Factors Affecting the Characteristics of Boards of Directors: An Empirical Study of New Zealand Initial Public Offering Firms

Y. T. Mak
NATIONAL UNIVERSITY OF SINGAPORE

M. L. Roush
VICTORIA UNIVERSITY OF WELLINGTON

This study examines the associations between the characteristics of boards of directors of initial public offering (IPO) firms and the availability of growth opportunities and level of inside share ownership of these firms. Three characteristics of boards of directors are examined: board size, proportion of outside directors, and the separation of the CEO and chairperson's roles (dual leadership). The impact of firm size on board characteristics is controlled for in the empirical tests. Based on a sample of 110 New Zealand firms that made initial public offerings of equity securities over the period 1983 to 1987, this study finds that firms that have lower inside share ownership tend to employ larger boards. In addition, the proportion of outside directors is positively related to the extent of growth opportunities available to a firm and negatively related to inside share ownership. Finally, firms with relatively more growth opportunities are likely to have dual leadership. Although some contrary results are found, the findings from this study provide some support for arguments that firms with greater agency problems, attributable to low inside share ownership and significant growth opportunities, are likely to choose boards of directors that are more effective at mitigating these problems.

The corporate governance role of the board of directors has become an issue of great interest to both researchers and regulatory agencies. The board of directors is often seen as serving a monitoring function, protecting the interests of various stakeholders against management's self-interests (Fama, 1980; Fama and Jensen, 1983). Larger boards (e.g., Zahra and Pearce, 1989), boards with more independent, outside directors (e.g., Fama and Jensen), and those with the CEO's and chairperson's roles being separated (dual leadership) (e.g., Jensen, 1993), have been argued by researchers to be better able to monitor management.

Regulatory agencies in different countries view certain characteristics of boards of directors as being important determinants of their effectiveness. For example, in the United States (U.S.), the New York Stock Exchange (NYSE) requires that listed companies have audit committees made up only of outside directors. In addition, the Securities and Exchange Commission (SEC) recommended that nominating and compensation committees should be dominated by outside directors (Wolfson, 1984). Brickley, Coles, and Jarrell (1994) also discuss calls in the U.S. by the United Shareholders' Association, large public pension funds, legislators and regulators, and the financial press for dual leadership.

Initial empirical research on board composition has tended to examine the association between board characteristics and firm performance (e.g., Baysinger and Butler, 1985; Rechner and Dalton, 1991), and results from these studies are mixed. These studies assume that boards with certain characteristics (such as dual leadership or more outside directors) are better able to carry out their functions, regardless of the characteristics of the firms employing these boards, and therefore, that firms adopting these board characteristics will outperform those that do not. In contrast, several recent studies have examined the associations between firm characteristics and board characteristics, based on the assumption that there is no board structure that is optimal for all firms and that firms will choose a board structure that is appropriate to its circumstances (e.g., Finkelstein and D'Averi, 1994; Rediker and Seth, 1995).

The present study adopts the more recent perspective in examining the determinants of board characteristics of New Zealand (N.Z.) firms making initial public offerings (IPOs) of equity securities (IPO firms). It tests hypotheses that firms associated with greater agency problems are likely to choose board characteristics that enhance a board's monitoring ability.
Previous research suggests that the availability of growth opportunities (e.g., Smith and Watts, 1992; Gaver and Gaver, 1993) and inside share ownership (e.g., Jensen and Meckling, 1976) are important determinants of agency problems. The present study investigates associations between these two variables and the board characteristics of IPO firms. In the IPO context, agency problems are likely to be significant and to have an important influence on board characteristics. Second, previous studies have mainly been conducted in the U.S., where regulatory requirements or pressure means that the choice of board size is also controlled for in the empirical tests because of its likely impact on board characteristics (e.g., Pfeffer, 1973; Zara and Pearce, 1989).

The present study contributes to the literature on the determinants of board characteristics in several respects. First, apart from Beatty and Zajac (1994), previous studies have not considered board characteristics of IPO firms. In the IPO context, agency problems are likely to be significant and to have an important influence on board characteristics. Second, previous studies have mainly been conducted in the U.S., where regulatory requirements or pressure means that the choice of board characteristics, particularly the use of outside directors, is not completely voluntary. In contrast, regulatory agencies in N.Z. have not required or applied pressure on firms to choose boards with particular characteristics, such as using relatively more outside directors. Consequently, any use of these monitoring techniques on the part of N.Z. firms is completely voluntary. Third, previous studies have generally not examined the association between the nature of a firm’s investment opportunities and its board characteristics.

### Agency Problems in the IPO Context

Previous researchers argue that tender offer bids (Byrd and Hickman, 1992) and management buyout (MBO) transactions (Lee, Rosenstein, Rangan, and Davidson, 1992) are characterized by significant agency problems. Similarly, we argue that there are significant agency problems when initial public offerings are made. The proposed issue of securities by IPO firms closely resembles the situation described by Jensen and Meckling (1976), where an existing owner-manager is attempting to sell equity claims to outside investors. The sale of equity claims to outside investors leads to a divergence of interests between the owner-manager and outside investors, because the fact that the owner-manager will no longer own 100% of the firm means that the owner-manager will not bear the full costs of actions that reduce the value of the firm. In the case of IPO firms, major agency problems are likely to exist between potential investors and parties closely associated with these firms who have the ability to expropriate wealth from outside investors to themselves. These latter parties (hereafter referred to simply as “inside owners”) include promoters, directors, managers, staff, associates, and existing shareholders of the firm.

