Three Essays in Corporate Finance

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Business Administration)
in The University of Michigan
2011

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Acknowledgements

I would like to thank my dissertation committee: Han Kim, Jeff Smith, Jim Westphal, Amiyatosh Purnanandam, Uday Rajan, and Ing Cheng, for their continuous guidance and encouragement. I am especially grateful to my advisor, Han Kim, for his kindness, support, and patience at every stage of my doctoral study. My dissertation has also benefited from the help of all other faculty members and fellow PhD students at the University of Michigan. I also gratefully acknowledge the financial support from the Ross School of Business, Rackham Graduate School, and the Mitsui Life Financial Research Center at the University of Michigan. All errors are my own.

I thank the staff members at the University of Michigan, especially Brian, Joyce, and Shelly, for their personal effort in helping me handling administrative issues. I thank my professors and colleagues at Tsinghua University and Vanderbilt University for stimulating my interest in finance research and encouraging me to continue my studies. I also thank my friends – you know who you are. My friends have seen me in my most frustrated moments. They patiently listened to me and encouraged me. They have been a constant source of inspiration, support and strength all these years.

Finally, I would like to thank the people who have contributed the most to my life: my parents and extended family members. This dissertation would not have been possible without the love and support from my family. I dedicate this dissertation to them.

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Chapter I

Introduction

The three essays in this dissertation examine issues related to corporate governance, investment, and financing decisions.

In the first essay, I analyze the consequences of CEO succession on board composition. I show that existing independent directors with no social ties to a succeeding CEO are more likely to depart from the board after the succeeding CEO takes charge. Compared to exiting independent directors, newly hired independent directors are more likely to be socially connected to the succeeding CEO. The effect of CEO-director social ties on independent director turnover is more pronounced when a succeeding CEO is hired into an under-performing or into a poorly governed firm, and thus is likely to have greater bargaining power over the board. In addition, strong external governance, as measured by the level of industry competition and the passage of the Sarbanes Oxley Act (SOX), reduces a CEO's influence on director selection. Finally, an increase in board social dependence is detrimental to firm value when the firm's need for board advising is low. The results provide new insights into the consequences of CEO succession and shed light on the within-firm evolution of board composition.

The second essay is coauthored with E. Han Kim at the University of Michigan. In the second essay, we study how the status of U.S. universities and the demand for U.S. education in foreign markets jointly determine U.S. universities' investments in overseas

degree programs. We show two waves of overseas programs offered by U.S. universities: A supply driven wave in the late 1980s to the mid 1990s and a current wave beginning in the early 2000s, with distinctly different players. We compile a comprehensive dataset on overseas degree programs and host country characteristics. We find that universities behave much like multinational corporations when they make investments overseas. Finance plays an important role. Real GDP per capita and tertiary school age population are two key determinants of the location choice. Asia and the Middle East are popular destinations for U.S. overseas programs, driven by market size and oil money, respectively. We also find that U.S. universities offer lower tuition discounts in countries with higher real GDP per capita. Undergraduate degree programs are discounted more than master degree programs because of greater local competition. Last, when universities reduce costs through partnerships with local universities or through financial support from local governments, the savings are not passed on to local students in the form of lower tuition.

The third essay is coauthored with Cong Wang at Chinese University of Hong Kong and Fei Xie at George Mason University. In the third essay, we examine the impact of reputation on contracting outcomes in the equity market. We show that firms with past earnings restatements are subject to large reputational penalties when contracting with investment banks in seasoned equity offerings (SEOs). Specifically, we find that firms that restate due to accounting irregularities subsequently pay higher underwriting fees (about 10-20% in relative terms or 50-100 basis points in absolute terms). The effect of restatements on underwriting fees is more pronounced for larger offerings and offerings in the first few years after restatements, and lessens as restatement firms make corporate

governance improvements. We also find that restatement firms employ more lead underwriters, form larger syndicates, and are less likely to use the faster and cheaper accelerated underwriting method than the traditional book building process. Overall, our evidence supports the hypothesis that financial misrepresentation tarnishes a firm's reputation and increases its contracting costs when accessing the equity market, but subsequent corporate governance improvements can mitigate this adverse consequence.

Chapter II

The Consequences of CEO Succession on Board Composition

II.1. Introduction

CEO succession has long been a subject of interest to financial economists, as a change in CEO is often associated with substantial organizational change (Gabarro (1987)). A large body of literature has sought to evaluate how CEO succession affects subsequent firm strategic changes (Weisbach (1995)), personnel changes (Helmich and Brown (1972), Fee and Hadlock (2004), and Hayes, Oyer, and Schaefer (2006)), and operating performance improvement (Denis and Denis (1995)). However, little attention has been paid to how CEO succession affects board composition despite the fact that previous studies document a high incidence of outside director turnover following CEO succession (Hermalin and Weisbach (1988), Denis and Sarin (1999), Yermack (2004), and Fahlenbrach, Low, and Stulz (2010)). In this paper, I explore one aspect, CEO-director connections, to explain the likelihood of director departure/addition during the years following CEO succession, and the subsequent shareholder value consequences of such changes on the board. I present some first evidence on the causes and consequences of director turnover following CEO succession, in order to shed light on the dynamic CEO-board relationship within a firm.

Anecdotal evidence suggests that CEO-director connections affect how new CEOs reshape their boards. For instance, five months after Jamie Dimon took over as the

CEO of Bank One Corporation in 2000, five out of seventeen outside directors[1] retired from the board of Bank One. Although the company announced that the five directors retired voluntarily, public media speculated that these directors left under pressure from the new CEO, Mr. Dimon. Two months later, Dimon convinced the board to hire two new outside directors: one, a former co-worker at Citigroup; the other, a fellow board member of Tricon.[2] Since a new CEO may not be as powerful as an established CEO, it is surprising that a new CEO has such immediate power when little is known about his ability to manage the firm. Is Dimon an exception, or are all new CEOs able to influence director selection? If new CEOs are able to influence board composition shortly after installation, do they vary in their abilities to do so? And what are the consequences of independent director turnover? Answering these questions will offer insight into how much influence a CEO can have on the within-firm evolution of board composition and shed light on the effectiveness of recent corporate governance reforms aimed at ensuring board independence and at strengthening board monitoring.[3]

I begin my study with an examination of independent director departure during the first year of a new CEO's tenure. Several studies document a high incidence of outside director departure following CEO succession (Hermalin and Weisbach (1988), Denis and Sarin (1999), Ward, Bishop and Sonnenfeld (1999), Yermack (2004), Farrell and Whidbee (2000), and Fahlenbrach, Low and Stulz (2010)). Whether a new CEO affects board composition, however, remains unclear. I use social ties, based on common

[1] I use "independent directors" and "outside directors" interchangeably in this paper to refer to directors who are legally independent. Legally independent directors are directors who have neither business relations with the firm nor any personal relations with the firm's management team.
[2] For a detailed description of the board restructuring event, see Khurana (2002).
[3] For a summary of recent regulatory changes and regulatory definitions of independent directors, see Duchin, Matsusaka and Ozbas (2009).

social activities, educational background, and employment, to measure the relationship between an independent director and a new CEO. Since individuals who share similar experiences are more likely to develop mutual trust and support (Westphal and Zajac (1995)), a new CEO is likely to encourage independent directors with whom he is not connected to leave the board in order to enhance the board's support of his proposals. One potential concern with my independent director departure analysis is that existing independent directors who lack social connections to a new CEO may voluntarily depart, because they feel less inclined to serve with a new CEO that they do not know well. A negative relationship between CEO-director social ties and the likelihood of director departure, therefore, may not reflect the CEO's influence over board members. If an incoming CEO is able to influence board composition, he is not only likely to influence the departure of existing directors, but also the addition of new directors. More specifically, an incoming CEO is more likely to select independent directors who are socially connected to him to replace former independent directors who lack social ties to him.

I further examine whether new CEOs differ in their abilities to bargain for friendly boards.[4] Board composition is often viewed as a bargaining outcome between a CEO and the incumbent directors (Hermalin and Weisbach (1998)) and a powerful CEO has greater influence over board member selection (Shivdasani and Yermack (1999), Westphal and Zajac (1995), and Fracassi and Tate (2009)). When a new CEO takes charge, he inherits the board of his predecessor; a board that is less likely to be susceptible to his personal influence (Wade, O'Reilly and Chandratat (1990), Core,

[4] A "friendly board" refers to a board with a high percentage of directors who are legally independent, but nevertheless socially connected to the CEO.

Holthausen and Larcker (1999), and Coles, Daniel and Naveen (2007)). However, a new CEO may have significant bargaining power over the incumbent board with respect to director selections, especially when he is hired into an underperforming firm to initiate substantial organizational changes as a "corporate savior" (Khurana (2002)). This new CEO may have such broad latitude because of the perception that he is especially competent to initiate strategic changes within the firm. Moreover, while current independent directors may possess valuable firm-specific knowledge, new independent directors typically bring with them understandings of alternative technologies and managerial practices used by other firms, which may facilitate organizational change during a transition in leadership. The need for strategic changes, then, offers the new CEO a legitimate reason to initiate changes in the boardroom. I use firm operating performance prior to CEO succession to measure the level of organizational change a firm needs. Poor firm performance is often followed by CEO dismissals and outside CEO successions. I expect the relationship between CEO-director social ties and independent director turnover to be more pronounced when a firm is underperforming and faces an urgent need for organizational change.

