA_j} - \frac{I_{SS}}{TA_{SS}} \right) \right)}{TA}$$

We use a number of control variables related to firm characteristics and governance which are consistent with the existing literature on internal capital market efficiency and board independence (Rajan, Servaes, and Zingales (2000) ; Scharfstein and Stein (2000) ; Sautner and Villalonga (2010) ; Guo and Masulis (2013) ; Dah, Frye, and Hurst (2014)). Table 1 contains more detailed information about the variables used in this study.

### 3.2. Descriptive Statistics

Table 2 Panel A compares the number of complying firms in the pre and post-SOX periods. Firms are considered to be complying with the independence requirement if more than 50% of its board is composed of independent directors. Our sample includes 1161 firms in the pre-SOX period and 1155 firms in the post-SOX period.

Non-complying firms were the minority in our sample in both the pre and post-SOX period. In the pre-SOX period, non-complying firms comprised 18.35% of the firms in our sample. This percentage decreased to 4.5% in the post-SOX period. This decrease (increase) in non-compliance (compliance) is consistent with the findings in the literature (e.g. Guo and Masulis (2013)). However, there still exists a significant percentage of firms which are non-compliant in the post-SOX period and after the adoption of the new NYSE and NASDAQ listing requirements. This can be attributed to the difference between the way “independent” is defined in RiskMetrics and the exchanges. RiskMetrics does not classify a board member as independent if he/she was a former employee in the company. On the other hand, the exchanges can classify a former employee as independent if three or more years have passed since he/she left the company. In addition, the exchanges may consider certain business relations between a board member and the firm as insignificant if they do not go over a certain payment threshold. This may not be the case in RiskMetrics. The exchanges also exempt firms from the listing requirements if they are controlled companies where the owners hold at least 50% of the voting power.

In Table 2 Panel B, we look at the differences in board composition between the pre and post-SOX periods. The results show that, on average, firms had 64.48% independent boards in the pre-SOX period. This percentage increased to 68.64% in the

post-SOX period. This is consistent with the findings of Guo and Masulis (2013) who find an increase in the percentage of independent directors in the post-SOX period. On the other hand, the average percentage of inside directors decreased from 21.53% to 19.04% between the pre and post-SOX periods. Similarly, the percentage of linked directors decreased from 13.99% to 12.32% in after SOX. This is also consistent with the findings of Guo and Masulis (2013) who show that firms became more independent by removing/adding independent directors and/or removing inside directors.

### **3.3. Board Independence, Diversification Discount, and ICM Efficiency**

#### **3.3.1. Board Independence and Diversification Discount**

Independent directors are said to be better at the monitoring function, so it can be argued that better monitoring by the board due to the presence of more independent directors will be beneficial for diversification. On the other hand, the presence of independent directors may reduce the benefits from diversification due to higher cost of monitoring, asymmetric information, and free rider problems (Fama & Jensen, 1983). Furthermore, mutual back scratching and socialization may be present between outsiders and the firm's top management (Brick et al., 2006).

In this section, we investigate the relation between board independence and the firm's excess value from diversification during the pre and post-sox periods. We first look at firms which were not previously compliant with the regulations in the pre-SOX era but became compliant post-SOX. Table 3 presents a regression of the three measures of excess value from diversification on the SOX dummy variable, the percentage of

independent directors, and various control variables. The regressions are also performed with and without an interaction variable between the SOX dummy and the percentage of independent directors.

Column 4 shows that there is a negative relationship between the percentage of independent directors on the board and excess value from diversification in the pre-SOX period. Column 5 shows that, all else equal, firms that were previously non-compliant with the regulations have a lower excess value in the post-SOX era. Finally, column 6 shows that the interaction variable between the SOX dummy and the percentage of independent directors has a negative significant coefficient. This indicates that board independence significantly reduces the excess value in the post-SOX period relative to the pre-SOX period.

Linck et al. (2008) propose that firms choose their board structure based on their specific contracting needs. They state that regulations which alter board structure assume that boards are not at their optimum level, and attempt to fix that problem by enforcing a certain board structure. The results from Table 3 show that firms that were previously non-compliant with the regulations did not benefit from increased independence in the post-SOX period. The regulations which forced these firms to alter their board structures may have moved these firms away from their optimum board structure.

