# THE TWO-TIER BOARD SYSTEM AND UNDERPRICING OF INITIAL PUBLIC OFFERINGS: EVIDENCE FROM AUSTRIA

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**Abstract**

We study the relation between initial IPO underpricing and two-tier board structure in the Vienna Stock Exchange of Austria, where a two-tier board is mandatory for listed companies. The board ratio, defined as the size of the supervisory board to the management board, is used to capture the effect of two-tiered board on underpricing. The results show that the board ratio is negatively related with underpricing, consistent with the agency theory which predicts that more effective monitoring implied in a relatively larger supervisory board will lead to lower agency costs, and thus lower underpricing. The results are robust to the inclusion of control variables and suggest that firms seeking to raise external capital will be helped by adopting strong corporate governance standards***.

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## 1 Introduction

Previous studies have examined the effect of different board characteristics, such as the board size, board composition, and board independence on the underpricing of initial public offerings (IPOs) in the context of the single board system. A single board, which consists of executive and outside directors, is the norm under the Anglo-American system in countries such as the U.S. and the U.K. An alternative corporate governance structure is the German model of two-tier boards, also known as dual boards, which is practiced in countries such as Germany, Austria, Denmark, Estonia, France, and Indonesia. Under the two-tier board system, there are two separate boards called the supervisory board and the management board. The primary objective of this paper is to examine the relation between IPO underpricing and the two-tier board structure using a sample from the Vienna Stock Exchange in Austria where the two-tier system is mandatory.

The two-tier board system provides a unique opportunity to investigate the relation between corporate governance and firm value. Based on the agency theory, we argue that two-tier boards provide a strong mechanism for monitoring managerial decisions and behavior, leading to a reduction of costs arising from conflicts of interest between shareholders and management. In fact, the recent worldwide trend toward strengthening corporate governance has placed strong emphasis on board independence requiring that a proportion, if not a majority, of directors should be independent outsiders, in the context of unitary boards. The European model of the two-tier board provides the strongest signal that an effective monitoring system is in place because the monitoring and managing tasks are legally split between a supervisory board and a management board. We argue that a larger supervisory board relative to the management board may signal more effective monitoring and supervision and lead to lower agency costs. Due to the perceived reduction in agency costs, we hypothesize that the board ratio, defined as the size of the supervisory board divided by the size of the management board, will be negatively associated with IPO underpricing.

The major contribution of our work to the literature is to provide empirical evidence on an aspect of corporate governance that has received very little attention. Although there has been previous work on the effect of board independence and monitoring on IPO underpricing, such studies are based on single board systems and utilize the proportion of outside directors as the primary proxy for board independence and the quality of the monitoring function. Except for Hasan and Hadad (2009) which examines IPO underpricing in the context of a two-tier board structure in Indonesia, none of the available studies has examined the impact of the quality of the monitoring as reflected in a two-tier board structure.

Given the recent strong interest in the effectiveness of different corporate governance mechanisms, we believe that understanding the effects of the dual board structure on IPO underpricing is particularly important. Further, there has been a strong trend in corporate governance regulations around the world to recommend or require the inclusion of independent directors in company boards underscoring the value of board independence.[1]

The empirical results of the paper show that the board ratio is negatively related with underpricing, confirming the prediction based on agency theory, which posits that more effective monitoring implied in a relatively larger supervisory board will lead to lower agency costs, and thus lower underpricing. The results are robust to the inclusion of important control variables such as ownership concentration, offer size, investor sentiment, and industry.

The rest of this paper is organized as follows. Section 2 provides an overview of the two-tier board structure in Austria. Section 3 discusses the related literature. The data and methodology are outlined in Section 4, while the results are discussed in Section 5. The conclusions of the study are presented in Section 6.