I then examine whether good internal and external governance can reduce a CEO's influence on director selections. I use the percentage of truly independent directors[5] on the board prior to CEO turnover to measure internal governance, and use the level of industry competition and the passage of the Sarbanes Oxley Act (SOX) as proxies for external governance. I expect good governance to mitigate the positive relationship between CEO-director social ties and independent director addition.

[5] Truly independent directors are directors who are legally independent and are not socially connected to the CEO.

Last, I examine whether shareholders benefit from changes in independent directors. Recent literature emphasizes both the monitoring and advising roles played by independent directors (Adams and Ferreira (2007), Adams (2009), and Adams, Hermalin and Weisbach (2010)). While social ties between a CEO and independent directors can enhance a board's advising effectiveness since a CEO is more willing to share information with and seek advice from a friendly board, it is unclear whether shareholders capture the benefits from the enhanced boardroom collaboration since CEO-board connections may also compromise the monitoring effectiveness of the board. I directly test the impact of board social dependence[6] on firm value.

Specifically, I collect a sample of 1,489 CEO succession events between 2000 and 2007. I focus on heterogeneity at the director level, analyzing who left the board and who were appointed to the board during the first year of a CEO's tenure. I find that incumbent independent directors who lack connections to the succeeding CEO are significantly more likely to depart after the new CEO takes charge. And, as expected, compared to exiting independent directors, new independent directors are more likely to share prior connections with the succeeding CEO. Further analysis reveals that the impact of CEO-director social ties on independent director turnover is more pronounced when a firm is underperforming or when a firm has a lower percentage of truly independent directors on the board prior to CEO turnover. In addition, a new CEO's influence over director selection is primarily concentrated in non-competitive industries and in the years prior to the passage of SOX. Last, an increase in a board's social dependence is also associated with a decrease in firm value, especially when the firm's need for board advising is low.

[6] Board social dependence is measured as the number of legally independent directors socially connected to the CEO, normalized by the total number of directors on the board.

Taken together, the evidence suggests that a new CEO, especially a powerful one, is able to influence independent director turnover and bargain for a friendly board immediately upon taking charge. While a friendly board facilitates boardroom collaboration, it seems that the benefits of enhanced team collaboration are entirely captured by the new CEO rather than by the shareholders of the firm.

The paper makes three contributions to the literature. First, my study adds to the research that studies the consequences of CEO succession on various aspects of the firm. I build on prior research that finds a substantial within-firm change in board composition following CEO succession (Hermalin and Weisbach (1988) and Denis and Sarin (1999)) and explore further the CEO-director relationship to explain such changes on the board. I show that an incoming CEO can have significant impact on the retentions/additions of independent directors. While the extent to which a new CEO can initiate change in the boardroom has attracted considerable attention in the media over the last decade (Foshee (1998)) and Worthen, Scheck and Lublin (2011)), this paper is the first large-sample study presenting quantitative evidence on a new CEO's influence on board composition. Hermalin and Weisbach (1988) show that new independent directors are often hired to replace departing independent and inside directors after a succeeding CEO assumes office and this often leads to an increase in the percentage of independent directors on the board. They offer two possible explanations for this. First, a new CEO may not be ready to promote inside directors who are likely to be his successors; he thus hires independent directors who will serve as his advisers. Second, since a new CEO has relatively less bargaining power compared to an established CEO, shareholders are able to put more

independent directors on the board to monitor the new CEO. My results support their first conjecture.

Second, my study offers insight into the effect of CEO power on *within-firm* change in board composition and complements recent studies that examine the *cross-sectional* relationship between CEO power and director selection (Westphal and Zajac (1995), Boone, Field, Karpoff and Raheja (2007), Linck, Netter and Yang (2008), Hwang and Kim (2009), and Fracassi and Tate (2009)). As Adams, Hermalin and Weisbach (2010) point out, none of the above-mentioned studies shed light on the *within-firm change* in board composition. In contrast, I use firm-CEO fixed effects regressions to control for unobserved firm-specific factors, and explore firm-specific time-varying changes in board composition. I also control for a wide array of director expertise and perceived quality measures that may affect director selection (Adams, Gray and Nowland (2010)). Consistent with the predictions of the bargaining model in Hermalin and Weisbach (1998), my evidence suggests that a CEO has considerable influence on within-firm change in board composition, and a powerful CEO is more likely to bargain for a friendly board. While previous studies suggest that CEOs who sit on the nominating committees of boards, who are chairmen of the board, or who are connected to existing board members are more likely to influence new director selection (Shivdasani and Yermack (1999)), Westphal and Zajac (1995), Fracassi and Tate (2009)), and Zajac and Westphal (1996)), I show that in the CEO succession context, an incoming CEO's power to bargain for a friendly board is higher when he is expected to initiate substantial changes in the firm or when internal and external governance is weak.

Finally, my study contributes to the recent literature on outside director turnover. Yermack (2004) suggests that poor performance is positively correlated with outside director turnover. Other studies suggest that outside directors are more likely to leave a board when they enter into disputes with the management (Agrawal and Chen (2009)) or when they are likely to possess negative information about the firm (Fahlenbrach, Low and Stulz (2010)). I show that independent director turnover can also be affected by social connections between the CEO and outside directors.

The remainder of this paper is organized as follows. Section 2 reviews the literature and develops testable hypotheses. Section 3 describes the construction of the sample and variables. Section 4 presents the empirical results and discusses the implications. Section 5 concludes.

II.2. Literature review and hypotheses development

In this section, I first develop hypotheses regarding how CEO-director connections affect the departure of existing independent directors and the addition of new independent directors. I then discuss the consequences of such changes on the board.

When a new CEO takes charge, he may not have developed good working relationships with existing independent directors. Existing independent directors with no past connections to the new CEO (henceforth "unconnected directors") may be less willing to continue serving on the board with a new CEO about whom they know very little. As existing independent directors may also have different views about the source of a firm's problems and the strategic changes it needs to make, a new CEO may encourage some independent directors to whom he is not connected to leave the board and will then

replaces them with "friendly" independent directors in order to strengthen his control of the board. This leads to the following hypothesis:

H1: Independent directors with no past connections to the succeeding CEO are more likely to leave the board after the new CEO takes office, and they will be replaced by new independent directors who are socially connected to the succeeding CEO.

How much influence a CEO has on the selection of independent directors depends on the CEO's relative bargaining power over the incumbent board. Shivdasani and Yermack (1999) document that a firm is more likely to appoint inside directors when the CEO is on the nominating committee of the board. Moreover, in firms where CEOs have more bargaining power over the boards (e.g., when a CEO is chairman of the board or when the board is less independent of the CEO), new directors are more likely to be demographically similar to the CEOs (Westphal and Zajac (1995)), share more past connections with the CEOs (Fracassi and Tate (2009)), or may have served on other boards that are friendly to management (Zajac and Westphal (1996)).

Previous studies suggest that independent directors who joined a board before the incumbent CEO are less subject to the CEO's influence and make better monitors than directors who joined the board after the CEO took office (Wade, O'Reilly, and Chandratat (1990), Core, Holthausen, and Larcker (1999) and Coles, Daniel, and Naveen (2007)). However, CEO turnover may follow a prolonged period of poor performance and the board may need to hire a superior replacement manager to initiate substantial organizational changes within the firm. A new CEO may have greater bargaining power over the incumbent board when the CEO is hired into an underperforming company as "a corporate savior" (Khurana (2002)). The CEO may then be able to bring in independent

directors with whom he is socially connected. Since the new CEO is expected to initiate strategic changes in the firm, he also has an incentive to bring in independent directors who are likely to be his supporters and as well as capable advisers of strategic issues.

I use firm operating performance prior to CEO turnover as a measure of a firm's need for organizational change. Shen and Cannella (2002) suggest that firms that experienced poor performance prior to CEO turnover are expected to initiate substantial strategic changes. I expect newly elected independent directors to be more likely to share social connections with the succeeding CEO when the firm is performing poorly.

Several studies (Giroud and Mueller (2010, 2011) and Kim and Lu (2010, 2011)) document that good internal and external governance reduces a CEO's power within the firm. Following these studies, I use the percentage of truly independent directors prior to CEO turnover as a measure of internal governance, and the industry concentration ratio and the passage of SOX as measures of external governance. I posit that good internal and external governance reduces a CEO's influence over director selections.

This prediction is summarized in the second hypothesis:

H2: The effect of CEO-director connections on independent director turnover is more pronounced when the incoming CEO's bargaining power over the board is high.

Despite the high costs associated with board social dependence such as excessive CEO compensation and value-destroying acquisitions (Hwang and Kim (2009) and Fracassi and Tate (2009)), social connections between new CEOs and independent directors can enhance boardroom collaboration and the boards' advising effectiveness. Although new independent directors may lack the firm-specific knowledge which incumbent directors have acquired during their tenure on the board, they typically bring a

fresh perspective that facilitates implementation of new strategies during a transition period. Therefore, whether the benefits of board advising as a result of increased board social dependence can balance out the costs of weakened board monitoring depends on a firm's need for board advising. This leads to the following hypothesis:

H3: An increase in board social dependence is detrimental to firm value, especially when a firm's need for board advising is low.