Table 4 presents the regression of the three measures of excess value from diversification on the SOX dummy variable, the percentage of independent directors, and various control variables. The regressions are also performed with and without an

interaction variable between the SOX dummy and the percentage of independent directors. This table deals with the subsample of firms which were compliant with the regulations in both pre and post-SOX periods.

Similar to the results in the Table 3, there is a negative relation between the SOX dummy variable and the firm's excess value. Firms that were previously compliant with the regulations extracted less value from diversification in the post-SOX era. Unlike the first table, the relation between the percentage of independent directors and excess value pre-SOX is now positive. This indicates that board independence was beneficial to firms that were already compliant with the regulations before SOX. This is consistent with Linck et al.'s (2008) proposition that firms choose their board structure based on their specific contracting needs. In other words, compliant firms did benefit from such high levels of board independence due to their unique needs.

Looking at the interaction variable in column 4 of Table 4, it seems that independence significantly reduces the excess value during the post-SOX period for previously compliant firms relative to the pre-SOX period. This is consistent with the findings of Dah, Frye, and Hurst (2014) who found that 55.8% of compliant firms increased their board independence post-SOX. They suggest that the pressure to increase board independence post-SOX was what drove the already compliant firms to increase board independence. It is also possible that management in firms which increased board independence might have intentionally hired directors who fit the legal description of independent directors but were linked to management in other ways (Romano, 2004). These directors may become free riders and not perform their monitoring role well.

Therefore, board structure changes in compliant firms in the post-SOX era could have also pushed these boards away from their optimum levels of independence. This is consistent with the proposition of Linck et al. (2008).

### **3.3.2. Board Independence and Internal Capital Market Efficiency**

Shin and Stulz (1998) find that diversified firms treat segments with better investment opportunities in a similar fashion to other segments, which suggests that internal capital markets are inefficient. Scharfstein and Stein (2000) propose that there is a sort of socialism in diversified firms, where weaker divisions are subsidized by stronger ones. They suggest that capital misallocation, as a result of inefficient internal capital markets, is partly due to poor corporate governance. Similarly, Sautner and Villalonga (2010) look at German companies and find that firms with concentrated ownership have more efficient internal capital markets and are less diversified.

In this section, we examine the relation between board independence and the efficiency of internal capital markets. We first look at firms which were not previously compliant with the regulations in the pre-SOX era but became compliant post-SOX. Table 5 presents a regression of the two measures of internal capital market efficiency on the SOX dummy variable, the percentage of independent directors, and various control variables. The regressions are also performed with and without an interaction variable between the SOX dummy and the percentage of independent directors.

In Column 2 of Table 5, we find that the coefficients for the SOX dummy and the percentage of independent directors are positive. Sadly, these first two coefficients are not significant. However, we do find a negative and significant coefficient for the

interaction variable between the SOX dummy and the percentage of independent directors. This indicates that, relative to the pre-SOX period, board independence has a negative effect on internal capital market efficiency in the post-SOX period for previously non-compliant firms.

Table 6 presents the regression of the two measures of internal capital market efficiency on the SOX dummy variable, the percentage of independent directors, and various control variables. The regressions are also performed with and without an interaction variable between the SOX dummy and the percentage of independent directors. This table deals with the group of firms which were compliant with the regulations in both pre and post-SOX periods.

Column 4 shows a significant positive relation between the percentage of independent directors and internal capital market efficiency during the pre-SOX period. However, the interaction variable between the percentage of independent directors and SOX has a negative and significant coefficient. This indicates that, relative to the pre-SOX period, board independence has a negative effect on internal capital market efficiency in the post-SOX period. This is also consistent with Linck et al.'s (2008) proposition that regulations have pushed corporate boards away from their optimal level of independence. If outsiders are replacing insiders on corporate boards, these boards may become less capable of performing their advising duties. Independent directors may not have the necessary knowledge and experience with the company to be able to perform an advising role. The cost of adding more independent directors rises further if the directors being hired are involved in back scratching and socialization with top management, which reduces their ability to perform a monitoring role.