However, potential investors are aware that inside owners may take actions that are not in the potential investors’ best interests. In evaluating the IPO, they will, therefore, take into account any monitoring expenditures they will have to incur to ensure that inside owners act in their interests, and the cost of the inside owners diverging from their interests that cannot be cost-effectively eliminated through monitoring. This “price protection” can take the form of a discount in the offering price of the securities, or as an ultimate form of price protection, investors may refuse to purchase shares offered by the firm. To reduce the price protection demanded, inside owners of IPO firms may voluntarily put in place mechanisms for limiting such divergence of interests. The next section provides an overview of the model underlying the study, which shows the sources of agency problems of IPO firms and the board characteristics that can control these agency problems.

### Model Overview

Several researchers argue that the board of directors is an element of corporate governance, particularly for monitoring the behavior of top managers. For example, the board of directors has been described as perhaps the ultimate internal monitor of top managers (Fama, 1980) and as the “common apex” of the decision control systems of organizations characterized by a separation of ownership and decision-making (Fama and Jensen, 1983). Similarly, the board of directors is likely to represent an important mechanism for limiting the divergence of interests between inside owners and potential investors for IPO firms.

Inside owners choose the board of directors of IPO firms at the time of the offering of securities. That is, regardless of the number or proportion of shares that may eventually be held by outside investors as a result of the security issuance, inside owners decide the number and composition of the board of directors and whether the CEO should also be the chairperson of the board. However, the ability of potential outside investors to “price-protect” provides a strong incentive for inside owners to increase the monitoring ability of the board where agency problems are significant.

We argue that although the board of directors serves institutional, governance, and strategic functions that may conflict (Goodstein, Gautam, and Boeker, 1994), the governance function is likely to be particularly important at the time of a public offering of securities. Consequently, we focus on the monitoring role of the board and study the associations between variables designed to capture cross-sectional differences in agency problems and board characteristics that can control agency problems. Figure 1 shows the model underlying the present study.

We believe that two major firm characteristics increase or decrease the extent of agency problems when initial public offerings are made. These characteristics are the availability of growth opportunities and the percentage of shares retained by insiders. Compared to investment in existing assets, invest-
ment in growth opportunities is less observable to outside investors, and managerial discretion is correspondingly greater (Smith and Watts, 1992). Consequently, there is greater scope for managers of firms with relatively more investment in growth opportunities to expropriate wealth from outside investors to themselves. The percentage of shares retained by insiders affects agency problems, because the larger the proportion of shares insiders hold, the closer their interests are aligned to outside investors (Jensen and Meckling, 1976). However, three characteristics of the board can help control these agency problems and they are: larger board size (e.g., Singh and Harianto, 1989), more outside directors (e.g., Fama and Jensen, 1983) and dual leadership (e.g., Jensen, 1993). This is discussed further in the following section.

**Board Characteristics as a Response to Agency Problems**

**Board Size**

Board size has been argued as affecting the monitoring ability of boards. Larger boards are often believed to be more capable of monitoring the actions of top management, because it is more difficult for CEOs to dominate larger boards. This enhances the independence of the board from the CEO, which increases the board’s ability and willingness to use its decision control powers to ratify or refuse decisions made by the CEO (Zahra and Pearce, 1989). Similarly, Singh and Harianto (1989) suggest that larger boards can make it more difficult for the CEO to obtain consensus for taking actions that harm shareholders’ interests.

Some authors argue that smaller boards may be more effective, but they generally do so from the view of the board’s ability to make timely strategic decisions (e.g., Goodstein, Guatam, and Boeker, 1994; Judge and Zeithaml, 1992). Similarly, the few published empirical studies that have examined board size have done so mainly from the resource dependence (e.g., Pfeffer, 1973) and strategic decision-making perspectives (e.g., Goodstein, Guatam, and Boeker). The results of these studies seem to indicate that larger boards are beneficial from the resource-dependence perspective but dysfunctional from the strategic decision-making perspective. There is little empirical research that has specifically examined the determinants or consequences of board size from a monitoring perspective.

**Outside Directors**

According to Fama and Jensen (1983), the effectiveness of the board for decision control can be enhanced by including outside directors on the board. Outside directors have incentives to monitor management on behalf of shareholders, because the demand for directors’ services, and therefore, the value of their human capital, is dependent upon their effectiveness as decision control specialists (Fama and Jensen, 1983).

Many studies have examined the association between the use of outside directors and financial performance, based on the assumption that firms using relatively more outside directors will show better financial performance. The results from these studies are mixed. However, apart from the difficulty in capturing the effects of using outside directors in overall firm performance, the rationale underlying these studies has been challenged. For example, Hermelin and Weisbach (1991) argue that if firms have boards that are optimally weighted between insiders and outsiders, or if they reduce agency problems to approximately the same level, it may be impossible to find a relationship between firm performance and board composition, even if board composition helps to control agency problems.