II.3. Sample and variables

II.3.A. Sample

I use the BoardEx database[7] to identify all CEO turnover events between 2000 and 2007.[8] For each firm, if the executive listed as the CEO in any year is different from the CEO listed for the previous year, I treat it as a CEO turnover event.[9] I then identify the date and cause of CEO turnover through a Lexis/Nexis news search. Following previous studies (Parrino (1997), Huson, Parrino, and Starks (2001), Parrino, Sias and Starks (2003), Huson, Malatesta and Parrino (2004), and Jenter and Kanaan (2008)), a turnover event is defined as *forced* if it is not due to the following reasons: sudden death, health, normal retirement (when the CEO is 60 years old or older, or the retirement is announced six months prior to CEO turnover), move to a higher/comparable level position at another firm. I exclude CEO turnover events due to mergers, acquisitions, or spinoffs. Firm year observations involving interim CEOs or co-CEOs are also deleted. To

[7] http://www.boardex.com/. See the Appendix in Fracassi and Tate (2009) for a detailed description of the BoardEx database.

[8] The sample starts from 2000, because the coverage of BoardEx Directors database is rather limited prior to 2000. BoardEx began covering board information of S&P 500, S&P mid-cap 400, and S&P small-cap 600 firms in 2000 and gradually increased their coverage of US firms over time. The sample ends in 2007, because I need at least two years of board composition information to calculate changes in independent directors.

[9] CEO turnover occurred in approximately 11% of the firm-year observations in the BoardEx database, which is comparable to recent studies using the Risk Metrics director database (Mobbs (2009)).

clearly isolate the effect of one CEO succession event on the changes in board composition, I require the departing CEO to be in office for at least two years prior to CEO turnover and the succeeding CEO to serve for two years or more. I define an outside CEO succession as one where the new CEO has been with the firm for less than one year before becoming CEO. I obtain financial information from Compustat, stock price information from CRSP, and institutional holdings from Thomson Reuters 13F filings. The final sample consists of 1,489 CEO succession events,[10] among which 678 departing CEOs were fired and 417 new CEOs were hired from outside the firm. All continuous variables are winsorized at the 1st and 99th level to reduce the influence of outliers. Variable definitions are presented in Appendix II.A. For director level regressions, I include firm-CEO fixed effects.[11] For firm level regressions, I include Fama-French 12 industry fixed effects and calendar year fixed effects.

II.3.B. Measures of CEO-director connections

Current debate on the effectiveness of board governance centers on whether CEOs are able to fill their boards with directors who are legally independent, but nevertheless socially connected to them. To maintain their personal relationships with the CEOs, connected directors[12] may well compromise their fiduciary duties to shareholders. The public media are also critical of independent directors who share social ties with the CEOs through common educational background and employment. They see these

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[10] The sample consists of 1,409 unique firms. Among the 1,409 firms, 1,265 firms experienced one CEO succession event, 109 firms experienced two CEO succession events, and 2 firms experienced three CEO succession events, during the sample period. Excluding the firms that experienced multiple CEO succession events does not affect the empirical results.

[11] Firm-CEO fixed effect regression is equivalent to firm fixed effect regression for firms that experienced only one CEO succession event during the sample period.

[12] "Connected directors" refers to directors who are legally independent but have prior social connections to the CEOs.

connected independent directors as being too sympathetic to management (Davidoff (2010)).

I collect CEO and director education, social activity, and employment information[13] from the BoardEx database.[14] The BoardEx database contains demographic information for directors of U.S. public companies. The BoardEx employment file reports detailed information on directors' employment histories, including their roles in organizations that they have worked for and their years of employment. The BoardEx education file reports information on directors' education histories, including the higher education institutions they attended, degree awarded, and their graduation years. The BoardEx activity file contains information on other organizations that these directors belong to, such as charitable organizations and leisure clubs. I construct dummy variables to measure three types of social connection between a CEO and a director formed prior to the CEO succession year[15] and outside the firm that experienced the CEO turnover. An independent director is connected to the incoming CEO via social activities (*Activity*) if they were members of the same social organization. An independent director is connected to the incoming CEO via education (*Education*) if they attended the same educational institution. An independent director is connected to the succeeding CEO via employment (*Employment*) if they worked for the same company or served on the same board outside

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[13] Among the outside directors in my sample, 0.33% have no employment history, 23.05% have no activity, and 13.23% have no education information reported in the BoardEx database. When no information is available for a director, I treat her as unconnected to the CEO. This is likely to lead to measurement errors in the social tie variables and is likely to bias me against finding any significant results.

[14] The BoardEx database may assign different identification numbers to one organization. For example, Harvard Business School has two names in the database (Harvard Business School and Harvard Graduate School of Business Administration) with two different identification numbers. I code both of them as the business school of Harvard University and assign them a unique identification number.

[15] For about 50% of the directors in the sample, the activity or degree dates are unknown. Since education ties are more likely to be formed before an executive becomes a CEO or a director, I include such weak ties in my analyses and also test the sensitivity of my results to missing dates.

the focal firm that experienced a CEO succession. I then create a dummy variable that equals 1 if an independent director is connected to the CEO through prior activity, education or employment, and 0 otherwise. As a robustness check, I also use the total number of social ties between a director and a CEO in my empirical analyses and I obtain similar results. Furthermore, Duchin and Sosyura (2010) and Chidambaran, Kedia and Prabhala (2010) suggest that the effects of social connections on corporate decisions vary across the three types of social ties. I also examine how each type of CEO-director social connections affects independent director turnover differently.

II.4. Empirical results

II.4.A. Summary statistics

Panel A of Table II.1 shows the sample distribution by fiscal year. The number of CEO turnover events increased markedly in 2003, most likely because the BoardEx database increased their coverage of US firms in 2003.[16] The number of CEO turnover events in my sample decreased in 2007 because of the unavailability of post-CEO turnover board information for some firms that experienced CEO turnover in 2007. Panel B of Table II.1 tabulates the disclosed reasons for CEO turnover in my sample. 43.2% of the firms do not provide any information in their public news announcements regarding the cause of CEO turnover. The second most frequently cited reason for CEO turnover is retirement (32.1% of the sample). Based on the classification scheme used in previous studies ((Parrino (1997), Parrino, Sias and Starks (2003), Huson, Malatesta and Parrino (2004), and Jenter and Kanaan (2008)), however, Panel C of Table II.1 shows that 678 out of 1,489 departing CEOs were considered fired. It appears that firms routinely

[16] For a description of the trend of CEO turnover events over time, see Kaplan and Minton (2006).

obscure the actual cause of CEO turnover. Panel D of Table II.1 shows that Business Services, Banking, Electronic Equipment, Pharmaceutical Products, and Retail industries experienced the most frequent CEO succession events during the sample period.

Panel A of Table II.2 provides the summary statistics of firm characteristics. The sample firms have mean (median) total asset values of $8.58 (1.00) billion, Tobin's Q of 2.09 (1.46), R&D intensity of 0.21 (0.00), leverage ratio of 0.22 (0.19), SIC two-digit industry-adjusted ROA of 0.01 (0.01), fiscal year market-adjusted stock return of 0.06 (-0.04), annual stock return volatility of 0.45 (0.39), and a fraction of institutional block holdings of 0.17 (0.14) in the year prior to CEO succession. Two years after CEO succession, the sample firms have mean (median) total asset values of $9.96 (1.46) billion, Tobin's Q of 1.74 (1.36), R&D intensity of 0.13 (0.00), leverage ratio of 0.24 (0.20), and SIC two-digit industry-adjusted ROA of 0.01 (0.01). The average firm size is comparable to recent studies using the ExecuComp database to identify CEO turnover events (Jenter and Kanaan (2008)). In addition, pre-turnover firm stock return is much lower for forced CEO turnovers and outside CEO successions.

Panel B of Table II.2 presents the characteristics of departing and succeeding CEOs. The average (median) age of departing CEOs is 58 (59) years, with an average time in office of 9.59 (7.25) years. The average (median) age of succeeding CEOs is 50 (51) years, having been with the firm for an average (median) of 7.60 (4.55) years before assuming the title of the CEO.

Panel C of Table II.2 presents the board composition of the sample firms in the fiscal years immediately prior to and following CEO turnover. In the year prior to CEO turnover, the average (median) firm has 9.21 (9.00) directors, 67.84% (71.43%) of whom

are independent directors. 66% of the departing CEOs are also chairmen of the board. The board composition is similar to recent studies using the IRRC director database (Masulis, Wang and Xie (2010)) and BoardEx database (Schmidt (2009)). One year after CEO turnover, the average (median) firm has 9.18 (9.00) directors, 73.66% (75.00%) of which are independent. This is consistent with the evidence in Hermalin and Weisbach (1988) that firms increase their board independence after a change in CEO. Further, 29% of the succeeding CEOs are also chairmen of the board, suggesting a separation of CEO and Chairman of the Board positions during a transition in leadership (Brickley, Coles and Jarrell (1997)).

