

First Chapter of *FIRM VALUE AND OPTIMAL LEVELS OF LIQUIDITY*

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by

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## **Dedication and Acknowledgements**

This book is dedicated to my wife, my mother and my father.

Credit is due every person in my life for the patience, understanding and encouragement shown me over the past five or six years. The following gentleman, however, deserve an extra tip of the hat for the lengths to which each of them has gone on my behalf. No gesture by me could ever begin adequately to describe my gratitude for the time and energy each has given me. Since entering college:

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## **Preface**

The objective here is to consider the factors influencing a firm's optimal level of liquidity. Financial theory describes the demand for liquid resources by the firm and the impact of the accumulation of liquidity on firm value. Studies by Miller and Orr (1966,1968), Myers and Majluf (1984), Jensen (1986) and Stulz (1990) establish that firm value is first enhanced and later reduced as the firm acquires liquid resources. Combining the ideas of Myers and Majluf (1984) and Jensen (1986), the optimal level of liquidity is determined by costs of over- and under-investment and the carrying and stockout costs portrayed by Miller and Orr (1966,1968). Capital markets favor the inflow of needed liquidity to avoid stockout costs, but penalize firm value for liquidity's carrying costs. Investors' reactions to liquidity changes and knowledge of the variables related to these costs should provide evidence of the optimal liquidity position. Private equity placement announcements are examined as they provide an opportunity to study changes in firm value, at the time of an announced change in liquidity, independent of issues that may obscure the sources of changes in firm value in other liquidity-enhancing events. Prior studies of private placements provide little or no evidence on the impact of liquidity enhancement on firm value. This study considers the premise that market responses to these announcements are conditioned, in part, by a firm's access to liquid resources. Since prior studies attribute market responses to these announcements to information releases and changes in ownership structure, controls are provided for these and other firm-specific features. A sample of private placement announcements between 1988 and 1995 is examined. Abnormal returns are adjusted for the size and price of the placement. Significant unadjusted and adjusted positive abnormal returns are discovered over the primary announcement

period. This contrasts with adverse market responses to equity issues in general, but is consistent with the positive responses to private placements observed in prior studies.

Selected liquidity measures are significantly related to market responses to private placement announcements. Given the substantial costs borne by the firm in placing equity privately, a pecking order model of capital structure is favored over a static tradeoff model. Pre-announcement liquidity and changes in liquidity are, independently and interactively, positively and significantly related to these market responses. Changes in liquidity are significantly more important than a firm's initial liquidity levels in describing market reactions to these announcements. Most proxies for managerial discretion are not significantly related to the market's responses, but changes in ownership concentration pursuant to the private placement are associated with non-monotonic changes in firm value. An earnings/price ratio and firm size are significantly and inversely related to observed abnormal returns. The earnings/price and firm size measures are robust factors in a number of estimating environments. Additionally, recent and more relaxed SEC guidelines reduce the significance of the positive impact, observed in earlier private placement studies, of an unregistered private equity sale.

Moderate existing liquidity prior to the announcement is positively related to market responses, when the size of the liquidity change is ignored. When the size of the liquidity enhancement is considered, however, it dominates. Recent stock performance, similar to existing liquidity levels, may proxy for the announcing firm's survivability, as a significant and adverse market response is observed for the firm underperforming the market in the weeks prior to the announcement.

## **TABLE OF CONTENTS**

|  |     |
|--|-----|
| Dedication and Acknowledgements.....   | ii  |
| Preface.....   | iii |
| List of Tables.....  | ix  |
| List of Figures .....  | xi  |
| CHAPTER 1.....   | 1   |
| FIRM VALUE AND OPTIMAL LEVELS OF LIQUIDITY.....                                      | 1   |
| 1.1 Introduction and Motivation.....   | 1   |
| 1.2 Examining an Optimal Liquidity Hypothesis.....                                   | 4   |
| 1.3 Research Questions.....  | 5   |
| 1.4 Private Placements of Equity and the Provision of Liquidity to the<br>Firm ..... | 7   |
| 1.5 Limitations of This Study.....   | 8   |
| 1.6 Empirical Summary .....  | 9   |
| 1.7 Organization of the Study. . . . .   | .11 |
| CHAPTER 2 .....  | 12  |