Several studies provide empirical support for the impor-
tance of outside directors for corporate governance in different contexts, including as a substitute for takeover restriction (Brickley and James, 1987), removing the CEO for poor firm performance (Weisbach, 1988), in tender offer bid situations (Byrd and Hickman, 1992), and in management buyout situations (Lee, Rosenstein, Rangan, and Davidson, 1992). A number of studies have found that agency-related factors affect the use of outside directors. Brickley and James (1987) find a negative relationship between the degree of concentration of ownership and number and proportion of outsiders, but only in nonacquisition states. This is consistent with concentration of ownership and outside directors being substitute devices for controlling managerial behavior. Beatty and Zajac (1994) find that firms whose managers owned relatively fewer shares use a large proportion of outside directors. Rediker and Seth’s (1995) results indicate that the use of outside directors is negatively related to the presence of large outside shareholders, insider ownership, and the mutual monitoring potential of top management. Bathala and Rao (1995) find that, consistent with the predictions of agency theory, the use of outside directors is negatively associated with the proportion of managerial share ownership, the dividend payout ratio, and the ratio of long-term debt to the sum of total debt and equity.

**Dual Leadership**

It may also be advantageous from a monitoring perspective not to have the CEO of the organization also performing the chairperson’s role (Jensen, 1993). Given that chairpersons are the heads of boards of directors, they are likely to be able to affect the operations of the boards significantly by developing operating procedures, influencing the configuration of committees, and serving as the ultimate persons responsible for performance of the boards. The chairperson often schedules and sets the agenda for meetings and is likely to be responsible for communicating information to external directors prior to board meetings (Rechner, 1989).

Studies that have examined the association between dual leadership and performance have found conflicting results (e.g., Rechner and Dalton; 1991; Donaldson and Davis, 1991; Mallette and Fowler, 1992). However, these studies have the same potential weaknesses as those studies that have examined the association between the use of outside directors and performance. Some studies attempt to provide more direct evidence on the impact of dual leadership on corporate governance. Mallette and Fowler explore the relationship of dual leadership and the adoption of “poison pills” (takeover defenses) by U.S. industrial manufacturing firms. They find that firms are less likely to adopt poison pills when separate people serve as the CEO and chairperson. However, Kesner, Victor, and Lamont (1986) find no evidence of a statistical association between the dual leadership and the commission of illegal acts by Fortune 500 companies. Beatty and Zajac (1994) find that IPO firms that have lower percentages of managerial compensation being derived from incentives, and therefore, presumably higher agency costs, are more likely to have dual leadership.

In summary, previous theoretical and empirical research generally suggests that firms that with greater agency problems are likely to employ boards that are larger, have relatively more outside directors, or dual leadership, because such boards are more effective in controlling agency problems. Although larger board size, more outside directors, and dual leadership may reduce a board’s effectiveness in carrying out other functions (e.g., Goodstein, Guatam, and Boeker, 1994; Judge and Zeithaml, 1992), the importance of controlling agency problems in an IPO context leads to the prediction in the present study that firms with greater agency problems are more likely to employ boards having these characteristics.

**Sources of Agency Problems and Hypotheses**

**Inside Share Ownership**

For an IPO firm, where potential investors face possible wealth transfers to inside owners, agency costs are likely to be dependent upon share ownership by these owners. The smaller the proportion of shares held by inside owners, the lower the costs that they would bear from taking actions that reduce firm value (Jensen and Meckling, 1976). Therefore, it is expected that the lower the proportion of shares retained by inside owners, the greater the monitoring ability of the board employed by an IPO firm. Previous research indicates that managerial ownership is negatively related to the proportion of outside directors (e.g., Bathala and Rao, 1994; Beatty and Zajac, 1994) and dual leadership (Beatty and Zajac). Although previous studies have not examined the association between share ownership and board size, a negative relationship between these two variables is expected on the basis that larger boards are likely to be more effective at controlling agency problems (e.g., Singh and Harianto, 1989). Therefore, the following hypothesis is tested:

**H1**: The proportion of inside share ownership is negatively related to board size, proportion of outside directors, and dual leadership.

**Availability of Growth Opportunities**

An important factor that may affect the level of monitoring demanded by potential IPO investors is the availability of growth opportunities to the IPO firm. Firm investment may take the form of investment in existing assets, which represents existing investments, or investment in growth opportunities (Myers, 1977). Managerial actions are less observable and managerial discretion is greater where the proportion of firm value represented by growth opportunities increases relative to assets-in-place (Smith and Watts, 1992). The greater information asymmetry inherent in high-growth firms (i.e., those
with greater investment in growth opportunities) increases the potential for wealth transfers from potential investors to inside owners (Gaver and Gaver, 1995).

Little empirical research has examined the association between the availability of investment opportunities and board characteristics. Anderson, Francis, and Stokes (1993) find that relative expenditure on monitoring from directors is positively related to the availability of growth opportunities. Bathala and Rao (1995) note that firms with more future growth opportunities can be argued to use more outside directors on the board to control the higher agency problems inherent in such firms. Other researchers have also hypothesized that firms with greater growth opportunities adopt mechanisms and corporate policies (e.g., compensation plans) that better control agency problems, and there is substantial empirical support for these predictions (e.g., Smith and Watts, 1992; Gaver and Gaver, 1993).

Based on previous studies, we argue that firms with more growth opportunities will adopt boards that are better able to monitor the decisions and actions of inside owners, to ensure that they are in the interests of potential investors. This leads to the following hypothesis:

**H2**: The availability of growth opportunities is positively related to board size, proportion of outside directors, and dual leadership.