Panel D1 and D2 of Table II.2 provide summary statistics of independent director departures/additions surrounding CEO succession years. My measure of firm-level independent director departure rate is defined as the total number of independent directors left during years following CEO succession, normalized by the total number of independent directors in the year prior to CEO succession. More specifically, pre-succession board composition is measured in the fiscal year prior to CEO succession and post-succession board composition is measured in the fiscal year after CEO succession. The CEO succession year is event year zero. [17] The mean and median independent director departure rates from the year prior to CEO succession to the year after CEO succession are 14% and 8%, respectively.[18] It also appears that independent director departure concentrates within a two-year window[19] surrounding a CEO succession, as the

[17] The CEO succession year is determined by the effective date of a CEO succession.
[18] For non-CEO turnover years in the BoardEx database, the average (median) independent director departure rate for a two-year period is approximately 8% (0%).
[19] From one year prior to CEO succession to one year after CEO succession.

mean (median) independent director departure rate for a three-year window[20] is 16% (11%), only slightly higher than the independent director departure rate for a two-year window. This is consistent with the evidence in previous studies (Gabarro (1985), Gabarro (1987), and Romanelli and Tushman (1994)) that substantial organizational changes are implemented within the first eighteen months of CEO successions. Firms also appear to hire independent directors, to replace exiting gray and inside directors,[21] since the mean and median independent director addition rates[22] are much higher than the corresponding independent director departure rates for a two-year period surrounding CEO succession. In my empirical analysis, I follow Ward, Bishop and Sonnenfeld (1999), using a two-year window to capture much of the change in board composition without allowing excessive time to elapse and letting normal director retirement contaminate my results.[23]

II.4.B. Analysis of independent director turnover

B.1. Independent director characteristics

I now turn to an analysis of how each independent director is affected by a change in CEO. I consider three groups of director characteristics that may influence an independent director's departure/addition likelihood during CEO succession years. The first group of director characteristics, which is the focus of the analysis, considers a director's past connection to the succeeding CEO. I expect directors with no past connection to the succeeding CEO to be more likely to leave the board after the new CEO

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[20] From one year prior to CEO succession to two years after CEO succession.
[21] "Gray directors" refer to directors who have business relations with the firm or personal relationships with the firm's management team. "Inside directors" are directors who are also employees of the firm.
[22] Independent director addition rate is defined as the total number of independent directors elected to the board during a two-year window of CEO succession, normalized by the total number of independent directors in the year prior to CEO succession.
[23] I obtain similar results if I use a three-year window to estimate changes in independent directors.

takes office. The second group of director characteristics includes director age, tenure, and gender. I use director age[24] and tenure to control for normal director retirement. The gender of the outside director may also matter since female directors are more likely to be retained for board diversity purposes (Adams and Ferreira (2009) and Ahern and Dittmar (2009)). The third group of variables includes director characteristics that may reflect their ability and incentive to serve on the board. I use the number of outside directorships at public companies as a proxy for a director's perceived quality in the labor market. Fama and Jensen (1983) suggest that the director labor market presents a useful way to measure a director's managerial skills and external reputation. Outside directors with reputations to protect in the labor market are likely to be more effective advisors and monitors. Consistent with this hypothesis, Masulis and Mobbs (2009) find that firms whose inside directors hold other external directorships have higher valuation. However, Ferris, Jagannathan and Pritchard (2003) and Fich and Shivdasani (2006) suggest that busy directors may be less effective monitors as they have less time for each of their board service. To capture the time outside directors have to serve on the board, I construct a dummy variable that equals 1 if a director holds three or more outside directorships and 0 otherwise. Vafeas (1999) finds that boards meet more frequently following performance deterioration and Fahlenbrach, Low and Stulz (2010) suggest that outside directors have incentives to leave the board when their workload is expected to increase. Since new CEOs may need more board advising and monitoring, busy directors

[24] As a robustness check, I use director age greater than 70, between 65 and 70, and below 65 dummy variables to control for the potential non-linear effect of director age on independent director turnover. This does not affect my results and conclusions.

who have high opportunity costs of time may be more likely to leave the board.[25] I also construct a dummy variable to measure whether a director has CEO experience at other publicly traded companies (i.e., CEO directors). Ahern and Dittmar (2009) suggest that director quality such as CEO experience may matter for firm performance. Fich (2005) finds that the stock market reacts positively to a firm's appointment of a director who is CEO of another firm. However, Fahlenbrach, Low and Stulz (2008) find that CEO directors may have limited influence on firm performance. Although the evidence on whether CEO directors add value is mixed, directors with CEO experience may be able to provide valuable advising to a new CEO during the transition in leadership. I also consider whether a director has related industry experience outside the firm or holds an MBA degree. Directors who have related industry experience may be more aware of alternative strategies employed by other firms in the same industry (McDonald, Westphal, and Graebner (2008)). Directors who hold MBA degrees may have broader industry knowledge and management skills. I expect firms to be more likely to retain directors who have reputations in the labor market, are female, have CEO or related industry experience, or have MBA degrees. In addition, I control for the past connection between a director and the departing CEO. I expect directors, who are connected to the departing CEO and thus supporters of him, to be more likely to leave the board after a change in CEO.

B.2. Independent director departure analyses

[25] As a robustness check, I use outside directorship and the square term of outside directorship to control for the effect of director busyness on independent director turnover. This does not alter my results or conclusions.

Panel A of Table II.3 shows the percentage of independent directors who are connected to succeeding CEOs. Among retained independent directors, 7.02% of them are connected to succeeding CEOs via social activity, 4.42% via educational institution, and 16.43% via a same employer. In contrast, a much lower percentage of departed independent directors shares social connections with succeeding CEOs. Among departed directors, 4.96% of them are connected to succeeding CEOs via social activity, 2.95% of them via educational institution, and 13.95% via same employment. The univariate comparison suggests that independent directors with past connections to a succeeding CEO are more likely to remain on the board following CEO succession.

Panel B of Table II.3 presents the summary statistics of other director characteristics. Compared to retained independent directors, exiting independent directors are older, have longer board tenure, hold fewer outside directorships, are less likely to be busy directors, and are less likely to hold MBA degrees. There is no significant difference between the two groups of directors in terms of their social connections to departing CEOs. 32.72% of the retained directors are connected to departing CEOs via activity, education or common employment outside the firm. 32.06% of the exiting directors share at least one past connection with departing CEOs.

To conduct a multivariate analysis of whether social connections between independent directors and succeeding CEOs affect the likelihood of director departure, I use firm-CEO fixed effect regressions to control for the heterogeneity in CEO succession events and explore the within-firm variation in director departure likelihood. Table II.4 presents the coefficient estimates for the firm-CEO fixed effect regressions. The dependent variable is equal to 1 if an independent director left the board during the two

years surrounding CEO succession and 0 otherwise. The main explanatory variable of interest is whether there is any past connection between an independent director and the succeeding CEO.

Column (1) of Table II.4 shows that independent directors who share past connections to a succeeding CEO are less likely to depart from the board. Having past social connection to a succeeding CEO reduces the likelihood of director departure by 2.6%. Given an average director departure likelihood of 14% during CEO succession years, the magnitude is both economically (an 18% increase in the likelihood of departure) and statistically significant.

In Column (2), I use other director characteristics variables as additional controls. The negative relationship between a director's connection to the incoming CEO and her likelihood of departure is still significant. Both director age and tenure are positively correlated with departure likelihood, suggesting that normal retirement also affects independent director departure at the time of CEO succession. Additionally, directors who hold fewer outside directorships or have related industry experience are more likely to depart from the board. Interestingly, whether an independent director shares a connection to the departing CEO does not seem to affect her likelihood of departure.

I also examine how various types of connection affect the likelihood of director departure and distinguish between strong and weak ties (Granovetter (2005)). Table II.5 shows the results. In Column (1), I replace the aggregate social connection measure with three separate measures of connection: social connection via activities, education and employment. Both the education and employment connections with the new CEO reduce a director's departure likelihood, but the effect of activity tie is not significant. The

insignificant coefficient of the activity tie may be caused by the measurement error in this variable. In Column (2), I further distinguish between strong and weak ties. If two individuals graduated from the same institution within two years of each other or worked for the same employer at the same time, they are connected to each other via strong ties. Otherwise, I consider their connection weak. When degree dates are unknown, I treat two individuals as weakly connected through past education if they attended the same institution. I find that independent directors who have weak education ties to the succeeding CEO are more likely to depart from the board following CEO succession. This result can be caused by the fact that degree dates are unknown for many directors in the sample. I also find that independent directors who worked with the succeeding CEO for the same employer at the same time are more likely to remain on the board. However, the differences between the effects of strong ties and those of weak ties are not statistically significant.

B.3. Independent director addition analyses

Panel C of Table II.3 shows the percentage of independent directors who are connected to succeeding CEOs. Among exiting directors, 4.96% are connected to succeeding CEOs via social activity, 2.95% via educational institution, and 13.95% via common employment. In contrast, a higher percentage of new independent directors shares social connections with succeeding CEOs. Among new independent directors, 6.26% are connected to succeeding CEOs via social activity, 4.61% via educational institution, and 14.56% via shared employment. The univariate comparison suggests that compared to exiting directors, new independent directors are more likely to have prior connections to succeeding CEOs.

Panel D of Table II.3 presents summary statistics of other director characteristics. Compared to exiting independent directors, new independent directors are younger, more likely to be female, less likely to be busy directors, more likely to have related industry experience, and more likely to hold MBA degrees. The evidence suggests that new independent directors are not lower in quality than exiting independent directors.

