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RESEARCH NOTES AND COMMENTARIES

INFORMATION ASYMMETRY AND INVESTOR VALUATION OF IPOs: TOP MANAGEMENT TEAM LEGITIMACY AS A CAPITAL MARKET SIGNAL

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The condition of information asymmetry between current owners and potential IPO investors creates a context wherein the legitimacy of the top management team (TMT) may serve as a valid signal of value to potential investors. The results confirm our hypotheses that TMT legitimacy is negatively correlated with post-IPO stock value run-up. Our results support a previously unexplored view of the TMT as an important signal of value in IPOs, and suggest that dual benefits accrue to the TMT selection process in IPO firms.

INTRODUCTION

The condition of information asymmetry between current security owners and potential IPO investors creates a context wherein opportunistic behavior on the part of *ex ante* owners is an important consideration in investors' valuation, and thereby determines the signals[1] utilized by investors to gauge economic value (Carter and Manaster, 1990; Leland and Pyle, 1977; Spence, 1976). While the extant literature has identified a number of such signals, research has yet to investigate the potential role of the top management team (TMT) as a valid signal in the IPO process. Following prior research, we argue that the legitimacy of the TMT will be directly linked to investor evaluation of firms at IPO due to investors' association of managerial credibility and organizational economic potential under conditions of uncertainty (Stuart, Hoang, and Hybels, 1999; Podolny, 1994; D'Aveni, 1990). Our empirical test of the impact of TMT legitimacy on IPO underpricing supports the proposition that TMT legitimacy is an important signal to investors who are attempting to avoid the opportunistic behavior of *ex ante* security owners at IPO.

Keywords: top management team; information asymmetry; initial public offering; signaling
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[1] 'Signals are observable firm characteristics which are directly controllable by the firm at the time of the equity issue' (Downes and Heinkel, 1982).

THEORY AND HYPOTHESES

An IPO is characterized by the condition of information asymmetry, wherein potential investors possess substantially inferior knowledge relative

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to the owners of the security (Carter and Manaster, 1990; Leland and Pyle, 1977; Ross, 1977; Stuart *et al*., 1999). Current owners of the firm have access to extensive information regarding the internal operation of the firm, its economic potential, and the industriousness of its management and employees (Leland and Pyle, 1977). In contrast, public market investors have access to relatively limited knowledge regarding the IPO (Carter and Manaster, 1990; Ross, 1977; Stuart *et al*., 1999), and a number of factors leave substantial scope for information asymmetry and the provision of less than perfect information to potential investors (Downes and Heinkel, 1982; Leland and Pyle, 1977; Ross, 1977). First, most organizations are a complex creation of leadership, culture, technology, products, and strategy, placed within a market and industry context that adds to that complexity. Second, most of the information received by investors is screened by the current owners, who are incented to misrepresent the firm to potential investors (Downes and Heinkel, 1982). Third, although owners are legally compelled to provide accurate information, laws cannot require full disclosure of all material information. Finally, the potential returns to inaccurate or incomplete disclosure can be substantial, and the condition of information asymmetry in the IPO capital market produces the potential for opportunistic behavior on the part of the sellers of the security.

As a result of the condition of information asymmetry at IPO, potential investors will tend to ignore certain information released by the firm because it is tainted by incentives for misrepresentation or omission (Riley, 1979; Spence, 1976). Thus, investors would be expected to be cautious of the claims associated with the IPO, and would be particularly responsive to valid signals of value (Downes and Heinkel, 1982; Spence, 1976). 'Almost by definition, when the quality or value of commodities potentially exchanged is difficult to discern, actors cannot compare exchange opportunities by focusing on the commodities themselves' (Podolny, 1994). Thus, investors will rely inordinately on signals of economic value that they perceive as more genuine, and disregard those factors deemed suspicious or manipulable. Furthermore, the validity of a signal in the minds of investors is dependent on the inherent credibility of that signal (Spence, 1976) or, more specifically, 'it must be unprofitable for sellers of low quality products to imitate it [the signal]. That is, high quality sellers must have lower costs for signaling activities' (Spence, 1976: 592). Thus, research has shown that the percentage of retained ownership (Downes and Heinkel, 1982; Leland and Pyle, 1977), pre-IPO capital investment and debt levels (Ross, 1977), and reputation of the investment banker (Carter and Manaster, 1990) are linked to IPO valuation.