### Control Variable

**FIRM SIZE.** Previous agency theory-based studies have used firm size as a proxy for agency costs and have argued that larger firms are more likely to use various monitoring mechanisms, such as external auditing (Chow, 1982) and audit committees (e.g., Pincus, Rusbarsky, and Wong, 1989). Similarly, larger IPO firms facing greater agency problems are more likely to employ boards that are more effective in monitoring managers. However, firm size may capture other factors, and it is difficult to interpret relationships involving firm size as being unambiguously attributable to agency-related factors.

It is, however, important to include firm size as a control variable in the present study, because relationships between firm size and board size (e.g., Pfeffer, 1973; Cotter, Shivdasani, and Zenner, 1997), proportion of outside directors (e.g., Cotter, Shivdasani, and Zenner), and dual leadership (e.g., Finkelstein and D'Aveni, 1994; Boyd, 1995) have been suggested or documented by other researchers.

### Data Collection

#### Sample Selection

The sample for this study is based on N.Z. firms that made initial public offerings of equity securities between 1983 and 1987, and which subsequently listed on the N.Z. Stock Exchange (NZSE). There were no IPOs in N.Z. between the stock market crash in October 1987 and December 1988. IPOs remained relatively infrequent for much of the period after December 1988. The following types of firms are excluded from the study:

1. oil and gas exploration firms and mining firms—these typically are no-liability firms that are involved in highly speculative activities, which may affect their comparability with other firms;
2. firms making offerings of securities that are unavailable for subscription by the general public; and
3. unit trusts—the nature of these entities, and, therefore, their governance structures, may not be comparable to other types of firms.

A total of 110 firms that met the selection criteria are included in the study.

#### Variable Measurement

Except where indicated otherwise, information for measuring the variables employed in the study was obtained from the prospectuses issued by the sample firms.

**BOARD SIZE (BRDSIZE).** This variable is measured by the total number of members on the board of directors.

**PROPORTION OF OUTSIDE DIRECTORS (OUTDIR).** The definition of outside directors adopted in this study includes only independent outside directors. According to Byrd and Hickman (1992, p. 199): “The traditional two-way classification scheme of ‘insider’ (corporate employee) or ‘outsider’ (nonemployee) directors fails to consider potential conflicts of interest when directors are not full-time employee but have affiliations with the firm.”

Under the definition of outside directors adopted in the present study, directors with the following affiliations with the firm are not deemed to be outside directors: (1) an employee of the firm; (2) an individual or member of a firm who has sold or proposes to sell assets or other business interests to the firm; (3) an individual who provides consulting or other services, or who is a member of a firm that provides such services; (4) a major shareholder or a director appointed by a major shareholder; or (5) a director or employee of a related firm. Firms are considered to be related to the IPO firms where: (1) the new firm is formed to take over some of the activities of the other firm, and shares are issued as consideration; (2) the firm being issued the shares is the promoter of the new firm; or (3) there are cross-shareholdings between the two firms. The exclusion of a major shareholder or a director appointed by a major shareholder from the definition of outside directors is consistent with Rosenstein and Wyatt (1990). We believe this exclusion is appropriate for our study, because, as we explained earlier, the major concern of potential investors in the IPO context is that actions will be taken that benefit inside owners at the expense of potential investors (outside or new owners). Therefore, a director who is an existing major shareholder or who is appointed by an existing major shareholder
is likely to be perceived as being more aligned to the interests of inside owners than potential investors. Note that we are referring to major shareholders at the time of the offering, who are, therefore, part of the group of inside owners of the firm. The proportion of outside directors is calculated by dividing the number of outside directors by the total number of directors.

**DUAL LEADERSHIP (DUALEAD).** A binary variable is used to measure the existence of dual leadership. Firms that have CEOs also serving as chairpersons of the board are coded as 0, and those with dual leadership as 1.

**AVAILABILITY OF GROWTH OPPORTUNITIES (GROWTH).** Previous studies operationalize growth opportunities in several ways, including market value to book value of total assets (e.g., Smith and Watts, 1992), market value to book value of equity (e.g., Gaver and Gaver, 1993), earnings to price ratio (e.g., Gaver and Gaver, 1993), and variability of returns (e.g., Smith and Watts, 1992). However, none of these studies focused on IPO firms.

For the IPO firms included in the present study, some of these measures cannot be used. For example, many IPO firms do not have previous earnings histories that rule out the use of the earnings to price ratio. In this study, four alternative measures are used to measure the availability of growth opportunities and these are discussed below.

**VARIANCE OF RETURNS.** Variance of returns (VARRET) has been used in many previous studies to operationalize the availability of growth opportunities (e.g., Smith and Watts 1992; Gaver and Gaver, 1995). The use of variance of returns is based on the argument that the value of investment options increases with the variability of cash flows (Chung and Chareonwong, 1991; Kester, 1986), which is, in turn, expected to be reflected in the variance of returns. However, because price and returns data for IPO firms are only available after listing, this measure can only be calculated on an ex post basis for these firms. Consequently, there are limitations associated with this particular measure.

VARRET is measured by the variance of the difference between the firm’s equity return and the market return; that is, \( \text{Var}(r_f - r_m) \). Returns for the first 20 trading days after listing, excluding the initial return, are used to calculate this variable. This is similar to the method used by Beatty (1989) to calculate the ex post measure of ex ante uncertainty for IPO firms, except that returns are adjusted for market movements. This adjustment is important, because the study extends over several years, where significant differences in market conditions may have existed. The measure used assumes that all IPO firms have the same market risk, an assumption consistent with most previous studies involving IPO firms (Saunders, 1990).