## 2 Overview of the two-tiered board structure in Austria

The Austrian Code of Corporate Governance (the "Code") is based on the Austrian corporate law, securities law, and capital market law, as well as on the tenets of the OECD Principles of Corporate Governance. The main objective of the Code is to establish a system of management and control of companies that is accountable and geared to creating sustainable long-term value. Compliance with the Code is mandatory for Austrian companies that are admitted to the Prime Market of the Vienna Stock Exchange. Accordingly, exchange-listed firms in Austria must have a two-tiered board structure, which consists of a supervisory board and a management board. A few salient features of the governance code are described below.[2]

### *2.1 Supervisory board*

The supervisory board consists of independent, non-executive directors and employee representatives. The directors are elected by the shareholders, while employees of a company that has a works council are entitled to appoint their representatives to the supervisory board. A works council is mandatory in companies with at least five employees. For every two supervisory directors elected by the shareholders, the works council has the right to appoint one of its members to the supervisory board. If the number elected by the shareholders is uneven, the works council has the right to appoint an additional member. The size of the supervisory board is defined in the articles of incorporation of each firm with the minimum number being three members (excluding employee representatives) and the maximum number being 20 members (excluding employee representatives). The rights and obligations of employee representatives are the same as those of shareholder representatives. The supervisory board appoints its own chairman. The supervisory board is responsible for appointing and terminating the members of the management board, overseeing and providing support to the management board, and approving important business transactions. Further, the chairperson of the supervisory board is expected to regularly communicate with the chairperson of the management board in regard to strategies, the course of business, and the risk management of the firm.

### *2.2 Management board*

The management board is responsible for managing the firm taking into consideration the interests of the shareholders, employees, and the public good. This board consists of several persons such as the chief executive officer, chief operating officer and the chief financial officer with one member acting as the chairperson. The number of directors in each board is stated in the articles of incorporation of each company. The minimum number of directors in the management board is usually one while there is no maximum. Banks and other related businesses must have at least two directors.

### *2.3 Cooperation between supervisory board and management board*

The management board is responsible for providing the supervisory board comprehensive information in a timely manner on relevant business matters including an assessment of the risks and the risk management in place at the company and at group companies in which it has major shareholdings. The management board is required to immediately inform the chairperson of the supervisory board about significant business developments. The management board formulates the strategic direction of the enterprise with the supervisory board and periodically discusses the progress made on implementing the strategy.

### *2.4 Conflicts of interest*

The members of the management board are required to disclose to the supervisory board any material

[1] For example, the recommendations for independent directors in listed company boards include a majority of independent directors (NYSE), at least one-third of the board (China, Hong Kong, India, Singapore, Thailand,), at least one independent director or one statutory auditor (Japan), at least 25% outside directors (Korea), at least two independent directors or one-third of the board, whichever is higher (Malaysia), at least two and not less than 20% (Taiwan), at least 30% independent commissioners in the board of commissioners (Indonesia).

[2] Please see "Austrian Code of Corporate Governance"(January 2010) for full details. Our summary is largely based on this document.

personal interests in transactions of the company and group companies as well as any other conflicts of interest. Furthermore, they must also immediately inform the other members of the management board of such conflicts. Transactions which may raise issues of potential conflict of interest must be approved in advance by the supervisory board. Members of the supervisory board cannot be members of the management board. Supervisory board members may not assume any functions on the boards of other enterprises which are competitors of the company.

### *2.5 Qualifications and independence of the supervisory board*

When electing the supervisory board, shareholders are expected to ensure a balanced composition with respect to the structure and the business of the company as well as the expertise and the personal qualifications of the supervisory board members. A majority of the supervisory board members should be independent of the company and its management board. Independence is defined as not having any business or personal relations to the company or its management board that constitute a material conflict of interests. There are also several clear guidelines in assessing the independence of supervisory board members. They are listed below.

1. The member should not have served as a member of the management board or as a management-level staff of the company or one of its subsidiaries in the past five years.
2. The member should not have maintained any significant business relations with the company or one of its subsidiaries in the past year.
3. The member should not have acted as auditor of the company or have owned a share in the auditing company or have worked there as an employee in the past three years.
4. The member should not be a member of the management board of another company in which a member of the management board of the company is a supervisory board member.
5. A member may not remain on the supervisory board for more than 15 years, except in the case of members who are shareholders with a direct investment in the company or who represent the interests of such a shareholder.
6. The member should not be closely related to a member of the management board.
7. In the case of companies with a free float of more than 20%, the shareholder representatives of the supervisory board should include at least one independent member who is not a shareholder with a stake of more than 10% or who represents such a shareholder interest. In the case of companies with a free float of over 50%, at least two members of the supervisory board must meet these criteria.
8. The chairperson of the supervisory board should not be the former chairperson of the management board unless a period of two years has expired between the termination of the function as chairperson of the management board and the start of the function as chairperson of the supervisory board.