## THEORETICAL DEVELOPMENT OF AN OPTIMAL LIQUIDITY HYPOTHESIS12

|   |  |    |
|---|--|----|
| 2.1   | Outline and Objectives of Chapter Two .....  | 12 |
| 2.2   | Financial Slack, Free Cash Flow and Firm Value.....  | 13 |
| 2.3   | Ownership Structure, Equity Issues and Firm Value .....  | 23 |
| 2.4   | Information Asymmetries, Equity Issues and Firm Value .....  | 35 |
| 2.5   | Security and Market Choice and Firm Value.....   | 45 |
| 2.6   | Firm Liquidity and Market Response to Private Equity Placement<br>Announcements ..   | 53 |
| CHAPTER 3.....  |  | 55 |
| EXAMINATIONS OF THE OPTIMAL LIQUIDITY HYPOTHESIS..... |  | 55 |
| 3.1   | Outline and Objectives of Chapter Three.....   | 55 |
| 3.2   | Development of the Empirical Model.....  | 56 |
| 3.3   | Proxies for Liquidity in Tests of an Optimal Liquidity Hypothesis.....   | 64 |
| 3.4   | Proxies for Growth Options in Tests of an Optimal Liquidity<br>Hypothesis.....   | 66 |
| 3.5   | Proxies for Ownership Structure in Tests of an Optimal<br>Liquidity Hypothesis .....   | 68 |
| 3.6   | Testable Implications of Controls for Information Releases Related<br>to Firm Size, Performance and the Nature of the Security Issued. . . . | 73 |
| 3.7   | Interaction of the Explanatory Variables .....   | 76 |
| 3.8   | Sample Selection Procedure.....  | 76 |

|   |   |     |
|---|---|-----|
| 3.9   | Tests for Model Misspecification and Violations of the Assumptions Underlying the Classical Linear regression Model ..... | 81  |
| 3.10  | Concluding Econometric Remarks.....   | 86  |
| CHAPTER 4. ....   |   | 87  |
| OPTIMAL LIQUIDITY LEVELS AND PRIVATE EQUITY PLACEMENTS. ....        |   | 87  |
| 4.1   | Outline and Objectives of Chapter Four. ....  | 87  |
| 4.2   | Sample Description and Summary Data. ....   | 88  |
| 4.3   | Unadjusted and Adjusted Announcement Period Returns. ....   | 93  |
| 4.4   | Empirical Predictions and Tests of an Optimal Liquidity Hypothesis. .   | 95  |
| 4.5   | Tests of Hertzal and Smith (1993) and Wruck (1989) .....  | 105 |
| 4.6   | Limitations of the Statistical Results. ....  | 107 |
| 4.7   | Conclusions and Review of Research Questions .....  | 114 |
| CHAPTER 5. ....   |   | 118 |
| SUMMARY, IDEAS FOR SUBSEQUENT RESEARCH AND CONCLUDING REMARKS. .... |   | 118 |
| 5.1   | The Equity-Issue Puzzle and Firm Liquidity. ....  | 118 |
| 5.2   | Summary of Empirical Results. ....  | 119 |
| 5.3   | Extensions and Implications for Subsequent Research. ....   | 121 |
| 5.4   | Concluding Remarks. ....  | 126 |

|                   |     |
|-------------------|-----|
| APPENDIX 1.....   | 127 |
| BIBLIOGRAPHY..... | 133 |
| TABLES 1-12.....  | 143 |
| FIGURES 1-4.....  | 169 |

**LIST OF TABLES**

|            |  |     |
|------------|--|-----|
| Table 1.   | Variable Definitions.....  | 143 |
| Table 2.   | Sample Characteristics of Equity Private Placements.....                             | 146 |
| Table 3.   | Sample Characteristics of Privately Placing Firms.....                               | 147 |
| Table 4.   | Sample Characteristics of Purchasers of Private Equity Placements.....               | 148 |
| Table 5.   | Sample Characteristics of Proposed Uses of Private Equity<br>Placement Proceeds..... | 149 |
| Table 6-A. | Selected Contrasts to Earlier Studies of Equity Private Placements.....              | 150 |