**OPERATING HISTORY.** For IPO firms, another potential measure of the availability of growth opportunities is the existence of an operating history. An IPO firm is sometimes formed through the conversion of an existing unlisted firm to a publicly listed firm with little change in operations. In this case, the major purpose of the IPO may be to allow the firm to increase its access to outside capital or its spread of sharehold- ing to meet listing requirements, or to allow existing share- holders to reduce their shareholding. Alternatively, a new firm may be formed by merging or acquiring existing firms, with these existing firms often becoming subsidiaries of the new firm. In both cases, the IPO firms have previous operating histories and potential investors in these firms will be acquiring claims in a combination of future growth opportunities and existing assets-in-place.

On the other hand, an IPO firm may be formed to commence operations for the first time. Potential investors in such start-up firms, which do not have past operating histories, will be acquiring claims in future growth opportunities, because these firms do not have existing assets-in-place. It is expected that firms without operating histories will have relatively more growth opportunities and that these firms will provide greater monitoring through their board of directors.

The existence of an operating history (HISTDUM) is measured by a binary variable, with firms having operating histories coded as 1, and those without operating histories coded as 0.

**YEARS OF OPERATING HISTORY.** Another measure used in this study that is closely related to the previous operating history measure is the number of years of operating history. That is, rather than measuring operating history as a binary variable, operating history here is measured by a continuous variable. The assumption underlying this measure is that relatively more established firms are likely to have more assets-in-place compared to growth opportunities. Both measures of operating history have the advantage of being ex ante measures of the availability of growth opportunities.

Years of operating history (HISTCON) is measured by the number of years between the date of formation of the IPO firm and the prospectus date.

**OFFERING SIZE.** Another potential measure of the availability of growth opportunities for IPO firms is the relative size of the offering. Assuming that IPOs are designed primarily to fund growth opportunities, the relative size of the offering (OFFER) can proxy for the extent of growth opportunities available to the IPO firm. OFFER is measured by the amount to be raised through the IPO divided by firm size (see below). This measure has the advantage of being ex ante in nature but has the major limitation of ignoring growth opportunities funded by existing resources. Furthermore, although relative offering size is likely to affect the need to enhance the reputation of the offeror, and, therefore, the monitoring ability of the board of directors, it may be a relatively weak measure of availability of growth opportunities.

Each of the three measures is likely to partially and imperfectly measure the availability of growth opportunities. Fol-
Factors Affecting New Zealand Boards of Directors

Descriptive Statistics

Table 1 shows descriptive statistics for the independent, dependent, and control variables included in the study. The distributions of VARRET, HISTCON, and SIZE are positively skewed, and this is reflected in the mean values for these variables being significantly larger than their median values. Therefore, the natural log transformation is applied to these three variables in order to reduce the skewness in their distributions before conducting the empirical tests. The distributions of the logged measures are approximately normal, and this is supported by Table 1, which shows that the mean and median values are very close.

Although the use of outside directors is voluntary in N.Z., it is evident from Table 1 that IPO firms on average employ a majority of these directors. Also, most of the IPO firms have dual leadership. These characteristics may be indicative of significant agency conflicts existing in the IPO context. Jensen (1993) argues that it may be easier for the CEO to control alternative measures of firm size, calculated as the market value of ordinary shares (the total number of shares after the issue multiplied by the first listing price), plus book value of total debt and preference shares immediately prior to the IPO. Because the results are unaffected by the size measure used, only the results using the first measure are presented.

**Data Analysis and Results**

**Descriptive Statistics**

Table 1 shows descriptive statistics for the independent, dependent, and control variables included in the study. The distributions of VARRET, HISTCON, and SIZE are positively skewed, and this is reflected in the mean values for these variables being significantly larger than their median values. Therefore, the natural log transformation is applied to these three variables in order to reduce the skewness in their distributions before conducting the empirical tests. The distributions of the logged measures are approximately normal, and this is supported by Table 1, which shows that the mean and median values are very close.

Although the use of outside directors is voluntary in N.Z., it is evident from Table 1 that IPO firms on average employ a majority of these directors. Also, most of the IPO firms have dual leadership. These characteristics may be indicative of significant agency conflicts existing in the IPO context. Jensen (1993) argues that it may be easier for the CEO to control alternative measures of firm size, calculated as the market value of ordinary shares (the total number of shares after the issue multiplied by the first listing price), plus book value of total debt and preference shares immediately prior to the IPO. Because the results are unaffected by the size measure used, only the results using the first measure are presented.