These guidelines ensure the independence of the supervisory board and hence provide for effective monitoring of the management board.

## 3 Related literature

### *3.1 Corporate governance and firm value*

There are two strands of corporate governance research that are very closely related to the issue of IPO underpricing: studies that relate the firm value to (i) board independence, and (ii) CEO duality. We discuss the main findings of this literature and draw implications for IPO underpricing in the context of a two-tier board structure.

#### *3.1.1 Board independence*

Agency theory suggests that potential conflicts of interests between shareholders and managers could lead to loss of shareholder wealth and, therefore, it is important to have effective mechanisms for corporate control (Jensen, 1993). One such control mechanism is to have a strong board of directors to monitor the management. A board that is comprised predominantly of outside directors may signal that effective monitoring and control systems are in place, and non-executive directors are perceived to be better monitors of managerial discretion (e.g., Fama and Jensen, 1983; Shleifer and Vishny, 1997). The perception of effective monitoring may be particularly critical for firms issuing new securities, and firms that are perceived as having more effective governance structures tend to be more positively received by the investment community (Gompers, 1995).

There is also a large body of empirical evidence that supports the view that board independence plays an important role in effective monitoring of management. Rosenstein and Wyatt (1990) find that the market reacts positively to the appointment of outside directors. Better monitoring can benefit the shareholders through more reliable financial statement information. Board independence has been found to be associated with lower financial statement fraud (Beasley, 1996; Uzun et al., 2004), lower likelihood of accounting enforcement actions by the SEC for GAAP violations (Dechow et al., 1996), improved timeliness and informativeness of earnings (Bushman et al., 2004; Vafeas, 2000), higher announcement returns for bidding firms in tender offers (Byrd and Hickman, 1992), positive market reaction to adoption of poison pills by firms (Brickley et al., 1994), and higher likelihood of CEO replacement following poor performance (Weisbach, 1998).[3]

[3] Hearn (2013) examines the impact of corporate governance on director compensation in West African IPO firms and finds that the increased presence of true independent nonexecutives is more likely to adopt best governance best practices.

#### *3.1.2 CEO dualism*

The literature on CEO dualism, where the CEO also holds the position of the chairman of the board rather than splitting the positions between two people, also provides important implications for the importance of the two-tier board in reducing agency conflicts. Separating the CEO and chairman positions increases the independence and the strength of the board (Jensen and Meckling, 1976; Fama and Jensen, 1983). Studies show that CEO duality leads to higher CEO compensation (Core et al., 1999), a weak relationship between CEO turnover and firm performance (Weibach, 1988; Goyal and Park, 2002), and a negative market response to acquisition announcements (Grinstein and Haribar, 2004). Masulis et al. (2007) find that acquiring firms that separate the positions of CEO and chairman experience higher abnormal announcement returns. Huang and Tompkins (2010) show that investors react positively to announcements of seasoned equity offerings by U.S. firms in which different people hold the CEO and chairman positions. Chahine and Tohme (2009) find higher underpricing in IPO firms that have CEO duality. Thus, the CEO dualism literature largely supports the view that stronger corporate governance is viewed positively by investors owing to reduction of agency problems.

The major implication from the literature on board independence and CEO dualism, discussed above, is that strong boards, which are characterized by independent directors and separation of CEO and chairman positions, are perceived as providing effective monitoring of the management, thus leading to lower agency costs. In the context of a two-tier board system, the quality of the signal that an effective monitoring system in place is very clear and strong since the monitoring and managing tasks are legally split between a supervisory board and a management board. The supervisory board consists of non-executive outsiders who are better able to independently monitor the management board, which consists of executive insiders. A larger supervisory board relative to the management board may signal more effective monitoring and supervision and leads to lower agency costs and, hence, lead to lower underpricing. Based on the agency theory, we hypothesize that a larger board ratio, which is defined as the ratio of the size of the supervisory board to the size of the management board, will be associated with lower underpricing.