I estimate firm-CEO fixed effect regressions using the sample of new and exiting independent directors. The regression results are in Table II.6. The dependent variable is equal to 1 if an independent director was elected to the board after the new CEO was hired and 0 if an independent director left the board after the new CEO took office. Column (1) of Table II.6 shows that compared to exiting independent directors, new independent directors are 4.7% more likely to share prior connections with the succeeding CEO. In Column (2), I add other director characteristic variables as controls. Compared to exiting independent directors, all else equal, new independent directors are 5.1% more likely to have connections to succeeding CEOs. New independent directors are also younger and are more likely to have related industry experience. The overall quality of independent directors does not seem to decrease after CEO succession.

I then examine the effect of the various types of connections and distinguish between strong and weak connections. Table II.7 presents the results. In Column (1), I replace the aggregate social connection measure with three separate measures of connectedness: social connections via activities, education, and employment. Compared to exiting independent directors, new independent directors are more likely to have connections to the succeeding CEO via education and employment. The effect of activity ties, however, is not significant. The insignificance of the activity ties variable may be

caused by the measurement error in this variable. In Column (2), I distinguish between strong and weak ties. I find that new independent directors are more likely to have weak education ties to a succeeding CEO, which can be caused by the unavailability of degree dates for many directors in the sample. I also find that new independent directors are more likely to have worked with a succeeding CEO under the same employer, at the same time. However, the effects of strong ties are not statistically significantly different from those of weak ties.

I further test whether CEO power affects the relationship between CEO-director ties and director turnover. The regression results are presented in Panel A of Table II.8. In Column (1) of Panel A, I add an interaction term between CEO-director connection and a firm operating performance prior to CEO turnover greater than sample median dummy ($ROA_{[-1]}$_High). In Column (2) of Panel A, I add an interaction term between CEO-director connection and a board social independence prior to CEO turnover greater than sample median dummy ($BSIND_{[-1]}$_High). The evidence suggests that compared to exiting independent directors, new independent directors are more likely to share prior connections with a succeeding CEO hired into an underperforming firm or a firm with low level of board independence. However, the coefficient estimate of the ROA above sample median group and that of the ROA below sample median group are not statistically significantly different. In Column (3) of Panel A, I allow for a non-linear effect of the board's social independence on the relation between CEO-director tie and independent director turnover. I test the hypothesis that a CEO may not have sufficient power to influence board composition when the board's social independence is high and he may not have an incentive to influence board composition when the board's social

independence is low. More specially, I create two dummies variables to measure board social independence. $BSIND_{[-1]}$_High is equal to 1 if a board's social independence is in the highest tercile of its distribution and 0 otherwise. $BSIND_{[-1]}$_Medium is equal to 1 if a board's social independence is in the middle tercile of its distribution and 0 otherwise. The results show that a CEO is able to influence direction selection when the board's social independence is in the lowest tercile, although the differences between the three groups are not statistically significant.

I also test whether external governance affects the relationship between CEO-director ties and independent director turnover. The regression results are presented in Panel B of Table II.8. In Column (1) of Panel B, I add an interaction term between CEO-director ties and an industry concentration greater than sample median dummy ($HHI_{[-1]}$_High), where the industry concentration ratio is measured as the sum of the squares of percentage market share in sales of all firms in the 2-digit SIC industry. A higher industry concentration ratio indicates a less competitive industry. In Column (2) of Panel B, I add an interaction term between CEO-director ties and an after SOX dummy, where the after SOX dummy is equal to 1 if the CEO succession year is after 2003 and 0 otherwise. Although SOX does not prohibit firms from hire independent directors who are socially connected to their CEOs, Kim and Lu (2011) suggest that SOX may have weakened a CEO's power in the boardroom. The regression results suggest that compared to exiting independent directors, new independent directors are more likely to share prior connections with a succeeding CEO only in non-competitive industries and in the years prior to the passage of SOX, although the difference between the pre-SOX period and the post-SOX period is not statistically significant.

II.4.C. Director turnover and firm value

The recent literature emphasizes both the monitoring and advising roles played by independent directors (Adams and Ferreira (2007), Adams (2009), and Adams, Hermalin and Weisbach (2010)). While an increase in the board's social dependence is associated with weakened board monitoring, the overall value of a firm may not necessarily decrease as a friendly board also encourages boardroom collaboration, which is crucial for setting new corporate strategies (Foshee (1998)).

To examine how a change in the board's social dependence affects firm value, I estimate OLS regressions of post CEO turnover firm value improvement against the change in the board's social dependence while controlling for other financial and governance variables that may affect firm value. I follow previous studies (Kim and Lu (2010)) and examine changes in firm value, as measured by firm Tobin's Q. The dependent variable in the regression is change in Tobin's Q from one year prior to CEO turnover to two years after CEO turnover. The main explanatory variable is the change in the board's social dependence during a two-year window surrounding CEO succession. Following Huson, Malatesta and Parrino (2004), I include change in operating performance, firm size, firm R&D intensity, board size, board independence, and the percentage of block holdings as control variables, all measured at the end of the fiscal year prior to CEO turnover. Table II.9 shows the regression results. In Column (1), I do not control for pre CEO turnover Tobin's Q since it is likely to be correlated with the error term of the regression. In Column (2), I include pre CEO turnover Tobin's Q in my regression to control for mean reversion of firm value. The results in both columns show that an increase in a board's social dependence is detrimental to firm value, suggesting

that the benefits of better board advising are less than the costs of weakened board monitoring in the early years of a CEO's tenure.[26] The economic magnitude of the marginal effect is much smaller than that identified in Fracassi and Tate (2009), suggesting that boardroom collaboration brings additional benefits during a transition in leadership.

I then test whether the effect of board social dependence on firm value varies with a firm's need for board advising. Since an increase in board social dependence strengthens the advising effectiveness of the board but weakens the monitoring effectiveness of a board, it is more likely to impair firm value when the firm's need for board advising is low. I first add an interaction term between change in board social dependence and a dummy variable that equals 1 if a firm's R&D intensity ($R\&D/Sale_{[-1]}$_High) prior to CEO turnover is greater than the sample median. The results in Column (1) of Table II.10 show that the detrimental effect of board social dependence is primarily concentrated in low R&D intensity firms. This suggests that as firms with low R&D intensity are less likely to subject to information asymmetry and independent directors of these firms do not need to rely on insiders for firm-specific information, these firms benefit less from increased board social dependence. In Column (2) of Table II.10, I add

[26] In unreported results, I also use a Heckman selection model to adjust for a potential selection problem. Specifically, for the first stage, I estimate a probit model where the dependent variable is equal to 1 if the firm remains independent and has financial information available for the two years following CEO turnover. The explanatory variables used in the Heckman selection model include firm operating performance and board characteristics, measured at the end of the fiscal year prior to CEO turnover. The regression also includes CEO age, CEO tenure with the firm, outside CEO dummy, block holdings, and fiscal year. I then include the inverse Mill's ratio (IMR) in the second stage regression. The inverse Mill's ratio is not statistically significant in the second stage regression (with a regression coefficient of 0.239 and a p-value of 0.717). The coefficient for the change in board social dependence in the second stage regression is -0.592 with a p-value of 0.019. The coefficients for other explanatory variables in the second stage regression remain qualitatively similar after I adjust for the potential selection bias. However, a lack of exclusion restriction makes the effect of adjusting for sample selection bias rather limited.

an interaction term between change in board social dependence and a dummy variable that equals 1 if a firm's board social dependence ($BSD_{[-1]}$_High) prior to CEO turnover is higher than the sample median. The results show that the detrimental effect of board social dependence on firm value is larger for firms with high pre-existing levels of board social dependence, which are less likely to benefit from increased board social dependence. However, the differences between the groups are not statistically significant.

II.4.D. Additional tests

D.1. Excluding certain independent directors

In my sample, 201 independent directors may have left the board prior to CEO succession. Excluding these directors does not affect my results. Since firms may have mandatory retirement age or term restrictions for independent directors, I exclude potential retiring independent directors who are 69 years old or older or have been on the board for more than six years. The regression results are similar. In addition, I re-estimate my firm-CEO fixed effect departure likelihood regressions using conditional logit models and obtain similar results. Furthermore, 242 independent directors may have joined the board prior to CEO succession and I obtain similar results if I exclude these independent directors from my director addition analyses.

D.2. Including gray directors

Outside directors include both independent and gray directors. Gray directors are directors who have business relations with the firm or personal relationships with the firm's management team. After CEO departure, gray directors may leave the board and they may be replaced by new independent or gray directors. To test whether my results hold for all outside directors, I rerun my firm-CEO fixed effect director level regressions

including both independent directors and gray directors and I obtain similar results. In addition, compared to independent directors, gray directors are more likely to depart from the board after a change in CEO. Consistent with an increase in board independence following CEO succession, newly hired outside directors are more likely to be legally independent.

II.5. Conclusion

Independent directors play a critical role on corporate boards. As representatives of shareholders, independent directors are expected to alleviate agency problems caused by the separation of ownership and control in modern corporations (Fama (1980)). High-profile corporate scandals in the early 2000s led to recent stringent regulations aimed at ensuring board independence and strengthening board monitoring. Truly independent directors, however, are difficult to find. In this paper, I present evidence that a new CEO can have significant influence over who is retained on the board and who is elected to the board upon his promotion to the CEO position. In addition, the effect of CEO-director relationship on director turnover is more pronounced when the new CEO is likely to be powerful and when external governance is weak. Finally, an increase in the board's social dependence is detrimental to shareholder value, when the benefits from enhanced boardroom collaboration are likely to be low. My results suggest that board restructuring following CEO succession is unlikely to be random and underscore the importance of examining CEO-direction relationships when analyzing changes in board composition.