We argue that research has largely ignored one of the most important signals of firm value at IPO, the legitimacy of the top management team (TMT). Broadly speaking, legitimacy may be considered 'a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions' (Suchman, 1995: 571). For the study of firms at IPO, legitimacy would be the perception that the IPO firm would act in a manner consistent with shareholder wealth generation, as well as trust that the firm's economic potential is accurately reflected in information provided to the investors. Theory suggests that legitimacy is particularly important in new ventures as it is critical to the ability to acquire other resources, including capital (Zimmerman and Zeitz, 2002).

As a fundamental driver of organizational norms, values, decision-making and action, the TMT can convey legitimacy on the organization. TMT legitimacy in a pre-IPO firm may be viewed as the extent to which the composition, characteristics, or behaviors of the TMT contributes to the legitimacy of the firm. We expect TMT legitimacy to influence investors' perception of the firm and thereby act as a valid signal, because investors who are unable to discern the venture's quality from economic disclosure turn to more social indicators of value (Podolny, 1994). Thus, within the context of an IPO, investors are likely to focus on indicators such as the status of the exchange partner (Podolny, 1984), strategic alliance partners (Stuart *et al*., 1999), managerial prestige (D'Aveni, 1990), and legitimacy (Zimmerman and Zeitz, 2002).

TMT legitimacy represents a credible indicator of value because investors know that the most legitimate managers will avoid ventures that lack viable business strategies and substantial economic potential. With some exception, legitimate top managers avoid such collaborations because: (1) their time is likely better spent elsewhere (making it more costly for them to engage a low-quality venture); (2) like investment bankers, they risk

damage to their longer-term reputation by associating with firms that do not have viable strategies, but are attempting to position themselves as such; and (3) they have often allocated their own financial assets into the firm and, like other investors, hope to gain a substantial return on their investments. Thus, the multi-period career game pursued by the best managers reduces the probability that such managers will allow themselves to be employed in lesser, opportunistic firms. To the extent that IPO investors are aware of the importance of managers' self-reputation, they will view the legitimacy of the TMT as a valid indicator of the venture's economic potential. Thus:

> *Proposition: The legitimacy of a venture's top management team will serve as a signal of firm value to IPO investors.*

Research has found support for the existence of a relationship between firm performance and characteristics of the TMT such as TMT size (Cooper and Bruno, 1977), education (Bantel and Jackson, 1989), and TMT functional heterogeneity (Bourgeois and Eisenhardt, 1988). Entrepreneurship scholars have also linked firm growth to team size, previous joint work experience (Eisenhardt and Schoonhoven, 1990), functional heterogeneity (Weinzimmer, 1997), and education (Bhide, 2000). Given the nature of these findings, we would expect the characteristics of the TMT to be related to the valuation of firms at IPO, regardless of any signaling effects. As a result, verification of the signaling proposition requires us to differentiate signaling effects of the TMT from effects on IPO value which are related to investors' expectation of higher performance in firms led by better managers. To accomplish this, we employ finance theory on signaling and underpricing of firms at IPO.

Past empirical research has shown a substantial difference between the IPO subscription (offering) price (i.e., fixed pre-IPO price locked in for insiders and investment banks) and the secondary market (opening) price (i.e., Miller and Reilly, 1987). This difference is referred to as underpricing, or run-up, and is so common that many finance researchers consider it to be an equilibrium phenomenon (Carter and Manaster, 1990). Of course, underpricing is critical to the issuing firm as lower offer prices result in less retained wealth for the initial shareholders (Certo *et al*., 2001). But as an equilibrium phenomenon, underpricing is expected to be a function of the information asymmetry between current owners and potential investors (the higher the information asymmetry, the greater the underpricing and run-up). Thus, Carter and Manaster (1990: 1046) argue that, 'IPO underpricing compensates uninformed investors for the risk of trading against superior information.' For present purposes, this implies that underpricing is an indicator of the information asymmetry existing between the issuer and the investors and that it can be used as a gauge of the extent to which certain signals are utilized by investors.

In an influential study, Carter and Manaster (1990) develop and test a model of the effects of underwriter reputation on underpricing at IPO. They find a negative relationship between underwriter reputation and underpricing and conclude that underwriter reputation represents a signal to the market which acts to reduce information asymmetry and therefore underpricing. Applying Carter and Manaster's theoretical and empirical model, we expect that the legitimacy of the TMT will be negatively related to run-up, and that evidence of this provides support for the contention that TMT legitimacy acts as a valid signal to potential investors. Thus:

> *Hypothesis 1: The legitimacy of a venture's top management team will be negatively related to IPO underpricing (run-up).*

METHODOLOGY

We drew a random sample of firms from the 884 U.S. IPOs executed from January 1, 1998 through December 31, 1999. The initial sample of 248 firms was reduced to 221 due to the elimination of firms that had (1) missing data for one or more of the variables, or (2) been founded more than 15 years prior to the IPO. Older firms were eliminated to focus on the typical IPO firm that, over a 'normal' period of time, progressed from start-up, through an initial growing period, and then to a public offering. The primary sources of data were the Securities Data Company (SDC) new issues database, the IPO prospectus of each firm, and the CRSP database.