Table 1. Descriptive Statistics for Independent and Dependent Variables (n = 110)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTDIR</td>
<td>0.58</td>
<td>0.26</td>
<td>0.60</td>
</tr>
<tr>
<td>DUALLEAD</td>
<td>0.85</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>BRDSIZE</td>
<td>5.28</td>
<td>1.53</td>
<td>5.00</td>
</tr>
<tr>
<td>VARRET</td>
<td>24.98</td>
<td>61.89</td>
<td>10.17</td>
</tr>
<tr>
<td>ln(VARRET)</td>
<td>2.34</td>
<td>1.21</td>
<td>2.32</td>
</tr>
<tr>
<td>HISTCON</td>
<td>9.09</td>
<td>16.39</td>
<td>2.0</td>
</tr>
<tr>
<td>ln(HISTCON)</td>
<td>1.45</td>
<td>1.27</td>
<td>1.39</td>
</tr>
<tr>
<td>OFFER</td>
<td>0.46</td>
<td>0.59</td>
<td>0.33</td>
</tr>
<tr>
<td>INOWN</td>
<td>0.53</td>
<td>0.23</td>
<td>0.58</td>
</tr>
<tr>
<td>SIZE (NZ$m)</td>
<td>20.52</td>
<td>70.76</td>
<td>7.01</td>
</tr>
<tr>
<td>ln(SIZE)</td>
<td>16.23</td>
<td>1.23</td>
<td>16.08</td>
</tr>
</tbody>
</table>

1 Proporion of outside directors
2 Dual leadership, zero if no dual leadership, one if there is dual leadership
3 Total number of directors
4 Variance of (Ri±Rm) over the first 20 trading days after listing, excluding the first trading day
5 Existence of operating history, coded 0 for firms without operating histories, and 1 for firms with operating histories. For this variable, the mean represents the proportion of firms with an operating history
6 Number of years of operating history
7 Natural logarithm of (HISTORY + 1). The constant term was added to eliminate zero values of HISTORY prior to taking log (Wall, 1986, p. 145).
8 Amount of offering divided by firm size
9 Proportion of shares retained by inside owners
10 Firm size, measured by book value of total assets

**Factor Analysis**

Following Gaver and Gaver (1993, 1995), the continuous measures of GROWTH—ln(VARRET), ln(HISTCON), and OFFER—are factor analyzed to derive an aggregate GROWTH measure. Principal component factor analysis is used to decompose each of the three measures into one or more common factor(s) and a factor unique to each of the individual measures.

Table 2 presents the results of the factor analysis. Only one factor had an eigenvalue greater than one, and this first factor explained 55% of the total variance. All three individual measures had factor loadings of 0.60 or better for this factor. The single factor extracted is labeled GRSCORE, and this
Table 2. Principal Components Factor Analysis of Three Measures of Growth Opportunities

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvvalue</th>
<th>% Variance</th>
<th>Cumulative % Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.6630</td>
<td>55.4</td>
<td>55.4</td>
</tr>
<tr>
<td>2</td>
<td>0.7789</td>
<td>26.0</td>
<td>81.4</td>
</tr>
<tr>
<td>3</td>
<td>0.5581</td>
<td>18.6</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Factor Matrix

<table>
<thead>
<tr>
<th>Factor 1</th>
<th>ln(VARRET)</th>
<th>OFFSIZE</th>
<th>ln(HISTCON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(VARRET)</td>
<td>0.7873</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFFSIZE</td>
<td>0.6450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln(HISTCON)</td>
<td>-0.7919</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Descriptive Statistics of the Common Factor Extracted from Three Measures of Growth Opportunities

<table>
<thead>
<tr>
<th></th>
<th>Maximum</th>
<th>Minimum</th>
<th>Median</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(VARRET)</td>
<td>4.691</td>
<td>-2.055</td>
<td>0.099</td>
<td>0.000</td>
</tr>
<tr>
<td>ln(HISTCON)</td>
<td>0.4418***</td>
<td>-0.2747**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFFER</td>
<td>0.2669**</td>
<td></td>
<td>-0.7913***</td>
<td></td>
</tr>
<tr>
<td>GRSCORE</td>
<td>0.7873***</td>
<td>0.6450***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INOWN</td>
<td>-0.0780</td>
<td>0.4226***</td>
<td>-0.4296**</td>
<td>-0.4048***</td>
</tr>
<tr>
<td>ln(SIZE)</td>
<td>-0.2142*</td>
<td>0.3316**</td>
<td>-0.4479***</td>
<td>-0.4319***</td>
</tr>
</tbody>
</table>

factor is used as the primary measure of availability of growth opportunities in the subsequent analyses.

Correlations

Table 3 presents the Pearson correlations among the continuous explanatory variables, including correlations between the aggregate GRSCORE and the three underlying individual measures of availability of growth opportunities. In view of the significant correlations among the explanatory variables, GRSCORE, INOWN and ln(SIZE), a multivariate analysis should be used to analyze the relationship between these variables and each board characteristic. A multivariate analysis allows an assessment of the relative importance of each explanatory variable after controlling for the correlations between them.

The significant correlations between GRSCORE and the underlying individual measures of growth opportunities provide further support for the argument that the individual measures contributes significantly to the variation in GRSCORE. Note, however, that the high correlations between GRSCORE, and INOWN and ln(SIZE), can affect the ability to make inferences from the estimates of the coefficients of these variables. Because Table 3 also indicates that one of the individual measures of growth opportunities, ln(VARRET), is not as highly correlated with INOWN and ln(SIZE), the sensitivity of the potential impact of multicollinearity can be assessed by rerunning the analysis with ln(VARRET) substituted for GRSCORE.

Multivariate Tests

BOARD SIZE. Ordinary least-squares (OLS) regression is used to examine the relationship between board size and the explanatory variables, and the following model is estimated:

\[ BRDSIZE = a + b_1GROWTH + b_2INOWN + b_3ln(SIZE) \]

Three separate models are estimated, using three alternative measures of growth opportunities, GRSCORE, ln(VARRET), and HISTDUM. Recall that HISTDUM is the categorical measure of growth opportunities not used in the factor analysis to derive GRSCORE, while ln(VARRET) is used, because it is less highly correlated with the other explanatory variables.