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Table II.1. Sample distribution

The sample consists of 1,489 CEO succession events identified from the BoardEx database. To be included in the sample, the departing CEO must be in office for at least two years and the succeeding CEO must survive for two years or more. Succession events due to mergers, acquisitions, and spinoffs are excluded. Firm year observations involving interim CEOs and co-CEOs are also deleted.

Panel A: Year distribution

Year	Frequency	Percentage
2000	121	8.1%
2001	113	7.6%
2002	135	9.1%
2003	201	13.5%
2004	282	18.9%
2005	262	17.6%
2006	237	15.9%
2007	138	9.3%
Total	1,489	100.0%

Panel B: Reported reasons for CEO succession

Category	Frequency	Percentage
No reason	643	43.2%
Retire	478	32.1%
Resign	151	10.1%
Pursue Other Interest	56	3.8%
Jump Ship	35	2.4%
Ousted	33	2.2%
Fraud	30	2.0%
Health	20	1.3%
Death	16	1.1%
CEO/Chairman Separation	13	0.9%
Shareholder Control	9	0.6%
Restructure	5	0.3%
Total	1,489	100.0%

Panel C: Tabulation of CEO succession events by succession context

Frequency	Inside CEO succession	Outside CEO succession	Total
Voluntary CEO turnover	629	182	811
Forced CEO turnover	443	235	678
Total	1,072	417	1,489

Panel D: Top five industries that experienced CEO succession events

Fama-French 48 industry	Count	Percentage
Business Services	159	10.7%
Banking	139	9.3%
Electronic Equipment	95	6.4%
Pharmaceutical Products	87	5.8%
Retail	66	4.4%

Table II.2. Summary statistics
This table provides the summary statistics for 1,489 firms included in the sample. Definitions of variables are in Appendix II.A.

Panel A: Firm characteristics	Mean	Median	Std.Dev
One year prior to CEO turnover			
Total Assets, in billons	8.58	1.00	31.96
Tobin's Q	2.09	1.46	1.70
R&D/Sale	0.21	0.00	1.05
Leverage	0.22	0.19	0.20
Industry-adjusted ROA	0.01	0.01	0.23
Market adjusted stock return	0.06	-0.04	0.52
Stock return volatility	0.45	0.39	0.25
Fraction of block holdings	0.17	0.14	0.15
Two years after CEO turnover			
Total Assets, in billions	9.96	1.46	34.05
Tobin's Q	1.74	1.36	1.08
R&D/Sale	0.13	0.00	0.66
Leverage	0.24	0.20	0.22
Industry-adjusted ROA	0.01	0.01	0.19
Panel B: CEO characteristics	**Mean**	**Median**	**Std.Dev.**
Departing CEO characteristics			
Age	58.32	59.00	8.47
Tenure as CEO	9.59	7.25	7.58
Succeeding CEO characteristics			
Age	50.54	51.00	6.84
Tenure with the firm	7.60	4.55	8.43
Panel C: Board characteristics	**Mean**	**Median**	**Std.Dev**
In the year prior to CEO turnover			
Board Size	9.21	9.00	2.94
Board Independence	67.84%	71.43%	16.89%
CEO/Chairman duality	0.66	1.00	0.47
One year after CEO turnover			
Board Size	9.18	9.00	2.63
Board Independence	73.66%	75.00%	14.08%
CEO/Chairman duality	0.29	0.00	0.45
Panel D1:			
# Outside director departed / # Outside directors $_{[-1]}$	Mean	Median	Std.Dev
[Prior to CEO turnover, New CEO elected to board]	0.07	0.00	0.14
[Prior to CEO turnover, One year after CEO turnover]	0.14	0.08	0.19
[Prior to CEO turnover, Two years after CEO turnover]	0.16	0.11	0.21
Panel D2:			
# New outside directors / # Outside directors $_{[-1]}$	Mean	Median	Std.Dev
[Prior to CEO turnover, One year after CEO turnover]	0.29	0.20	0.34

Table II.3. Independent director characteristics
This table describes the characteristics of 7,939 retained, 1,391 exiting, and 2,171 new independent directors of the sample firms that experienced CEO succession during years 2000 to 2007. Variable definitions are in Appendix II.A. Panel A and B compare the characteristics of retained and exiting independent directors. Panel C and D compare the characteristics of exiting and new independent directors.

Panel A: *Percentage connected to succeeding CEO*	(1) Retained N=7,939	(2) Exiting N=1,391	(1)-(2) p-value
Any tie	24.07%	19.63%	0.000***
Activity tie	7.02%	4.96%	0.004***
Education tie	4.42%	2.95%	0.003***
Employment tie	16.43%	13.95%	0.015**
Panel B: *Other director characteristics*	(1) Retained N=7,939	(2) Exiting N=1,391	(1)-(2) p-value
Tenure	6.79	8.44	0.000***
Age	59.37	62.09	0.000***
Female	12.08%	9.35%	0.003***
Outside directorships	1.28	1.12	0.002***
Busy directors	18.52%	16.10%	0.031**
CEO experience	21.05%	20.78%	0.818
Related industry experience	18.35%	20.20%	0.111
MBA	29.85%	27.03%	0.033**
Percentage connected to the departing CEO	32.72%	32.06%	0.626
Panel C: *Percentage connected to succeeding CEO*	(1) Exiting N=1,391	(2) New N=2,171	(1)-(2) p-value
Any tie	19.63%	22.52%	0.038**
Activity tie	4.96%	6.26%	0.095*
Education tie	2.95%	4.61%	0.009***
Employment tie	13.95%	14.56%	0.612
Panel D: *Other director characteristics*	(1) Exiting N=1,391	(2) New N=2,171	(1)-(2) p-value
Age	62.09	56.25	0.000***
Female	9.35%	14.14%	0.000***
Outside directorships	1.12	1.10	0.788
Busy directors	16.10%	13.96%	0.082*
CEO experience	20.78%	22.34%	0.269
Related industry experience	20.20%	23.86%	0.011**
MBA	27.03%	35.47%	0.000***

Table II.4. Director departure: baseline results
The dependent variable is equal to 1 if an independent director departed from the board during (-1, +1) years surrounding CEO turnover, and 0 if an independent director is retained on the board during (-1, +1) years surrounding CEO turnover. Definitions of explanatory variables are in Appendix II.A. Robust and clustered (at firm level) standard errors are reported in parentheses. ***, **, and * indicate the statistical significance based on two-sided tests at 1%, 5%, and 10% level, respectively.

Dependent variable: Exit=1/Retained=0	(1)	(2)
Connections to the succeeding CEO		
Tie	-0.028**	-0.026**
	(0.011)	(0.011)
Other director characteristics		
Tenure		0.006***
		(0.001)
Director Age		0.004***
		(0.001)
Female		0.006
		(0.011)
Outside directorships		-0.006*
		(0.004)
Busy director dummy		0.001
		(0.015)
CEO experience		0.012
		(0.010)
Related industry experience outside the firm		0.022*
		(0.012)
MBA degree		-0.006
		(0.008)
Connected to departing CEO dummy		0.002
		(0.010)
Constant	0.156***	-0.134***
	(0.004)	(0.033)
Firm-CEO fixed-effects	Yes	Yes
Observations	9,330	9,313
R^2	0.262	0.284

Table II.5. Director departure: additional analyses
The dependent variable is equal to 1 if an independent director departed from the board during (-1, +1) years surrounding CEO turnover, and 0 if an existing independent director is retained on the board during (-1, +1) years surrounding CEO turnover. Definitions of explanatory variables are in Appendix II.A. Robust and clustered (at firm level) standard errors are reported in parentheses. ***, **, and * indicate the statistical significance based on two-sided tests at 1%, 5%, and 10% level, respectively.

Dependent variable: Exit=1/Retained=0	(1)	(2)
Activity Tie	-0.001	-0.001
	-0.016	(0.016)
Education Tie	-0.039**	
	(0.019)	
Employment Tie	-0.030**	
	(0.014)	
Education Tie *same time*		-0.029
		(0.039)
Education Tie *not same time*		-0.039*
		(0.020)
Employment Tie *same time*		-0.043**
		(0.017)
Employment Tie *not same time*		-0.002
		(0.022)
Director characteristics	Yes	Yes
Firm-CEO fixed-effects	Yes	Yes
Observations	9,313	9,313
R^2	0.285	0.285
F-test: Education Tie *same time*=Education Tie *not same time*		
p-value		*0.836*
F-test: Employment Tie *same time*=Employment Tie *not same time*		
p-value		*0.108*

Table II.6. Director addition: baseline results
The dependent variable is equal to 1 if an independent director is added to the board during (-1, +1) years surrounding CEO turnover, and 0 if an existing independent director left the board during (-1, +1) years surrounding CEO turnover. Definitions of explanatory variables are in Appendix II.A. Robust and clustered (at firm level) standard errors are reported in parentheses. ***, **, and * indicate the statistical significance based on two-sided tests at 1%, 5%, and 10% level, respectively.