Since no existing measure of TMT legitimacy was available in the literature, we developed a measure using the approach of D'Aveni (1990) and the following logic. In accordance with Michel

and Hambrick (1992), TMT members were defined as all executives above vice president. Following D'Aveni's (1990) approach to managerial prestige, we first concluded that managerial legitimacy should be some function of the individual legitimacy engendered by each member of the TMT. Second, we concluded that legitimacy is likely perceived by potential investors in a cumulative manner. That is, legitimacy represents an additive function of the factors that create individual team member legitimacy. Third, we believed that legitimacy would be subject to diminishing returns. In other words, at higher levels of legitimacy, additional legitimacy would have less impact in the minds of investors. Fourth, the individual-level factors which convey legitimacy must (1) be observable to external stakeholders, and (2) reflect the top managers' propensity toward viable, economically attractive ventures. Thus, we operationalized TMT legitimacy as the logged sum of: (1) the number of top managers with industry experience; (2) the number of top managers with prior TMT experience; (3) the number of top managers aged 40 or over; and (4) the number of top managers with advanced degrees (Master's or equivalent). The logged sum was used because of our belief that legitimacy would be a cumulative function of the individual legitimacy of the individual team members, subject to diminishing returns. More specifically, as the value of the sum of the four factors increased, we considered that the effects on IPO value and run-up would decline. Finally, following the approach of D'Aveni (1990), we factor analyzed the four variables to ensure they loaded on a single factor. The principal components analysis revealed one factor with an eigenvalue greater than one (2.485).

In selecting these four indicators of TMT legitimacy (prior TMT experience, prior industry experience, age, and education), we reviewed the extant TMT literature relating individual TMT characteristics and organizational outcomes. We reasoned that more qualified and experienced managers would be perceived as more legitimate in the eyes of investors since such managers are less likely to be associated with lower-quality firms. The heterogeneity and type of previous industry experience of the TMT has been used to investigate the relationship between TMT characteristics and organizational growth (Eisenhardt and Schoonhoven, 1990) and innovation adoption (Bantel and Jackson, 1989). Prior related-industry experience among TMT members implies to investors a familiarity with the external environment of the firm and therefore the ability to lead the firm through complex managerial decisions. Prior TMT experience suggests both the ability to manage and lead a firm, but also the comfort of knowing the firm is being led by those who have done it before. Furthermore, prior top managers might be considered to have more options and thus be less likely to engage a firm which has questionable potential. Age of TMT members has been the subject of study as it relates to risk propensity (Hambrick and Mason, 1984), innovation (Bantel and Jackson, 1989), and firm growth (Bantel and Jackson, 1989; Weinzimmer, 1997). Age may also play a role in TMT legitimacy, as age often implies knowledge, experience, wisdom, and established networks. Of course, age may also suggest a lesser adaptability and a less modern view of the world (Bantel and Jackson, 1989). Nonetheless, we concluded that older managers would bring legitimacy to the firm. Finally, educational attainment of the TMT has been shown to relate to firm innovation (Bantel and Jackson, 1989) and business press endorsement (Coombs and Zimmerman, 2002). Therefore, it is expected that educational attainment generates legitimacy because it implies knowledge, skills, and intellectual capacity. This is particularly true of advanced degrees since such degrees are more exclusive.

To test our hypothesis, we utilize the model developed by Carter and Manaster (1990) for evaluating the effect of underwriter reputation on post-IPO stock price run-up. Our empirical model is identical to that of Carter and Manaster, except for the addition of the TMT legitimacy variable and control variables for profitability and industry. Thus, we regress run-up on five industry dummy variables: firm age, insider shares, underwriter reputation, offer size, net income, and legitimacy. Our measure of underpricing (run-up) is based on Carter and Manaster and represents the raw stock price change 2 weeks after the IPO (expressed as a percentage of the initial price), adjusted for the contemporaneous return in the broader stock market (the market return (NYSE, AMEX, and NASDAQ weighted according to the value of each market) is subtracted from the raw return). The industry dummy variables are based on six groupings of two-digit standard industrial classification codes. Firm age is measured as the time elapsed between the founding of the firm and the IPO, while insider

shares are the percentage of shares held by insiders after the offer. Underwriter reputation is based on the underwriter reputations scores developed by Carter and Manaster (1990) and Carter, Dark, and Singh (1998). Offer size is measured as the natural logarithm of total proceeds raised at IPO. Net income is net income after taxes as reported in the prospectus.