The results of this regression are shown in Table 4. All three estimated models are significant at \( p < 0.01 \). For all three models, inside share ownership is significantly related to board size in the expected direction at \( p < 0.05 \) or better. Not surprisingly, the relationship between firm size and board size is positive and significant (\( p < 0.01 \)). However, the direction of the associations for the three measures of growth opportunities are in the opposite direction to that predicted, with only HISTDUM being significant at \( p < 0.05 \). This result may reflect the problems that large boards have in making timely strategic decisions. (Goodstein, Gautam, and Boeker, 1994; Judge and Zeithaml, 1992). That is, although larger boards may be more effective in controlling agency problems (as reflected in the significant negative relationship between board size and inside share ownership), growth firms may find it important to have boards that can make timely strategic decisions and such firms may therefore prefer smaller boards.

The need for both greater monitoring and more timely decision making in growth firms may lead to countervailing

Table 3. Pearson Correlations between Explanatory Variables (n = 110)

<table>
<thead>
<tr>
<th>Variables</th>
<th>ln(VARRET)</th>
<th>ln(HISTCON)</th>
<th>OFFER</th>
<th>GRSCORE</th>
<th>INOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(HISTCON)</td>
<td>-0.4418***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFFER</td>
<td>0.2669**</td>
<td>-0.2747**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRSCORE</td>
<td>0.7873***</td>
<td>-0.7913***</td>
<td>0.6450***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INOWN</td>
<td>-0.0780</td>
<td>0.4226***</td>
<td>-0.4296**</td>
<td>-0.4048***</td>
<td></td>
</tr>
<tr>
<td>ln(SIZE)</td>
<td>-0.2142*</td>
<td>0.3316**</td>
<td>-0.4479***</td>
<td>-0.4319***</td>
<td>0.4746***</td>
</tr>
</tbody>
</table>

*Significant at \( p < 0.05 \) (two-tailed).
**Significant at \( p < 0.01 \) (two-tailed).
***Significant at \( p < 0.001 \) (two-tailed).
Table 4. OLS Regression of Board Size on Explanatory Variables

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Expected Direction</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROWTH</td>
<td>+</td>
<td>−0.2420</td>
<td>0.5937</td>
<td>0.0270</td>
</tr>
<tr>
<td>GRSCORE</td>
<td></td>
<td>(1.105)</td>
<td>(1.747)**</td>
<td>(0.228)</td>
</tr>
<tr>
<td>HISTDUM</td>
<td>−</td>
<td>−0.0171</td>
<td>−0.0206</td>
<td>−0.0153</td>
</tr>
<tr>
<td>ln(VARRET)</td>
<td></td>
<td>(2.518)**</td>
<td>(2.855)***</td>
<td>(2.308)**</td>
</tr>
<tr>
<td>ln(SIZE)</td>
<td>NA</td>
<td>0.4497</td>
<td>0.4356</td>
<td>0.5012</td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td>(3.432)***</td>
<td>(3.406)***</td>
<td>(3.892)***</td>
</tr>
<tr>
<td>F-value</td>
<td></td>
<td>(p &lt; 0.001)</td>
<td>(p &lt; 0.002)</td>
<td>(p &lt; 0.01)</td>
</tr>
</tbody>
</table>

For all models, the coefficients and the associated t-statistics (in parentheses) are shown.

*Significant at p < 0.10 (one-tailed).

**Significant at p < 0.05 (one-tailed).

***Significant at p < 0.01 (one-tailed).

DUAL LEADERSHIP. Finally, because dual leadership is a binary variable, logit analysis is used to estimate the relationship between this variable and the explanatory variables, and the following model is estimated:

\[
\text{DUALLEAD} = a + b_1\text{GROWTH} + b_2\text{INOWN} + b_3\ln(\text{SIZE})
\]

The models are significant at p < 0.05 or better. All three measures of growth opportunities are related to dual leadership in the expected direction, with GRSCORE and ln(VARRET) being statistically significant (p < 0.01). However, the relationship for HISTDUM is weak (p < 0.10). Inside share ownership is not significantly related to dual leadership. Therefore, there is only weak support for the agency theory predictions of choice of dual leadership. Consistent with Boyd’s (1995) observation, there is also a significant negative relationship between firm size and dual leadership.

There are at least two potential explanations for the relatively weak findings for dual leadership. First, most firms (94 out of 110) in the sample have dual leadership, which makes it difficult to find a statistical relationship for this variable. Second, there are costs and benefits associated with dual leadership. It may be that the costs of dual leadership, which include agency problems associated with having a non-CEO chairperson, information costs, costs of changing the succession process, and other costs (Brickley, Coles, and Jarrell, 1994), outweigh the benefits of dual leadership. Boyd (1995) notes that dual leadership may not be appropriate under conditions of resource scarcity or high complexity. However, note that the findings on the relationship between firm characteristics and board characteristics are for a sample of N.Z. firms.
and may not be generalizable to other countries with significantly different regulatory requirements, such as the U.S.