|             |   |     |
|-------------|---|-----|
| Table 6-B.  | Selected Characteristics of Private Placement Announcements<br>Excluding Announcements by Sonic Environmental and<br>Versus Technology. . . . .   | 151 |
| Table 7.    | Cumulative Announcement Period Abnormal Returns. . . . .  | 152 |
| Table 8-A.  | Predictions of an Optimal Liquidity Hypothesis . . . . .  | 153 |
| Table 8-B.  | Cross-Sectional Regression of Private Placement Announcement<br>Period Abnormal Returns . . . . .   | 154 |
| Table 8-C.  | Cross-Sectional Regression of Private Placement Abnormal<br>Returns without Allowance for Ownership Structure Changes. . . . .  | 155 |
| Table 8-D.  | Cross-Sectional Regression of Private Placement Announcement<br>Period Abnormal Returns without Allowance for Ownership<br>Structure Changes or Firm Size and Excluding the Influence of<br>Two Highly Influential Observations . . . . . | 156 |
| Table 8-E.  | Normative Cross-Sectional Regression of Private<br>Placement Announcement Period Abnormal Returns . . . . .   | 157 |
| Table 8-F.  | Cross-Sectional Regression of Private Placement Announcement<br>Period Abnormal Returns: Five Factor Iteration . . . . .  | 158 |
| Table 8-G.  | Cross-Sectional Regression of Private Placement Announcement<br>Period Abnormal Returns: Four Factor Iteration . . . . .  | 159 |
| Table 8-H.  | Cross-Sectional Regression of Private Placement Announcement<br>Period Abnormal Returns: Three Factor Iteration . . . . .   | 160 |
| Table 8-I.  | Cross-Sectional Regression of Private Placement Announcement<br>Period Abnormal Returns with an Allowance for Changes in<br>Ownership Concentration . . . . .   | 161 |
| Table 9.    | Cumulative Announcement Period Abnormal Returns<br>Excluding Announcements by Sonic Environmental and<br>Versus Technology. . . . .   | 162 |
| Table 10-A. | VIFs for a Cross-Sectional Modeling of Adjusted Abnormal Returns .  | 163 |
| Table 10-B. | Pearson Correlation Coefficients for the Variables Describing<br>Private Placement Adjusted Abnormal Returns. . . . .   | 164 |

|             |   |     |
|-------------|---|-----|
| Table 11-A. | White Standard Errors and Heteroskedastic Corrected T-values. . . . .   | 165 |
| Table 11-B. | White Standard Errors and Heteroskedastic Corrected T-values. . . . .   | 166 |
| Table 12-A. | Post-Event Parameter Estimation for the Full Sample of 69<br>Announcements of Private Placements of Equity. . . . .         | 167 |
| Table 12-B. | Post-Event Parameter Estimation for the Sample Excluding<br>Announcements by Sonic Environmental and Versus Technology. . . | 168 |

**LIST OF FIGURES**

|            |  |     |
|------------|--|-----|
| Figure 1.  | Optimal Liquidity Level for the Firm . . . . .                 | 169 |
| Figure 2.  | Optimal Liquidity Level for the Growing Firm . . . . .         | 170 |
| Figure 2a. | Changing Liquidity Optima for the Growing Firm. . . . .        | 171 |
| Figure 2b. | Benefits/Optima Shift . . . . .                                | 171 |
| Figure 3.  | Optimal Liquidity Level with an Entrenched Management. . . . . | 172 |
| Figure 3a. | Changing Liquidity Optimum with an Entrenched Mgt. . . . .     | 173 |
| Figure 3b. | Costs/Optima Shift . . . . .                                   | 173 |

Figure 4. Neutral Stock Price Response for an Excess Flow of Liquidity to a Slack-Poor Firm .....174

## **CHAPTER 1**

### **FIRM VALUE AND OPTIMAL LEVELS OF LIQUIDITY**

#### **1.1 Introduction and Motivation**

Studies by Miller and Orr (1966,1968), Myers and Majluf (1984), Jensen (1986) and Stulz (1990) theoretically establish the condition that firm value (stock price) is first enhanced and later reduced as the firm acquires costly liquid resources. The primary objective of this study is to test the unconfirmed empirical implication of these earlier studies that an optimal level of liquidity exists for the firm. The goal is to measure the strength of the unexamined premise that market responses to private placement announcements are conditioned, in part, by a firm's access to, and need for, financial slack or liquid resources.

The equity-issue puzzle is considered in this study. Implications for a firm's capital structure are specified. Prior examinations of liquidity are extended; the literature on the determinants of stock price responses to private equity issues is supplemented. Much evidence already supports that carrying costs of liquidity and free cash flows can be costly to investors. Little evidence establishes the costliness of stock-outs and under-investment and sacrifice of shareholder value with a slack-poor firm. A growing literature on the costliness of under-investment due to a lack of internal funds is supplemented in the following pages.