## **Chapter Four**

### **Conclusion**

This paper examines the effect of board independence on diversification and internal capital market efficiency. We make use of the exogenous shock caused by SOX and the changes in exchange listing requirements in 2002 in order to study the effect of increased board independence on the efficiency of internal capital markets in diversified firms.

Our results suggest that imposed regulations which increased board independence may have had unintended consequences. The move towards higher independence may have moved firms away from their optimal board structure. We find that, relative to the pre-SOX period, increased board independence had a negative effect on internal capital market efficiency and diversified firms' excess value in the post-SOX period. This suggests that firms did not benefit from the move towards higher independence in the post-SOX era. This applies to both firms that were previously compliant and those that weren't compliant with the regulations.

We attribute our findings to socialization and mutual back scratching between independent directors and top management. The increase in board independence may have given CEOs and top management an opportunity to hire independent directors who fit the legal description of independent directors but are linked to management in other ways. This explains why the documented increase in independence post-SOX had a negative effect on internal capital market efficiency. Our results are consistent with

Linck, Netter, and Yang (2008) who propose that a one-size-fits-all regulation may be inefficient and could move firms away from their optimum board composition.

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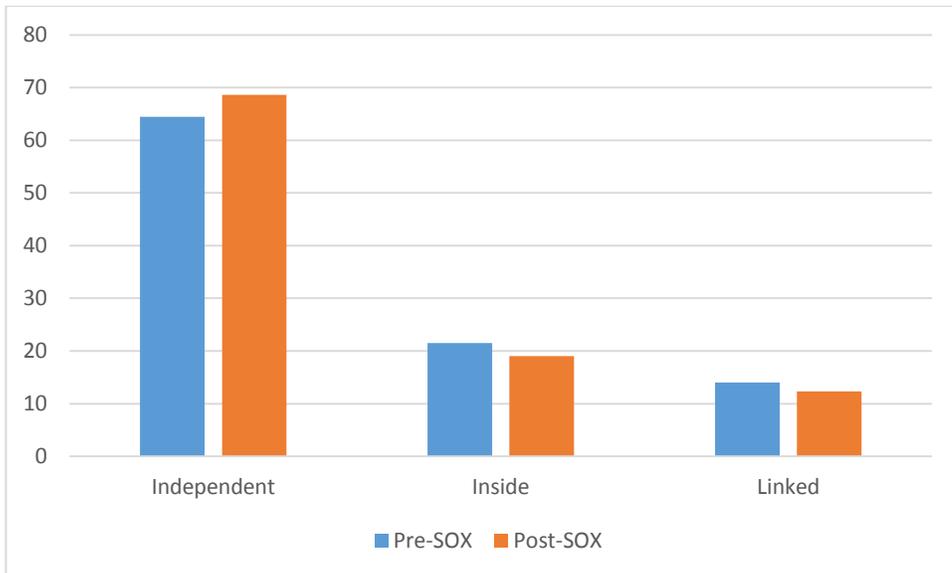
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# Figures

Figure 1 Compliant and Non-Compliant Firms Pre and Post-SOX



Figure 2 Board Composition Pre and Post-SOX



## Tables

Table 1. Variable Definitions

Variable	Variable Definition
Sox	A dummy variable for SOX which takes the value of 0 in the pre-SOX period and 1 in the post-SOX period
Percentage Independent	The percentage of independent directors on a given board
InSoxPercentage_independent	The interaction variable between Sox and Percentage_Independent
Firmsize	The size of the firm, it is the natural log of Sales.
Leverage	Calculated by dividing long term Debt by total assets.
Return on Assets	Is Income Before Extraordinary Assets divided by Total Assets.
E	Bebchuk, Cohen and Ferrell's (2009) E index for entrenchment.
R&D Expense	Research and Development expense divided by Total Assets
Advertisement Expense	Advertisement expense divided by Total Assets
R&DDummy	A dummy variable that takes the value of one if R&D Expenditure is missing and zero otherwise
AdvDummy	A dummy variable that takes the value of one if Advertisement Expense is missing and zero otherwise
Capx_at	The ratio of Capital Expenditures to Total Assets.
Executive's Age	The age of the CEO in years.