Summary and Concluding Comments

This study examines the impact of agency problems on characteristics of boards of directors of IPO firms. After controlling for firm size, the results show that firms with lower inside share ownership tend to employ larger boards. However, contrary to expectations, there is some evidence that firms expected to have more growth opportunities tend to employ smaller boards. In addition, consistent with predictions, the proportion of outside directors is positively related to the extent of growth opportunities available to a firm and negatively related to inside share ownership. Finally, as predicted, firms with relatively more growth opportunities are likely to use dual leadership, although there is no relationship between inside share ownership and dual leadership. Overall, although there are some contrary results, the findings provide some support for arguments that firms with greater agency problems, attributable to low inside share ownership and significant growth opportunities, are likely to choose boards of directors that are more effective at mitigating these problems.
Limitations

There are limitations associated with the present study. First, in developing the study hypotheses, this study only considered the board of directors’ role in monitoring managers. Clearly, boards of directors also perform other roles. The omission of other factors unrelated to the demand for monitoring may explain some of the contrary results found in this study.

Second, some of the proxies used could capture other factors that may or may not be related to agency problems. In particular, the measurement of availability of growth opportunities is problematic. For example, variance of returns is clearly a risk measure and an imprecise measure of growth opportunities. Therefore, relationships involving this variable could reflect the impact of risk, rather than growth opportunities, although risk itself can be a source of agency problems (Simunic and Stein, 1987). Similarly, operating history may capture information asymmetry because investors in firms without operating histories must rely mainly on information provided by inside owners to evaluate the IPO; whereas, investors in firms with operating histories have the previous track record and financial information as additional sources of information. Although significant information asymmetry is a key characteristic of growth firms (Gaver and Gaver, 1995) and is an important source of agency problems (Whittred and Zimmer, 1992), relationships involving operating history may simply reflect the impact of information asymmetry rather than availability of growth opportunities. In other words, although the relationships involving the measures of growth opportunities may still reflect the impact of agency problems on board characteristics, they may not be agency problems that arise from the availability of growth opportunities. Unfortunately, problems of developing appropriate proxies for important constructs, such as the availability of growth opportunities, pervade the financial economics literature.

Finally, this study only considered the board of directors for controlling divergence of interests between owner-managers and potential investors. In reality, a firm has available other mechanisms for limiting such divergence, including incentive contracts (e.g., Haugen and Senbet, 1981) and market mechanisms (e.g., Fama, 1980). The choice between alternative mechanisms is likely to be affected by the relative costs (and benefits) of these mechanisms. If firms choose from a package of these mechanisms and where these alternative mechanisms may be used as complements or substitutes, such single-equation models as those used in this study may not adequately capture the factors that affect the use of outside directors.

Implications

The major implication from this study is that because cross-sectional differences in the level of monitoring provided by the board of directors seem to be related to the severity of agency problems faced by these firms, regulations mandating all firms to adopt certain board characteristics may result in suboptimal board structures (Hermalin and Weisbach, 1991).

For example, in the U.S., various regulatory agencies have been made rules or recommendations that require firms to use more outside directors (Wolfson, 1984). There has also been pressure from various sources for firms to have dual leadership (Brickley, Coles, and Jarrell, 1994). Requiring all firms to adopt particular board characteristics ignore that certain firms may not require the greater monitoring provided by having more outside directors, larger boards or dual leadership. This imposes unnecessary costs on firms with low agency problems. Furthermore, other board functions not considered in the present study, such as strategic decision making, may also require board characteristics that are quite different from those required for monitoring purposes. Again, mandating that firms adopt particular board structures may result in these firms having boards that are ineffective for performing other functions.

Future Research

The preponderance of firms in the present study with dual leadership can be contrasted with the findings of Brickley, Coles, and Jarrell (1994), who find that most firms in their sample have unitary leadership. This difference may be attributable to the different types of firms included in the two studies. This explanation is supported by Beatty and Zajac’s (1994) study of U.S. IPO firms, where they also find that dual leadership is the dominant form of board leadership, although the proportion of firms using dual leadership in their sample is lower than the proportion found in the present study of N.Z. IPO firms. In contrast, Brickley, Coles, and Jarrell (1994) focus on large existing firms included in a Forbes survey of executive compensation. That is, Brickley, Coles, and Jarrell’s (1994) sample firms are very different from those used in Beatty and Zajac’s and the present study.

Comparing the use of dual leadership in Brickley, Coles, and Jarrell (1994), Beatty and Zajac’s (1994), and the present study suggests that firms move from dual leadership to unitary leadership as they become more established. This lends credence to Brickley, Coles, and Jarrell’s claim that unitary leadership is the equilibrium. According to them, dual leadership “signifies normal succession periods or extraordinary, transitory events” (p. 5). Perhaps IPOs represent “extraordinary, transitory events,” and these firms move toward unitary leadership, because the benefits of unitary leadership outweigh the costs of unitary leadership. This presents potential issues for future research; for example, (1) Do IPO firms adopt dual leadership and as they mature, move toward unitary leadership?; and (2) If so, when do these changes occur, and are these changes related to changes in the costs and benefits of dual leadership as the firms’ circumstances change?

We thank the participants at the Department of Finance and Accounting Seminar Series at the National University of Singapore, and especially the two anonymous reviewers for their insightful comments and helpful suggestions that have considerably improved the paper. Funding provided by Na-
References


Rediker, Kenneth J., and Seth, Anju: Boards of Directors and Substitut-