Liquidity broadly refers to any firm asset that can be converted to cash or cash equivalents (without a significant price concession) in the current operating cycle relative to the firm's expected cash disbursements over the same period.<sup>1</sup> Liquidity is required to meet operating and growth needs but is often wasted when it is over-accumulated. Liquidity is similar to, but distinct from, financial slack. Financial slack refers to the excess of firm liquidity over the next cycle's (generally one year) needs for operations, debt service and preferred dividends. Capital markets favor the inflow of needed slack, but penalize firm value for the agency costs of free cash flow. An optimal level of liquidity is implied for a given firm based upon its own set of circumstances. The primary contribution of this study comes from determining factors influencing optimal liquidity levels and the consistency of these discoveries with existing theory and prior empirics.

Conceptually, in a perfect market, firm value goes up a dollar with every arriving dollar of liquidity. In an imperfect market, an additional dollar of liquidity may not increase firm value by a dollar. According to Myers and Majluf (1984), putting a dollar of liquidity into the firm creates value as the firm is then relieved of the need to pursue costly external financing. Conversely, Jensen (1986) holds, beyond some point, an arriving dollar of liquidity or financial slack has a negative NPV and does not increase existing shareholder wealth by an equal amount. According to Jensen (1986), factors that increase managerial discretion, such as diffuse ownership, lower the optimal liquidity level. Myers and Majluf (1984) suggest that greater investment opportunities and lower degrees of information asymmetries lead to a higher optimal liquidity level. Combining the ideas of Myers and Majluf (1984) and Jensen (1986), the optimal level of liquidity is determined by the costs of over- and under-investment. Their ideas supplement the earlier work of Miller and

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<sup>1</sup>See Table 1 for a detailed description of liquidity.

Orr (1966,1968). They portray carrying and stockout costs arising from excessive and inadequate liquidity investments, respectively. At the optimum, the expected marginal return on the last dollar of slack equals the expected marginal cost of free cash flow for that same dollar.

Ignoring measurement issues and allowing cash and liquid resources to be proxied by selected measures of liquidity and allowing stock price to proxy for firm-value, the valuation effect of additional liquidity is a function of a firm's initial liquidity, the change in liquidity, the firm's liquidity optimum and other factors. This is broadly illustrated by Figure 1 as the firm acquires liquidity and moves to the right along the liquidity axis. Value increases - up to the global minimum cost of liquidity - and then declines.

Developing measures for liquidity and changes in liquidity is fairly straightforward. If multiple controlled observations of liquidity enhancing events for a single firm are made, then a firm-value function - as in Figure 1 - can be developed for that firm. It is much less straightforward for a sample of different firms. Specifying a firm's optimal liquidity level and identifying factors influencing market responses to liquidity enhancing events is difficult. Optimal liquidity is potentially impacted by such issues as ownership structure, growth options, information asymmetries, management compensation and the volatility and correlation among cash inflows and outflows. Equal changes in liquidity imply different changes in firm-value based upon the set of these mitigating factors that impact the costs and benefits of liquidity accumulation.

## **1.2 Examining an Optimal Liquidity Hypothesis**

An optimal liquidity hypothesis holds that market responses to liquidity-changing events are conditioned, in part, by the observed changing levels of firm liquidity. There are many

liquidity enhancing events that impact firm-value; debt or equity issues, sales of assets or subdivisions and loans from insiders all provide liquidity. The one choice variable of interest in each of these events is the level of liquidity. The objective of this study is to find a sample of liquidity changes when the sources of the changes in corporate value are as identifiable as possible. A clear link is needed between market responses to corporate events and the liquidity provided as a result of those events.

With a change in liquidity, two points on the functions portrayed in Figures 1-4 can be observed. With this simple infusion, other factors are fixed. But, other factors are not fixed in most liquidity infusions such as when the firm issues securities. News of most liquidity enhancing events is compromised by the resolution of one or more information asymmetries; by its decision to publicly procure funds through the sale of securities or corporate assets, management reveals some degree of inside information. Separating this information effect from other sources of market responses is difficult. However, the market for private equity placements provides the opportunity to observe market responses to corporate events without the cloud cast by information asymmetries.<sup>2</sup>

Private placements of equity, as noted by Wruck (1989), afford the investigator an opportunity to examine market responses to corporate events without the "clutter" of resolved information asymmetries impacting firm-value. An adjusted abnormal returns measure can be calculated that accounts for much of the resolution of information asymmetries at private placement announcement. Private placements are examined in this study, although the optimal liquidity hypothesis should apply equally to public issues. With the public issues, however,

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<sup>2</sup>The selection and description of the private placement market is fully developed in Chapter 2.

establishing a clear link between changes in shareholder wealth and arriving liquidity is much more tenuous.