RESULTS

Table 1 shows the results of the regression analyses. The first major column represents the first step of the model using only the control variables. This model explained approximately 22 percent of the variance in run-up. The column labeled 'Step II Legitimacy index' presents the results for the second step of the estimation wherein we entered our measure of legitimacy. Including TMT legitimacy increased the variance explained by 4.1 percent. As hypothesized, we found a significant negative regression coefficient for legitimacy (beta = −0.214), and conclude that Hypothesis 1 is supported by our analysis: TMT legitimacy is associated with lower levels of underpricing. Furthermore, the magnitude of this effect is rather substantial. Using the unstandardized regression coefficient for legitimacy, we calculated the effect of increasing legitimacy by one unit. At the average level of legitimacy (10), an increase in the value of legitimacy by one unit decreases run-up by 5.3 percent. This translates to an increase in the expected share price of $1.49 and an additional $6.7 million in proceeds at the average offering size.

The remaining four columns in Table 1 present Step II model estimations for each of the four components of our legitimacy measure. These results gauge the importance of each of the individual variables which constitute our measure of legitimacy. Prior TMT experience, prior industry experience, and age all had significant negative impacts on underpricing. Education, however, did not have a significant impact. At the average level of legitimacy, adding one top manager with prior TMT

Table 1. Regression results: effect of legitimacy on run-up

Variable	Step I	Step II	Step II			
			Legitimacy components			
	Controls	Legitimacy index	Prior TMT experience	Prior industry experience	Age	Education
Industry						
Manufacturing	−0.051	−0.048	−0.032	−0.045	−0.040	−0.057
Transportation	−0.058	−0.084	−0.062	−0.071	−0.084	−0.076
Wholesale	−0.023	−0.037	−0.036	−0.035	−0.030	−0.021
Retail	−0.072	−0.076	−0.073	−0.070	−0.081	−0.082
Finance	−0.042	0.013	−0.027	0.014	0.018	−0.044
Independent variables						
Firm Age	−0.060	−0.073	−0.094	−0.077	−0.040	−0.065
Insider Shares	0.167	0.130	0.172	0.140	0.146	0.140
Underwriter Reputation	−0.043	−0.047	−0.020	−0.053	−0.046	−0.048
Offer Size	0.365**	0.411***	0.345**	0.406**	0.418***	0.391**
Net Income	−0.110	−0.114	−0.090	−0.124	−0.104	−0.124
Dependent variables						
Legitimacy		−0.214**				
Prior TMT Experience			−0.152*			
Industry Experience				−0.185*		
Age					−0.199*	
Education						−0.122
N	121	121	121	121	121	121
R^2	0.218**	0.259***	0.239***	0.248***	0.252***	0.232**
Adjusted R^2	0.147**	0.184***	0.163***	0.172***	0.177***	0.154**
R^2 change	0.218**	0.041*	0.021*	0.030*	0.034*	0.014

* $p \leq 05$; ** $p \leq 01$; *** $p \leq 001$; standardized regression coefficients are reported.

experience, with prior industry experience, or over the age of 40 decreases run-up by 3.1 percent, 6.6 percent, and 5.5 percent, respectively. This translates to an increase in expected proceeds by $3.9 million, $8.2 million, and $6.8 million.

We also estimated a number of alternative models to gauge the sensitivity of our results to other variable measures. First, in order to ensure that our industry dummy variables were not too coarsely measured, we ran the same regressions with 26 dummy variables representing each of the two-digit SIC industries in the sample. Second, we utilized alternative measures of our dependent variable as presented by Carter and Manaster (1990) (raw run-up and equally weighted, market-adjusted run-up). Results for both of these alternative estimations were similar to the presented results. Third, we tested the impact of other measures of legitimacy. Most importantly, we calculated an unlogged legitimacy index and compared it to the results of the logged index. While the logged model fit the data slightly better, both the R^2 change and legitimacy regression coefficient for the unlogged model were significant and similar in magnitude ($R^2 = 0.038$, beta $= -0.214$). Differences between the logged and non-logged results for each of the individual legitimacy variables were also inconsequential. Finally, we altered the age cut-off point for our measure of TMT age. When the cut-off was reduced to 35 years or increased to 50 years, the beta coefficient for this variable became insignificant. At a cut-off point of age 45, however, the results were similar to our initial results with a cut-off age of 40 years. It appears that the greatest impact of hiring older managers occurs somewhere around the ages of 40 or 45.