Board Size	The size of the board.
CEO Duality	Dummy Variable for CEO Duality, takes the value of 1 if the CEO is also the Chairman of the Board
BOa	Berger and Ofek's (1995) measure for excess value from diversification calculated using Total Assets
BOs	Berger and Ofek's (1995) measure for excess value from diversification calculated using Sales
BOe	Berger and Ofek's (1995) measure for excess value from diversification calculated using EBIT
RSZ	Rajan, Servaes and Zingales' (2000) measure for internal capital market efficiency, calculated using ROA
RSZq	Rajan, Servaes and Zingales' (2000) measure for internal capital market efficiency, calculated using Tobin's Q

Table 2. Descriptive Statistics: Compliance and Board Composition

Panel A

Period	Compliant Firms	Non-Compliant Firms	Total Number of Firms	Percentage of Non-Compliant Firms
Pre-SOX	948	213	1161	18.35
Post-SOX	1103	52	1155	4.50

Panel B

Variable	Pre-SOX Mean	Post-SOX Mean
Independent	64.48002	68.64277
Inside	21.53014	19.03633
Linked	13.98984	12.32091

Table 2 Panel A shows the number of compliant and non-compliant firms in the pre and post-SOX periods. Compliant firms are those that have a percentage of independent directors that is higher than 50%. Panel B presents the means of the three different types of board directors in the pre and post-SOX periods.

Table 3. Diversification Discount and Independence for Previously Non-compliant Firms

	BOs	BOs	BOa	BOa	BOe	BOe
Sox	0.073	-0.304	-0.013	-0.469	-0.342**	0.394
	0.51	-0.77	-0.1	-1.33	-1.97	0.86
Percentage_independent	-0.005	-0.011	-0.004	-0.011*	-0.007	0.005
	-1.17	-1.41	-0.98	-1.69	-1.35	0.49
InSoxPercentage_independent		0.009		0.01		-0.017*
		1.01		1.42		-1.69
Firmsize	0.118**	0.119**	0.241***	0.242***	0.338***	0.332***
	2.09	2.11	5.14	5.22	4.8	4.71
Leverage	0.076	0.079	-0.977***	-1.006***	-1.069**	-1.126**
	0.18	0.18	-2.77	-2.88	-2	-2.08
Return on Assets	0.01	0.01	0.006	0.006	-0.017*	-0.016*
	1.36	1.33	1.01	1.01	-1.81	-1.71
E	-0.028	-0.028	-0.02	-0.018	-0.128	-0.129
	-0.47	-0.46	-0.4	-0.35	-1.46	-1.48
R&D Expense	0.429	0.432	0.007	-0.003	-5.213***	-5.065***
	0.28	0.28	0.01	0	-3.43	-3.3
Advertisement Expense	0.814	0.836	-0.634	-0.339	-11.666**	-12.518***
	0.22	0.22	-0.17	-0.09	-2.58	-2.72
R&DDummy	-0.071	-0.085	-0.641***	-0.647***	-0.979***	-0.962***
	-0.34	-0.4	-3.21	-3.26	-3.41	-3.38
AdvDummy	-0.347*	-0.340*	-0.056	-0.051	-0.028	-0.046
	-1.86	-1.82	-0.31	-0.27	-0.1	-0.18
Capx_at	-1.506	-1.658	-1.513	-1.618	-0.426	-0.287
	-1.36	-1.51	-1.35	-1.48	-0.4	-0.27
Executive's Age	0	0.001	-0.006	-0.005	0.016*	0.015
	0.04	0.14	-0.8	-0.69	1.66	1.54
Boardsize	0.008	0.004	0	-0.007	-0.082**	-0.075**
	0.33	0.15	0	-0.29	-2.42	-2.23

	BOs	BOs	BOa	BOa	BOe	BOe
CEO Duality	0.316***	0.304**	0.417***	0.407***	0.039	0.048
	2.61	2.52	3.74	3.68	0.24	0.3
Constant	-1.028	-0.795	-1.312**	-0.991	-2.386**	-2.762**
	-1.3	0.93	-2.24	-1.56	-2.12	-2.37
Industry Dummies	YES	YES	YES	YES	YES	YES
Observations	638	638	547	547	377	377
R-squared	0.43	0.43	0.4	0.41	0.4	0.4

Table 3 presents a regression of the three measures of excess value from diversification on the SOX dummy variable, the percentage of independent directors, and various control variables for firms that were non-compliant to the regulations pre-SOX. The regressions are also performed with and without an interaction variable between the SOX dummy and the percentage of independent directors. They also include industry fixed effects based on Fama and French (1997) 48-industry definition. The asterisks \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% level respectively.