### **1.3 Research Questions**

Stock price reaction to liquidity change announcements is a function of initial firm liquidity levels and final levels relative to the firm's optimum. The liquidity optima, in turn, are a function of a number of other factors. For example, a firm with inadequate liquidity, or to the left of the optimum in Figure 1, can expect a favorable market response to a liquidity enhancing event, *ceteris paribus*, achieved by moving towards the optimal level of liquidity. Other relationships between firm value and liquidity levels are portrayed in Figures 2 and 3. Two questions related to these stock price reactions are addressed in this study's consideration of an optimal liquidity hypothesis.

#### **1.3.1 What are the variables that affect the optimal level of liquidity and how do these factors impact market responses to liquidity infusions for the firm?**

It is unclear whether available liquidity influences market response to private placement announcements. As Ang (1991) notes, the value of financial slack to the firm and to stockholders is controversial unto itself independent of a firm's financing activities. An examination by Pilotte (1992) finds that slack provides no significant explanatory power to cross-sectional tests of market responses to new external general public offerings. Yet the study by Hertz and Smith (1993) reveals that firms in financial distress - an indirect proxy for slack poverty - are favorably treated when they announce private placements. Hertz and Smith (1993) do not, however, examine

whether announcement period returns are related to available slack in general. Slack-related variables such as  $\Delta$ liquidity,  $\Delta$ earnings/price and  $\Delta$ working capital are adopted in this study and seek to capture that element of the abnormal returns that can potentially be explained by an optimal liquidity hypothesis.

It is important to fill in the existing evidence on the impact of free cash flow with empirics also upon the value of slack. This value can be illustrated at the optimum where the marginal contribution from slack on the next dollar added to liquidity is less than the marginal cost of free cash flow induced by that next dollar. Earlier empirical studies make no specific allowance for the ability of an optimal liquidity hypothesis to explain returns. Examinations by Kim and Smith (1994) and Pilotte (1992) provide contrasting results for the inclusion of a slack factor in cross-sectional studies of market responses to mergers and growing firm security issues, respectively. The former attaches significant value to a slack variable and the latter discourages its inclusion. This contrast provides another catalyst for this study.

### **1.3.2 Agency costs of free cash flow result when slack is accumulated beyond a firm's perceived needs; empirically, what are the implications for firm-value for the privately placing firm?**

Funds might be acquired in the public or private market by firms that have sufficient slack; a potential exists for the confounding effects of the agency costs of free cash flow. Capital markets discount firm-value based on levels of this free cash flow vs. the premium provided slack-poor firms as they acquire slack. An extensive literature has grown that documents the market's negative response to the accumulation of liquidity in excess of needs by firms, but no such body has



examined the lack of liquidity.<sup>3</sup> The definitions of free cash flow and financial slack are distinct. The proxies used to represent each, however, are similar and their separation is often difficult.

#### **1.4 Private Placements of Equity and the Provision of Liquidity to the Firm**

The initial publication of a firm's decision to issue equity *privately* is commonly received favorably.<sup>4</sup> This is in contrast with general equity issues that are broadly seen as negative signals by investors.<sup>5</sup> Prior studies (see, for example, Wruck (1989), Fields and Mais (1991) and Hertz and Smith (1993)) attribute these atypical patterns to desirable information releases and improvements in ownership structures as a result of these equity sales. Large and sophisticated individual or institutional investors, by taking a greater investment share of the company, provide a positive opinion about the company's prospects and increase their monitoring of management with the private placement purchase. However, the role of liquidity or financial slack in explaining the average positive returns that occur at announcements of private placements is not considered. Descriptive data in prior research implies that the primary users of private placements may be slack-poor; this condition may increase the likelihood of an observable favorable liquidity effect.

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<sup>3</sup> Smith and Kim (1994) consider the potential for the mitigation of the under-investment issue of Myers and Majluf (1984) and the free cash flow problem of Jensen (1986) by the purchase of slack-poor firms by those with excess free cash flow. Their study supports one of the main contentions of this examination - that slack has measurable value to the slack-poor firm - and provides direction on the separation of the negative effects of free cash flow and the favorable impact of available or arriving slack.

<sup>4</sup> A private placement is a debt or equity issue that involves no public offering; as such, the issue is commonly exempt from registration with the Securities and Exchange Commission (SEC). A review of the Securities Act of 1933, as amended through 1996, and its implications for private placements is provided in Appendix 1.