DISCUSSION AND CONCLUSION

This research note suggests that the TMT plays an important role in the evaluation of firms at IPO. While prior research has certainly supported the proposition that the TMT has an effect on the financial performance of the firm (Chatterjee *et al.*, 1992; Boone, De Brabander, and Van Witteloostuijn, 1996; Pennings, Lee, and Van Witteloostuijn, 1998), our theory and results suggest a new and important role of the TMT in the IPO process. We find that TMT legitimacy is associated with lower underpricing. Following the logic of Carter and Manaster (1990), we argue that the power of TMT legitimacy in explaining underpricing is due to the efficacy of the TMT as a valid signal of firm value to investors. Underpricing represents the difference between the true market value of the firm and the value obtained by the owners at offering. Differences between the two values suggest uncertainty in investors' initial evaluation of the firm, and the negative relationship between legitimacy and underpricing suggests its role in signaling value and thereby reducing investor uncertainty. In the uncertain context of an IPO, information asymmetry between current owners and potential investors creates the potential for owner opportunism and the need for convincing signals of firm value. The legitimacy of the TMT represents a valid signal because investors perceive legitimate TMT involvement as a credible indicator of the economic potential of the firm.

This conclusion has a number of intriguing implications for the finance and management literatures. First, we shift the Carter and Manaster (1990) approach to signaling from external constituents back to the interior of the firm. Whereas the Carter and Manaster (1990) study focused substantial practitioner attention on the choice of investment bank, our study brings the attention back into the firm, to decisions regarding the choice of managerial decision-makers. This, we contend, is the true source of organizational legitimacy. But perhaps most importantly, our results imply that there may be a dual return to the choice of TMT in IPO firms. Prior research already suggests that choosing a higher-quality TMT can have a direct impact on the success of the firm. But it also seems that this impact is bolstered by the effect TMT choice has on valuation at IPO, as the ability to raise funds is also critical to the long-term success of the firm. Thus, to the extent that the choice of TMT acts as a signal to investors in a world of information asymmetry, that choice can have long-term implications since greater capital assets allow the firm greater flexibility to pursue growth strategies. For entrepreneurs and pre-IPO investors the important conclusion is that TMT selection is a critical process of strategic legitimation (Zimmerman and Zeitz, 2002) that has implications for the investor returns received at IPO, the firm's availability of capital, and its long-term performance.

Moreover, it is clear that the effect of TMT legitimacy on underpricing is substantial. As discussed above, increasing the level of legitimacy by

only one unit (at the average legitimacy) decreases underpricing by 5.3 percent. For the average firm in our sample, this would result in a $6.7 million increase in proceeds at IPO. This implies a sizeable economic value in the recruitment of experienced, senior managers in IPO firms, especially since the hiring of some managers may increase legitimacy by more than one unit. Our results imply that hiring one manager over 40, with prior TMT and industry experience can decrease underpricing by $18 million or more.

Within the selection process, it appears that a focus on prior industry experience, prior TMT experience, and age are most important. Among these individual variables, prior industry experience and age had the greatest effect, with expected increases in proceeds (decreases in run-up) of $8.2 and $6.8 million, respectively. In contrast, it was not apparent that the number of advanced degrees held by the TMT had any influence on underpricing.

Through the application of the concepts of information asymmetry, opportunism, and signaling to the relationship between firm owners and potential investors in the context of an IPO, this study has expanded our collective understanding of the relationship between the legitimacy of TMTs, and their role in investor valuation of IPOs. Although we are excited by the direct implications of this work, we find it curious that the strategic management and entrepreneurship literatures have spent so little time addressing the implication of information asymmetry between pre-IPO owners and investors. In contrast, information asymmetry between owners and managers of public firms accruing to the separation of ownership and control has been studied extensively, and has led to a great deal of insight regarding firm governance. The fact that such extensive insights have come from this line of inquiry into the owner/manager relationship in public firms suggests that study of the owner/investor relationship in the context of IPOs is fertile ground for future research. We hope this study will bring some attention to this relationship and serve as a first step in understanding its implication for the IPO process.

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