### *3.2 Other variables influencing IPO underpricing*

#### *3.2.1 Ownership retention and concentration*

Signaling theories suggest that issuers underprice IPOs to signal their favorable private information about the value of the firm to uninformed investors (Allen and Faulhaber, 1989; Grinblatt and Hwang, 1989; Welch, 1989). Issuers use the level of retained ownership by original shareholders (Leland and Pyle, 1977) or ownership concentration (Allen and Faulhaber, 1989) to signal firm quality. The information contained in the signal leads investors to place a higher value to high-quality issuers than low-quality issuers resulting in a higher post-IPO price. However, signaling through underpricing is costly because it represents a wealth transfer from initial owners to new investors. The initial owners expect to recoup the costs through subsequent equity offerings. Thus, according to signaling explanations, initial returns should be positively related with retained ownership as well as with subsequent seasoned equity offerings. There is empirical evidence of positive association between retained ownership and underpricing (see Ljungqvist,1997; Howton et al., 2001; Bradley and Jordon, 2002). However, the evidence in support of the major implications of signaling theories in relation to IPO underpricing is mixed (For example, Garfinkel 1993; Jagadeesh et al., 1993; Michaely and Shaw, 1994; Levis, 1995, Spiess and Pettway, 1997; Espenlaub and Tonks, 1998).

Agency models argue that underwriters have an incentive to underprice issues to minimize their marketing efforts (Baron and Holmstrom, 1980; Baron, 1982). One way to mitigate agency conflicts between issuers and underwriters is to monitor underwriters' marketing and pricing behavior directly. Ljungqvist and Wilhelm (2003) argue that dispersed pre-IPO ownership reduces the incentives for shareholders to monitor the underwriters, resulting in less monitoring and greater underpricing. They find that initial returns are larger when insider ownership stakes are smaller and more fragmented. Further, large shareholders mitigate the agency conflicts between shareholders and managers in that they have a strong incentive to monitor managers owing to their significant cash flows rights associated with large holdings, which leads to interest alignment (Shleifer and Vishny, 1997). Brennan and Franks (1997) finds that underpricing is associated with oversubscription which leads to diffused outside shareholding and, and as a result, reduced monitoring. Stoughton and Zechner (1998) finds that the value of a firm's IPO is determined by the ownership structure resulting from the offering mechanism. There is a large body of evidence that supports the view that large shareholders play an active and beneficial role in corporate governance and are able to provide effective monitoring of the management. This better monitoring by large shareholders owning to interest alignment will be perceived as beneficial by investors. As a result, the issuer will be able to sell shares at a higher price leading to lower underpricing. Thus, agency explanations predict a negative relation between ownership concentration and underpricing. [4]

[4] Previous theoretical and empirical literature includes a number of other potential explanations for IPO. Prominent among these are explanations based on institutional features such as legal liability (Lowry and Shu, 2002), price stabilization (Ruud, 1993), book building (Benveniste and Spindt, 1989), and tax arguments (Rydqvist, 1997).

#### 3.2.2 Offer size

Beatty and Ritter (1986), based on the asymmetric information model of Rock (1986), present a model in which greater the ex-ante uncertainty about the value of the issue, the greater is the expected underpricing. Using sales in the 12-month period prior to the IPO as a proxy for risk, Ritter (1984) finds that higher-risk (lower sales) issues have higher average initial returns than lower-risk (higher sales) issues. Beatty and Ritter (1986) use gross proceeds as one of the proxies to capture ex-ante uncertainty because small issues are considered more risky than large offerings. Consistent with the theory, they find that the inverse of gross proceeds is significantly positively related with underpricing. Issue size has been used as a proxy for ex-ante uncertainty in other studies as well (e.g., Kiymaz, 2000; Ljungqvist, 1997). Thus, the ex-ante uncertainty hypothesis predicts that the smaller the issue size, the larger will be the initial underpricing.