<sup>5</sup> See Smith (1986), Asquith and Mullins (1986) and Mikkelsen and Partch (1986).

## **1.5 Limitations of This Study**

Several anticipated shortcomings of this study deserve mention.<sup>6</sup> Firms face a number of tradeoffs in selecting private placements and the significance of liquidity in explaining market responses may not be clear; various hypotheses compete for position in explaining empirical test results. The interaction of these hypotheses are only one of the cross-currents that may limit this study. The role played by liquidity in characterizing market responses and in supporting one or another theory of capital and ownership structure are only implied by the relationships between market responses and the explanatory proxies employed.

This dissertation is hampered by data and statistical test limitations and the absence of a "clean" laboratory in which to test differing hypotheses. Published data in the CRSP and *Compustat* files is often limited for the relatively small and often thinly traded privately issuing firms. The text of the private placement announcements is sometimes inadequate and cursory; these announcements often only partially disclose important placement characteristics. Clear and unequivocal proxies for the underlying hypotheses do not exist. No single telling conclusion is expected. However, these limitations are similar in their spirit to many studies of financial issues and do not preclude a meaningful contribution by this study.

## **1.6 Empirical Summary**

A final sample of 67 private placement announcements are drawn from the *Business News*

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<sup>6</sup>For example, information concerning private placements is regularly limited and examinations of market responses to these placements is difficult. Rule 144A and Regulation S of the SEC hold that transactions taking place directly between firms and large informed investors are exempt from the scrutiny given public offerings. These exemptions limit the occurrence and the substance of announcements by firms of private placements.

*Wire* between 1988 and 1995. Each observation fulfills CRSP, *Compustat* and *Compaq Disclosure* data requirements. Traditional and adjusted market model abnormal returns measures are generated for each firm's announcement over several selected event windows. Ordinary least squares regression analyses are conducted to explain the cross-section of adjusted abnormal returns measures over the primary event window from three days before until the day of the announcement.

Significant adjusted and unadjusted positive abnormal returns are discovered over the primary announcement period. Findings are contrary to expectations of adverse market responses to equity issues in general. Results are similar to favorable responses to private placements observed in prior private placement studies. The infusion of liquidity from the private placements invites market responses that seem to favor a pecking order model over a static tradeoff theory of capital structure. Evidence supports a premise reviewed in this study that ownership structure is less important for the smaller firms in this study than for larger firms in similar studies in describing market responses to news of liquidity enhancing events. Nonetheless, consistent with prior studies on the relationships between firm value and ownership concentration, changes in ownership concentration pursuant to the private placement are associated with non-monotonic changes in firm value. Proxies for growth opportunities and firm size are robust factors in explaining these overall favorable returns. Recent and more relaxed SEC guidelines may have caused or contributed to the reduction in the significance of an unregistered private equity sale, relative to findings in earlier private placement studies of a positive response.

Test evidence confirms that liquidity and changes in liquidity help to describe the cross-section of market responses at private equity placement announcements. Significance is noted for both factors when the initial and the change in liquidity are considered separately. This

conditioning is statistically significant at the 1% level for liquidity changes without allowance for initial liquidity levels and at the 5% level for liquidity when the change in liquidity is not included. An interactive variable for the product of liquidity and the change in liquidity is significant at the 5% level, as well. The positive market responses are strongly associated with the size of the issue and a negative response, suggested by Jensen (1986) for the initially more liquid firms, does not result for the average announcing firm. The greater significance of the change in liquidity factor is anticipated by Myers and Majluf (1984).

Firms that perform on a par with or better than the market in the weeks prior to the announcement are associated with better responses than firms that perform poorly relative to the market. Additionally, an aversion exists by the market to the firms in the sample that have very low levels of pre-offer liquidity. Overall, announcements are favored for the better-performing firms in this study's sample that are receiving larger liquidity infusions and that initially possess higher levels of liquidity. The market effectively uses recent firm performance and existing levels of liquidity as proxies for survival.

## **1.7 Organization of the Study**

A theoretical and empirical review is provided in the next chapter. Implications for modeling and cross-sectional analyses are developed in Chapter 3. Sample selection procedures and tests to discriminate between competing hypotheses are provided. Variables are selected and tests are designed to provide insights into the explanatory power of various factors influencing market responses to private placement announcements.

Results of the tests outlined in Chapter 3 are provided in the Chapter Four. The final

sample is described. Additional consideration is given to the limitations of any results. Conclusions are reached. The paper closes in Chapter 5 with a summary, review of salient results and suggestions for subsequent research.