Table 4. Diversification Discount and Independence for Previously Compliant Firms

	BOs	BOs	BOa	BOa	BOe	BOe
Sox	-0.249***	-0.257	-0.228***	0.17	-0.423***	-0.08
	-5.23	-1.3	-5.29	0.89	-6.3	-0.24
Percentage_independent	0.003**	0.003	0.004***	0.007***	0.0000395	0.003
	2.18	1.36	2.77	3.33	0.02	0.79
InSoxPercentage_independent		0.000125		-0.006**		-0.005
		0.05		-2.11		-1.05
Firmsize	-0.02	-0.02	0.084***	0.083***	0.068**	0.068**
	-1.12	-1.12	5.16	5.04	2.48	2.46
Leverage	0.324*	0.324*	-0.049	-0.05	0.461*	0.458
	1.85	1.85	-0.32	-0.32	1.65	1.64
Return on Assets	-0.003	-0.003	0.006**	0.006**	0.001	0.001
	-1.48	-1.48	2.52	-2.47	0.24	0.22
E	-0.037**	-0.037**	-0.034**	-0.035**	-0.075***	-0.076***
	-2.14	-2.13	-2.02	2.11	-2.92	-3
R&D Expense	-0.820*	-0.820*	0.638	0.657	-2.528*	-2.513*
	-1.67	-1.68	1.29	1.33	-1.83	-1.83
Advertisement Expense	1.132	1.132	1.049	1.023	-0.875	-0.853
	0.73	0.73	0.85	0.82	-0.45	-0.44
R&DDummy	-0.195***	-0.195***	-0.161***	-0.157**	-0.102	-0.097
	-2.81	-2.81	-2.65	-2.57	-1.02	-0.97
AdvDummy	-0.003	-0.003	0.139**	0.143**	-0.022	-0.018
	-0.04	-0.04	2.27	2.33	-0.2	-0.16
Capx_at	-0.948*	-0.949*	0.614	0.648	-3.902***	-3.885***
	-1.66	-1.66	1.42	1.49	-4.82	-4.81
Executive's Age	-0.001	-0.001	-0.002	-0.002	-0.010**	-0.010**
	-0.35	-0.35	-0.53	-0.54	-1.97	-1.98
Boardsize	0.037***	0.037***	0.003	0.007	0.01	0.012
	3.53	3.52	0.36	0.73	0.63	0.79

	BOs	BOs	BOa	BOa	BOe	BOe
CEO Duality	0.023	0.023	-0.029	-0.027	-0.013	-0.014
	0.53	0.53	-0.65	-0.61	-0.21	-0.22
Constant	0.517	0.524	0.261	-0.023	1.718*	1.443
	0.95	0.93	0.6	-0.05	1.85	1.46
Industry Dummies	YES	YES	YES	YES	YES	YES
Observations	3933	3933	3448	3448	2295	2295
R-squared	0.25	0.25	0.21	0.21	0.27	0.27

Table 4 presents a regression of the three measures of excess value from diversification on the SOX dummy variable, the percentage of independent directors, and various control variables for firms that were compliant to the regulations pre-SOX. The regressions are also performed with and without an interaction variable between the SOX dummy and the percentage of independent directors. They also include industry fixed effects based on Fama and French (1997) 48-industry definition. The asterisks \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% level respectively.