#### 3.2.3 Investor sentiment

Another potential factor influencing underpricing is investor sentiment before the first day of trading of an IPO. Ritter (1984) calls this the institutional lag hypothesis because of the time gap between when the offer price is determined and the new issue is traded. Investor sentiment is defined as the general attitude of investors in the aggregate about the short-term direction of the overall market. Positive sentiment, which indicates that investors expect the overall market to trend upward, is likely to increase the demand for the IPO stocks on the first day of trading resulting in price appreciation. Similarly, negative sentiment, which shows that investors expect the overall market to decline in the short-term, is likely to diminish the enthusiasm for the IPO on the first day of trading. Thus, investor sentiment and underpricing is expected to be positively related.

## 4 Data and methodology

### 4.1 Sample description

Trading in the Vienna Stock Exchange is classified into three segments: the official market, the semi-official market, which is also called the second regulated market, and the third market. These market segments differ in regard to the quality of the admission criteria and continuing disclosure requirements. The official market imposes higher thresholds than the second regulated market in regard to the nominal value of shares, the free float in terms of the value and the number of shares, period of existence, and the number of years of financial statements. Table 1 shows a comparison of admission criteria between the official market and the second regulated market.

In addition, the companies listed in the official and the second regulated markets have to fulfill continuing disclosure through the publication of audited financial statements, interim and quarterly reports, and reporting requirements in the areas of insider dealings, directors' dealings, changes in major holdings, and stock buyback programs, among other things. Trading in financial instruments on the third market, however, does not require any formal admission procedures, and the obligations imposed on issuers in the official market and the second regulated market do not apply to the financial instruments traded on the third market. This also means that the requirement for having a two-tiered board does not apply to issues in the third market.

We obtained data on all common share IPOs that took place on the official and the semiofficial markets of the Vienna Stock Exchange during the period from 2000 to 2010. The source of the data is the Vienna Stock Exchange. There were no IPOs in these two market segments in 2008 through 2010. The IPOs in the third market were not considered because they do not have two-tiered boards. There were a total of 32 common share IPOs in the official and semi-official market segments during the sample period. We eliminated two issues due to the lack of data on the board of directors. This resulted in a final sample size of 30 issues.[5]

The data collected in respect of each issue include the first day of trading, offer price, first- day closing price, number of shared offered, the issuer's industry, ownership percentages of foundations, corporations, and individuals, the number of directors in the supervisory board and the number of directors in the management board, and trading segment. Traditionally, the fixed- price method has been used for small issues, and the book building method has been used to set the final offer price in large issues.

### 4.2 Testing the relation between corporate governance and underpricing

The initial return (IR) is calculated as the difference between the first-day closing price and the offer price as a percent of the offer price. This is given by equation (1) below:

$$IR_i = \left( \frac{\text{First-Day Close}_i - \text{Offer Price}_i}{\text{Offer Price}_i} \right) 100 \qquad (1)$$

where i represents the $i^{th}$ issue.

Ljungqvist (2007) provides an excellent discussion of all competing explanations.

[5] We recognize the sample size limitation. However, this sample represents all the IPOs, except for two issues, that came to the Austrian market under the two-tier system.

**Table 1.** Criteria for admission to the Vienna Stock Exchange

| | Official Market | Second Regulated Market |
|---|---|---|
| Total nominal value | Min. EUR 2.9m | Min. EUR 725,000 |
| Free float nominal value | Min. EUR 725,000 (par value shares) | Min. EUR 181,250 |
| Free float in no. of shares | Min. of 10,000 no-par-value shares | Min. of 2,500 no-par-value shares |
| Period of existence | Min. of 3 years | Min. of 1 year |
| Financial statements | For the three preceding full business years | For the preceding full business year |

Source: Vienna Stock Exchange

We first examine the average initial returns by issue year, issuer's industry, and the board ratio. Then, we investigate the relation between the first-day IPO underpricing and the board ratio through the regression of initial returns on the board ratio after controlling for ownership concentration, offer size, investor sentiment, and industry effects. The relation between initial returns and independent variables is first estimated one variable at a time, which will give a clear idea as to the importance of a specific variable in explaining underpricing. Then, multivariate regressions models are estimated using the board ratio and all the control variables. This will shed light into the ability of the board ratio to explain underpricing after controlling for ownership concentration, issue size, sentiment, and industry as well as to uncover any issues of multicollinearity. The multivariate regression model takes the following form:

$$IR_i = \alpha + \beta_1 BoardRatio + \beta_2 OwnCon + \beta_3 OSize + \beta_4 Sentiment + \sum_{i=5}^{10} \beta_i \, Industry\ Dummy_j + \varepsilon_i \quad (1)$$