Dependent variable: New=1/Exit=0	(1)	(2)
Connections to the succeeding CEO		
Tie	0.047*	0.051**
	(0.026)	(0.025)
Other director characteristics		
Director Age		-0.017***
		(0.001)
Female		-0.013
		(0.032)
Outside directorships		-0.004
		(0.012)
Busy director dummy		-0.049
		(0.051)
CEO experience		0.020
		(0.028)
Related industry experience		0.075**
		(0.030)
MBA degree		0.036
		(0.024)
Constant	0.598***	1.535***
	(0.011)	(0.075)
Firm-CEO fixed-effects	Yes	Yes
Observations	3,562	3,533
R^2	0.303	0.377

Table II.7. Director addition: additional analyses
The dependent variable is equal to 1 if an independent director is added to the board during (-1, +1) years surrounding CEO turnover, and 0 if an existing independent director left the board during (-1, +1) years surrounding CEO turnover. Definitions of explanatory variables are in Appendix II.A. Robust and clustered (at firm level) standard errors are reported in parentheses. ***, **, and * indicate the statistical significance based on two-sided tests at 1%, 5%, and 10% level, respectively.

Dependent variable: New=1/Exit=0	(1)	(2)
Activity Tie	-0.025	-0.027
	(0.048)	(0.048)
Education Tie	0.112*	
	(0.058)	
Employment Tie	0.065*	
	(0.035)	
Education Tie *same time*		0.079
		(0.175)
Education Tie *not same time*		0.122**
		(0.061)
Employment Tie *same time*		0.078*
		(0.041)
Employment Tie *not same time*		0.038
		(0.058)
Director characteristics	Yes	Yes
Firm-CEO fixed-effects	Yes	Yes
Observations	3,533	3,533
R^2	0.412	0.414
F-test: Education Tie *same time*=Education Tie *not same time*		
p-value		*0.819*
F-test: Employment Tie *same time*=Employment Tie *not same time*		
p-value		*0.532*

Table II.8. Director addition: interaction effects
The dependent variable is equal to 1 if an independent director is added to the board during (-1, +1) years surrounding CEO turnover, and 0 if an existing independent director left the board during (-1, +1) years surrounding CEO turnover. Definitions of explanatory variables are in Appendix II.A. Robust and clustered (at firm level) standard errors are reported in parentheses. ***, **, and * indicate the statistical significance based on two-sided tests at 1%, 5%, and 10% level, respectively. All regressions control for director characteristics and Firm-CEO fixed effects.

Panel A: Dependent variable: New=1/Exit=0	(1)	(2)	(3)
Tie	0.082**	0.101***	0.093**
	(0.034)	(0.035)	(0.038)
Tie × ROA $_{[-1]}$_High	-0.080		-0.025
	(0.050)		(0.064)
Tie × BSIND $_{[-1]}$_High		-0.094*	-0.091
		(0.049)	(0.056)
Tie × BSIND $_{[-1]}$_Medium			
F-test: Tie + Tie × ROA $_{[-1]}$_High	0.002		
p-value	*0.944*		
F-test: Tie + Tie × BSIND $_{[-1]}$_High		0.007	0.068
p-value		*0.843*	*0.190*
F-test: Tie + Tie × BSIND $_{[-1]}$_Medium			0.002
p-value			*0.960*
Observations	3,533	3,533	3,533
R^2	0.379	0.378	0.378
Panel B: Dependent variable: New=1/Exit=0	(1)	(2)	(3)
Tie	0.051**	0.004	0.102**
	(0.025)	(0.032)	(0.046)
Tie × HHI $_{[-1]}$_High		0.107**	
		(0.050)	
Tie × After_SOX			-0.062
			(0.054)
F-test: Tie + Tie × HHI $_{[-1]}$_High		0.111***	
p-value		*0.004*	
F-test: Tie + Tie × After_SOX			0.041
p-value			*0.158*
Observations	3,533	3,533	3,533
R^2	0.377	0.379	0.378

Table II.9. Board social dependence and firm value: baseline results
The dependent variable is change in firm Tobin's Q from one year prior to CEO turnover to two year after CEO turnover. Definitions of explanatory variables are in Appendix II.A. Robust and clustered (at firm level) standard errors are reported in parentheses. ***, **, and * indicate the statistical significance based on two-sided tests at 1%, 5%, and 10% level, respectively.

Dependent variable: ΔTobinQ $_{[-1,+2]}$	(1)	(2)
ΔBoard social dependence $_{[-1,+1]}$	-0.511*	-0.592***
	(0.290)	(0.213)
Turnover characteristics		
Voluntary turnover	0.084	-0.000
	(0.080)	(0.057)
Outside CEO	0.214**	0.113*
	(0.086)	(0.061)
Firm characteristics		
TobinQ $_{[-1]}$		-0.583***
		(0.034)
ΔROA $_{[-1,+2]}$	0.649	0.922**
	(0.526)	(0.401)
Log (Total Assets) $_{[-1]}$	0.061**	-0.044**
	(0.028)	(0.018)
R&D/Sale $_{[-1]}$	-0.083	0.077
	(0.073)	(0.058)
Governance controls		
Board size $_{[-1]}$	0.010	-0.009
	(0.019)	(0.013)
Board independence $_{[-1]}$	-0.027	0.007
	(0.019)	(0.014)
CEO/Chairman duality$_{[-1]}$	0.050	0.077
	(0.088)	(0.060)
Block holdings $_{[-1]}$	0.008***	-0.001
	(0.002)	(0.002)
Constant	-0.443	1.097**
	(0.362)	(0.442)
Year fixed-effects	Yes	Yes
Industry fixed-effects	Yes	Yes
Observations	1,275	1,275
R^2	0.094	0.548

Table II.10. Board social dependence and firm value: additional analyses
The dependent variable is change in firm Tobin's Q from one year prior to CEO turnover to two year after CEO turnover. Definitions of explanatory variables are in Appendix II.A. Robust and clustered (at firm level) standard errors are reported in parentheses. ***, **, and * indicate the statistical significance based on two-sided tests at 1%, 5%, and 10% level, respectively.

Dependent variable: ΔTobinQ $_{[-1,+2]}$	(1)	(2)
ΔBoard social dependence $_{[-1,+1]}$	-0.534***	-0.460*
	(0.183)	(0.278)
ΔBoard social dependence $_{[-1,+1]}$ × R&D/Sale $_{[-1]}$_High	-0.232	
	(0.518)	
ΔBoard social dependence $_{[-1,+1]}$ × BSD $_{[-1]}$_High		-0.279
		(0.399)
Turnover characteristics		
Voluntary turnover	-0.003	0.003
	(0.057)	(0.057)
Outside CEO	0.110*	0.098
	(0.060)	(0.062)
Firm characteristics		
TobinQ $_{[-1]}$	-0.580***	-0.583***
	(0.036)	(0.035)
ΔROA $_{[-1,+2]}$	0.871**	0.921**
	(0.404)	(0.401)
Log (Total Assets) $_{[-1]}$	-0.050***	-0.043**
	(0.018)	(0.018)
R&D/Sale $_{[-1]}$ High	0.137*	0.079
	(0.078)	(0.058)
Governance controls		
Board size $_{[-1]}$	-0.008	-0.010
	(0.013)	(0.013)
BSD $_{[-1]}$ High	0.007	0.010
	(0.014)	(0.014)
CEO/Chairman duality$_{[-1]}$	0.073	0.073
	(0.060)	(0.060)
Block holdings $_{[-1]}$	-0.001	-0.001
	(0.002)	(0.002)
Constant	1.051**	1.136**
	(0.463)	(0.440)

Year fixed-effects	Yes	Yes
Industry fixed-effects	Yes	Yes
Observations	1,275	1,275
R^2	0.547	0.549
ΔBoard social dependence $_{[-1,+1]} \times$ (1+ R&D/Sale $_{[-1]}$_High)	-0.766	
p-value	*0.123*	
ΔBoard social dependence $_{[-1,+1]} \times$ (1+BSD $_{[-1]}$_High)		-0.739
p-value		*0.014***

Appendix II.A. Variable definitions

Board characteristics	
Board independence	The number of directors that are legally independent, divided by the total number of directors on a board. Source: BoardEx.
Board size	The total number of directors on a board. Source: BoardEx.
CEO/Chairman duality	A dummy variable that equals 1 if a CEO is also the chairman of the board, and 0 otherwise. Source: BoardEx.
Individual director characteristics	
Director Tenure	Director tenure on the board. Source: BoardEx.
Age	Director age. Source: BoardEx.
Director Female	A dummy variable that equals 1 if the director is female, and 0 otherwise. Source: BoardEx.
Outside directorship	The number of outside directorships at public companies held by a director. Source: BoardEx.
Busy director	A dummy variable that equals 1 if the director holds three or more outside directorships at public companies. Source: BoardEx.
CEO	A dummy variable that equals 1 if the director has experience as a CEO of a public company. Source: BoardEx.
Industry experience	A dummy variable that equals 1 if the director has been employed by other public firms in the same Fama-French 48 industry as the firm in question and 0 otherwise. Source: BoardEx.
MBA	A dummy variable that equals 1 if the director has an MBA degree and 0 otherwise. Source: BoardEx.
Activity Tie	A dummy variable that equals 1 if two individuals are members of the same social organization, and 0 otherwise. Source: BoardEx.
Education Tie	A dummy variable that equals 1 if two individuals attended the same university. Source: BoardEx.
Employment Tie	A dummy variable that equals 1 if two individuals worked for the same firm at the same time and 0 otherwise. Source: BoardEx.
Tie	A dummy variable that equals 1 if two individuals share at least one past connection via activity, education, or employment. Source: BoardEx.
ConnectedDirector	A dummy variable that equals 1 if an independent director is legally independent but socially connected to the CEO. Source: BoardEx.
Board social dependence	The number of legally independent but socially connected directors, divided by the total number of directors. Source: BoardEx.
Governance control variables	
Block holdings	The sum of percentage stock holdings by institutions whose ownership is greater than 5%, measured at the fiscal year end prior to CEO turnover. Source: Thomson Reuters.
HHI	Industry Herfindahl-Hirschman Index, calculated in each fiscal year as the sum of the squares of percentage market share (in sales) of all firms in each 2-digit SIC industry. Source: Compustat.
Firm characteristics	
Firm size	The natural log of firm's assets (#6), in millions of dollars. Source: Compustat.