Table 5. Internal Capital Market Efficiency and Independence for Previously Non-compliant Firms

	RSZ	RSZ	RSZq	RSZq
sox	-0.002	0.002	0.013	0.012
	-1.27	1.03	1.02	0.74
Percentage_independent	-0.00002	0.00004	0.00006	0.00004
	-0.71	1.09	0.61	0.19
InSoxPercentage_independent		-0.00009*		0.00002
		-1.79		0.11
Firmsize	0.001	0.001	0.002	0.002
	1.12	1.13	0.93	0.92
Leverage	-0.008	-0.008	0	0
	-1.05	-1.05	-0.02	-0.02
Return on Assets	0	0	0	0
	-1.32	-1.32	-0.31	-0.31
E	0	0	-0.005	-0.005
	1.19	1.18	-0.95	-0.95
R&D Expense	-0.006	-0.006	0.01	0.01
	-0.84	-0.83	0.68	0.67
Advertisement Expense	-0.002	-0.002	0.045	0.045
	-0.17	-0.17	0.83	0.83
R&DDummy	0.003**	0.003**	-0.001	-0.001
	2.38	2.43	-0.29	-0.3
AdvDummy	0.001	0.001	0.007	0.007
	1.06	0.99	1.01	1.01
Capx_at	0.005	0.006	0.005	0.005
	0.62	0.72	0.13	0.12
Executive's Age	0	0	-0.001	-0.001
	-0.99	-1.03	-1.02	-1.02
Boardsize	0	0	0	0
	0.58	0.76	-0.39	-0.37

	RSZ	RSZ	RSZq	RSZq
CEO Duality	-0.002	-0.002	-0.003	-0.003
	-0.79	-0.75	-0.68	-0.69
Constant	0.002	-0.001	0.019	0.02
	0.29	-0.21	0.74	0.66
Industry Dummies	YES	YES	YES	YES
Observations	1009	1009	1009	1009
R-squared	0.09	0.09	0.05	0.05

Table 5 presents a regression of the two measures of internal capital market efficiency on the SOX dummy variable, the percentage of independent directors, and various control variables for firms that were non-compliant to the regulations pre-SOX. The regressions are also performed with and without an interaction variable between the SOX dummy and the percentage of independent directors. They also include industry fixed effects based on Fama and French (1997) 48-industry definition. The asterisks \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% level respectively.

Table 6. Internal Capital Market Efficiency and Independence for Previously Compliant Firms

	RSZ	RSZ	RSZq	RSZq
sox	-0.001*	-0.006	-0.003	0.017*
	-1.7	-1.27	-0.81	1.84
Percentage_independent	-0.00004	-0.00008	-0.00003	0.0001**
	-0.95	-1.06	-0.35	2.03
InSoxPercentage_independent		0.00007		-0.0002*
		1.15		-1.96
Firmsize	0	0	0.004	0.003
	-1.37	-1.38	1.23	1.19
Leverage	-0.001	0	-0.015	-0.015
	-0.17	-0.14	-1.36	-1.38
Return on Assets	0	0	0	0
	0.63	0.63	-0.51	-0.49
E	0	0	-0.003	-0.003
	-0.63	-0.58	-1.27	-1.31
R&D Expense	-0.014	-0.014	0.026	0.026
	-1.16	-1.17	0.87	0.87
Advertisement Expense	0	-0.001	-0.081*	-0.077
	0.06	-0.11	-1.69	-1.62
R&DDummy	0	0	-0.013*	-0.013*
	-0.45	-0.52	-1.69	-1.67
AdvDummy	0	0	-0.011	-0.01
	0.91	0.76	-1.43	-1.4
Capx_at	0.017	0.016	-0.092	-0.09
	1.57	1.54	-1.45	-1.42
Executive's Age	0	0	0.001*	0.001*
	-1.07	-1.07	1.95	1.95
Boardsize	0	0	0.001	0.001
	0.88	0.8	0.9	1.12

	RSZ	RSZ	RSZq	RSZq
CEO Duality	0	0	-0.002	-0.002
	0.37	0.38	-0.74	-0.75
Constant	0.006	0.009	-0.032	-0.045**
	1.29	1.26	-1.59	-1.98
Industry Dummies	YES	YES	YES	YES
Observations	5742	5742	5742	5742
R-squared	0.01	0.01	0.02	0.02

Table 6 presents a regression of the two measures of internal capital market efficiency on the SOX dummy variable, the percentage of independent directors, and various control variables for firms that were compliant to the regulations pre-SOX. The regressions are also performed with and without an interaction variable between the SOX dummy and the percentage of independent directors. They also include industry fixed effects based on Fama and French (1997) 48-industry definition. The asterisks \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% level respectively.