The *BoardRatio,* defined as the ratio of the supervisory board size to the management board size, captures the impact of the two-tiered board on underpricing. We hypothesize that a larger board ratio reflects stronger board independence, and as explained earlier, agency explanations predict a negative relation between underpricing and the *BoardRatio.* The variable *OwnCon* represents the ownership concentration measured as the sum of the percentage of shareholdings of large shareholders which include private foundations, large individual block holders and corporations. Large shareholdings are defined as ownership in excess of 5% of total share capital. The signaling explanations predict a positive relation whereas agency explanations predict a negative relation between underpricing and ownership concentration. The effect of the issue size on initial returns is captured through *OSize,* which is the natural logarithm of proceeds of the issue. The uncertainty hypothesis predicts a negative relation between issue size and underpricing. To incorporate the impact of investor sentiment on initial returns, consistent with Kiymaz (2000), Ljungqvist (1997) and Kunz and Aggarwal (1994), we define the *Sentiment* variable as the cumulative market return over the three-month period before the first day of trading of the IPO. The market return is computed using the Vienna Stock Exchange Austrian Traded Index (ATX). Positive market returns capture positive investor sentiment, and negative cumulative market returns proxy for negative investor sentiment. The investor sentiment hypothesis predicts that sentiment and underpricing are positively related.

The sample comprises of issues from seven industries -investment, high tech, real estate, banking, industrial, entertainment, and utilities. In order to control for industry fixed effects, we include six industry dummy variables - *Inve* (investment), *Htech* (high tech), *Real* (real estate), *Bank* (banking), *Indu* (Industrials), and *Ente* (Entertainment) - in the multivariate model. Each industry dummy takes the value of 1 for the industry and 0 otherwise.

The treatment of outliers becomes particularly important considering the small sample size of the study. Deleting outliers further reduces the sample size. In order to deal with the potential impact of outliers, we winsorized the top 5% and bottom 5% of initial returns before estimating the regression models. The empirical results based on winsorized, unwinsorized, and outlier- deleted samples are almost identical lending confidence to the validity of the results. We report results based on the winsorized initial returns. The models are estimated using the Ordinary Least Squares method and heteroscedasticity-consistent t-statistics are used to assess the statistical significance of the regression coefficients.

## 5 Empirical results

### *5.1 Descriptive statistics*

Table 2 provides descriptive statistics on key variables used in this study. The average initial underpricing in the Austrian sample of IPOs is 3.02%. This is much lower than the magnitude of underpricing reported in most other markets. The *BoardRatio* has a mean of 2.10 and a median of 2.00. This suggests that, on average, the supervisory board has about twice as many directors as the management board. *OwnCon* indicates that, on average, about 77% of the shares is owned by foundations, corporations and large individual block holders with more than 10% shares, indicating a high degree of concentration of ownership. The natural log of average issue size is 4.10, which translates into about €71 million. Over the three months preceding IPOs, the overall market advanced by 5.09%, on average, consistent with IPOs occurring after a period of positive market sentiment.

**Table 2.** Descriptive statistics

| Variable | Mean | Median | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| IR (%) | 3.02 | 0.56 | 11.86 | -19.47 | 31.25 |
| BoardRatio | 2.10 | 2.00 | 0.78 | 1.00 | 4.50 |
| OwnCon (%) | 77.10 | 85.67 | 24.71 | 0.00 | 100.00 |
| OSize | 4.10 | 4.20 | 1.60 | 1.28 | 7.18 |
| Sentiment (%) | 5.09 | 5.68 | 5.89 | -6.55 | 14.09 |

*IR* is the initial return which is the difference between the first-day closing price and the issue price as a percent of the issue price. *BoardRatio* measures the relative board size and is the ratio of the number of directors in the supervisory board to the number of directors of the management board. *OwnCon* is the ownership concentration which is measured as the ownership percentage of foundations, corporations and large individual holders with more than 10% before the IPO. *OSize* represents the offer size and is calculated as the natural logarithm of total proceeds of the issue. *Sentiment* is the market return over the three-month period preceding the first day of trading of each IPO. The number of observations is 30.

**Table 3.** Average initial returns by year

| Year | Number of Issues | Average initial return | |
|---|---|---|---|
| | | % | *t*-stat |
| 2000 | 6 | -0.85 | -0.66 |
| 2001 | 3 | -2.93 | -0.85 |
| 2002 | 1 | -4.64 | -0.63 |
| 2003 | 4 | -0.95 | -0.66 |
| 2005 | 5 | 11.95 | 1.52 |
| 2006 | 6 | 1.11 | -0.38 |
| 2007 | 5 | 9.27 | 1.12 |

Initial return is the difference between the first-day closing price and the issue price as a percent of the issue price. Two sample *t*-statistics for testing the difference between average initial returns in a given year and the overall average initial returns are shown. ***, ** and * indicate statistical significance at the 0.01, 0.05, and 0.10 level, respectively. The number of observations is 30.

The distribution of initial returns by year (Table 3) indicates that initial returns were negative during the period from 2000 to 2003 and positive thereafter. The largest average underpricing of 11.95% was recorded in 2005, followed by 9.27% in 2007. However, none of the annual average initial returns is significantly different from the overall average underpricing. The industry distribution of IPOs (Table 4) shows that close to 50% of the the issues came from high tech and real estate sectors. The banking issues resulted in the highest average underpricing of 11.95% among the industries. The entertainment industry produced the lowest initial returns of -14.81%, which is significantly below the overall average. Except for the industrial and entertainment sectors, where initial returns are negative, all other sectors show evidence of underpricing.

**Table 4.** Average initial returns by industry

| Industry | Number of Issues | Average initial return | |
|---|---|---|---|
| | | % | *t*-stat |
| Investment | 2 | 0.50 | -0.30 |
| High Tech | 7 | 1.15 | -1.67 |
| Real Estate | 7 | 3.75 | 0.15 |
| Banking | 2 | 11.95 | 0.99 |
| Industrial | 6 | -0.77 | -0.77 |
| Entertainment | 3 | -14.81 | -2.55** |
| Utilities | 3 | 2.61 | -0.06 |

Initial return is the difference between the first-day closing price and the issue price as a percent of the issue price. Two sample t-statistics for testing the difference between average initial returns in a given industry and the overall average initial returns are shown. ***, ** and * indicate statistical significance at the 0.01, 0.05, and 0.10 level, respectively. The number of observations is 30.

### *5.2 Univariate analysis of the BoardRatio*

Prior to carrying out the multivariate analysis, Table 5 shows univariate results on the key corporate governance variable - *BoardRatio*. In order to understand the underpricing across different levels of relative board sizes, we classify the issues into two categories relative to the median *BoardRatio* of 2.0. In Panel A, the cases where the *BoardRatio* is less than or equal to 2.0 are classified as low, and those above 2.0 are classified a high. The supervisory board is one-and-half times as large as the management board in the low BoardRatio group whereas it is almost three times larger in the high BoardRatio group. Interestingly, the average underpricing of issues in the low BoardRatio group is almost 5%, which is 4.2% higher than the underpricing in the high BoardRatio group. This result clearly suggests that IPOs of companies with a larger supervisory board relative to the management board are substantially less underpriced. This result is consistent with the prediction based on the agency theory, which posits that the perceived better monitoring and resulting lower agency costs should lead to lower underpricing.

**Table 5.** Initial returns by board ratio

| Issue size | Average initial return (%) | Standard deviation of initial returns (%) | Average board ratio | Number of IPOs | |
|---|---|---|---|---|---|
| | | | | Number | % |
| Low: BoardRatio ≤ 2.0 | 4.98 | 11.63 | 1.5 | 16 | 53 |
| High: BoardRatio > 2.0 | 0.77 | 12.15 | 2.7 | 14 | 47 |
| Low – High | 4.21 | | | | |

*BoardRatio* measures the relative board size and is the ratio of the number of directors in the supervisory board to the number of directors of the management board. The median Board Ratio is 2. Board ratios up to 2 are classified as low, and above 2 as high. The number of observations is 30.

**Table 6.** Correlations

| | *BoardRatio* | *OwnCon* | *OSize* | *Sentiment* |
|---|---|---|---|---|
| *IR* | -0.39 | 0.18 | 0.03 | 0.18 |
| *BoardRatio* | | -0.08 | 0.11 | -0.18 |
| *OwnCon* | | | 0.24 | 0.45 |
| *OSize* | | | | -0.10 |

This table shows the correlation coefficients. *IR is* the winsorized initial returns. *BoardRatio* measures the relative board size and is the ratio of the number of directors in the supervisory board to the number of directors of the management board. *OwnCon* is the ownership concentration which is measured as the ownership percentage of foundations, corporations and large individual holders with more than 5% before the IPO. *OSize* represents the offer size and is calculated as the natural logarithm of total proceeds of the issue. *Sentiment* is the market return over the three-month period preceding the first day of trading of each IPO.

**Table 7.** Regression of initial returns on corporate governance and control variables

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| *Constant* | 0.15<br>(2.70)** | 0.09<br>(1.10) | 0.13<br>(1.93)* | 013<br>(2.28)** | 0.12<br>(1.23) |
| *BoardRatio* | -0.06<br>(-2.35)** | 0.05<br>(-2.29)** | -0.06<br>(-2.35)** | -0.06<br>(-2.26)** | -0.05<br>(-2.99)** |
| *OwnCon* | | 0.07<br>(0.99) | | | -0.04<br>(-0.67) |
| *OSize* | | | 0.01<br>(0.37) | | 0.01<br>(1.64) |
| *Sentiment* | | | | 0.21<br>(0.65) | 0.31<br>(0.89) |
| Industry Effects | No | No | No | No | Yes |
| Adj-$R^2$ | 0.12 | 0.11 | 0.09 | 0.10 | 0.29 |

This table shows the results of OLS regressions where the dependent variable is the winsorized initial returns. BoardRatio measures the relative board size and is the ratio of the number of directors in the supervisory board to the number of directors of the management board. OwnCon is the ownership concentration which is measured as the ownership percentage of foundations, corporations and large individual holders with more than 5% before the IPO. OSize represents the offer size and is calculated as the natural logarithm of total proceeds of the issue. Sentiment is the market return over the three-month period preceding the first day of trading of each IPO. The number of observations is 30. The t-statistics calculated using heteroscedasticity-consistent standard errors are shown in parentheses. ***, ** and * indicate statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

### *5.3 Multivariate Regression results*

Table 6 shows the correlations among key variables. The *BoardRatio*, which proxies for the monitoring effectiveness, is negatively related with initial returns with a correlation of -0.39. Table 7 presents the results of the regression of initial returns on the *BoardRatio* and control variables. The *BoardRatio* is strongly negatively related with initial returns at 5% level of significance. Model 2 shows that ownership concentration is not related to underpricing. Both offer size and market sentiment are not related to initial returns either. In Model 5, we include the control variables including the industry fixed effects. The results clearly show that the strong negative relation between initial returns and the *BoardRatio* remains robust to the inclusion of control variables.

Overall, the key finding if this study is that the board ratio is negatively related with underpricing. This result is consistent with the implications of the board independence and dualism literature for underpricing of IPOs of firms with the two-tier board structure.

## 6 Conclusions

This study examines the relation between underpricing of IPOs and the two-tier board structure using a sample of IPOs from the Vienna Stock Exchange of Austria. We employ the ratio of the supervisory board size to the management board size as a variable to capture effects of two-tiered board structure. The study finds that the relative board size is negatively related with underpricing, confirming the prediction based on the agency theory, which posits that more effective monitoring implied in a relatively larger supervisory board will lead to lower agency costs, and thus lower underpricing. The results are robust to the inclusion of control variables. The evidence indicates that firms seeking to raise external capital will be helped by adopting strong corporate governance standards. Regulations which mandate effective corporate governance will help foster better access to capital, especially for start-up firms.

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