Leverage	Book leverage ratio, measured as total debt [long term debt (#9) + short term debt (#34)], divided by total assets (#6). Source: Compustat.
Tobin's Q	Market to book ratio, calculated as [total assets (#6) + market value of equity (#25×#199) – book value of equity (#60)], scaled by total assets (#6). Source: Compustat.
R&D/Sale	R&D intensity, measured as research and development expenditure (#46) scaled by total sales (#12); set to 0 if missing. Source: Compustat.
ROA (Operating performance)	Fiscal year return to assets, measured as operating income before depreciation (#13) divided by book value of total assets (#6), adjusted by 2-digit SIC industry median ROA. Source: Compustat.

Chapter III

Universities as Firms: The Case of U.S. Overseas Programs

III.1. Introduction

U.S. universities are the leading providers of higher education in the world. According to Newsweek 2006 global university ranking, 15 of the top 20 universities worldwide are American universities.[27] More than 580,000 foreign undergraduate and graduate students are currently studying in the U.S. They spend around 15 billion dollars yearly, propelling the education industry into the fifth largest export service sector in the U.S. (Bhandari and Chow, 2007). U.S. universities are also active in a wide range of international activities, from setting up cross-country research labs to offering degree programs in foreign countries.

This paper employs the standard economic analysis to study overseas degree programs offered by U.S. universities. If U.S. universities ever behave like firms, they are more likely to do so overseas, where they are not bound by the same set of obligations to domestic stakeholders as they are in the U.S. We analyze how university characteristics (i.e., supply side) and host country environment (i.e., demand side) interact to affect the likelihood of a university offering overseas programs, how universities choose location,

[27] Available at http://www.msnbc.msn.com/id/14321230/, accessed August 2007.

and how they determine program pricing (tuition). We examine these issues using hand-collected data on U.S. overseas programs from multiple sources.

Our analyses help address whether university motives for foreign direct investment (FDI) are different from those of multinational corporations (MNCs). While there are numerous studies about MNCs' FDI, to the best of our knowledge, there is no economics-based, scientific study of foreign investment by U.S. universities. We also gather a unique data set that provides a comprehensive picture of the nature and type of overseas degree programs offered by U.S. universities.

Although there are important differences between nonprofit universities and profit-seeking corporations, we assume universities, like firms, are subject to financial constraints and give high priority to increasing the present value of the revenue-cost difference. In such a framework, universities endued with different intellectual capital will self-select into two broad types: reputable institutions with selective admission standards and active research programs, or moderately ranked universities with relaxed admission standards and greater tuition dependency. Given these two types of universities, which type is more likely to have an overseas program? The answer is not immediately obvious. While moderately-ranked universities may be more willing suppliers, local demand would be greater for programs offered by the elite type. However, elite schools may be less willing to venture abroad because of their concerns for quality control, diluting brand names, and diverting home campus resources.

We start the paper comparing universities to firms. We discuss how economic motives and non-pecuniary factors affect universities' decision to offer overseas programs, providing an overview of the costs and benefits affecting the supply for and

demand of U.S. university overseas programs. This overview is based on our survey of articles published in the Chronicle of Higher Education. When we examine the historical archive of the Chronicle, we observe two major waves of U.S. overseas programs. The first wave occurred during the late 1980s to the mid 1990s, mainly led by moderately ranked universities with less stringent admission standards. After almost a decade of relative inactivity, a new surge of overseas programs appears, with active participation by highly reputable research universities.

During the first wave, most overseas programs were apt to be supply driven and failed due to the lack of demand in the host countries. For instance, more than 30 U.S. universities established branch campuses in Japan during its economic boom in the late 1980s. These universities had low name recognition and almost all of these overseas programs were closed by the mid-90s due to low enrollment. In contrast, the current wave is more demand driven, and the main suppliers are large research universities with high visibility and strong reputation. It appears that the best schools are making efforts to globalize their institutions and to provide higher education opportunities overseas.

Finance plays a decisive role in offering overseas programs. Schools with greater tuition-dependency are more likely to offer overseas programs. Their location choice illustrates the important role economics plays in these programs. Real GDP per capita and tertiary school age population are two key determinants of the location choice. U.S. universities target countries with large potential markets where the local population has the economic means to pay for their services. They also follow U.S. multinational corporations' FDI flows and invest in business friendly countries with loose regulations. Asia and the Middle East are the most popular destinations for overseas programs, but for

different reasons. Asia provides a large market with strong local demand for U.S. style education. Alternately, Middle Eastern countries are attractive because they grant substantial financial aid to sponsoring universities with their oil money.

Our analysis of tuition charges reveals that U.S. universities adjust their pricing to local conditions. They discount tuition less in countries with higher real GDP per capita. Undergraduate degree programs are discounted more than master degree programs because of greater local competition in the market for undergraduate degree programs. When universities reduce costs by forging local university partnerships and/or by obtaining financial support from local governments, they do not pass on the savings to local students in the form of lower tuition.

In sum, universities behave much like multinational corporations when they make overseas investments and operate overseas programs.

III.2. Universities as firms

III.2.A. Organizational structure and objective function

Universities differ from for-profit corporations in various ways. Universities provide both private and public goods. Their two main products are knowledge creation and knowledge dissemination through research and teaching. Research results are freely available to most members of society and help stimulate economic growth. Knowledge dissemination increases human capital, and the benefits can be direct to those who receive higher education, or indirect to those who benefit from the economic growth attributable to the development and accumulation of human capital through higher education. The need for higher education has become crucial in the age of globalization,

as knowledge-based workforces have become an essential ingredient to acquire and maintain a competitive edge in the market place.

The payoffs from knowledge creation take a long time to be realized and are highly uncertain, yet they generate positive externalities to society. In turn, society supports these activities by nonprofit universities through gifts and endowments from the private sector and subsidies from local and federal governments. The *Digest of Education Statistics* (2007) reports that during the 2004-2005 academic year, total tuition revenue represented only 16.4% of total revenue for all public degree-granting institutions and 29.5% for all private nonprofit degree-granting institutions in the U.S. Society does not provide much support for for-profit universities, as it expects them to support their own profit-generating activities.[28]

Governance of universities is more complicated than governance of corporations. Unlike private enterprises with residual claim holders (stockholders), nonprofit universities have multiple stakeholders without a clearly defined pecking order, which leads to multiple objectives without well-defined priorities. Coleman (1973) compares universities to shells that encompass a variety of activities: teaching, research activities supported by government and private organizations, and external consulting. These activities often create conflicts of commitment and interest, leading to compromises in teaching and research effectiveness, although spillover effects (e.g., research and consulting experience benefiting the quality and effectiveness of teaching) may lessen the costs. Lacking well-defined priorities, faculty resource allocations are likely to be made

[28] See Goldin and Katz (1999) for a review of the history of universities. Nonprofit organizations are preferred to for-profit organizations when consumers are uncertain about product quality due to asymmetric information (Easley and O'Hara, 1983).

for the benefits of individual faculty, and some universities may resemble a collection of little kingdoms built around individual faculty. Such an organizational form is not necessarily bad: It may encourage entrepreneurship on the part of individual faculty, making them more creative and productive. It also may make them more accountable for their individual actions. However, such an organizational form may make it difficult to create synergies between individual talents and for the university to act as a cohesive unit to meet various, and often conflicting, demands of the stakeholders.

Regardless of the organizational form a university takes, it must provide services to various stakeholders, who ultimately decide on the amount of its financial resources. Universities generate revenues from tuition; private gifts and endowments; state subsidies; and federal and private grants. Like firms, they strive to maximize the present value of the revenue-cost difference, not because they are profit maximizing, but because they want to maximize financial resources available for their pursuit of various goals and objectives, however ambiguous they may be.[29]

The strategies universities adopt to maximize the present value of the revenue-cost difference depends on the university type. Consider an elite university with high intellectual capital based on past research accomplishments, academic traditions, and highly selective admission standards, yielding a strong reputation and a large number of prominent and loyal alumni. Its present value of the revenue-cost difference will be higher if the school maintains its high-quality research and teaching than if it suddenly turns into a tuition-maximizing entity by compromising its standards on research and teaching.

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[29] Winston (1999) also recognizes that nonprofit organizations' behavior may appear profit driven because of budget constraints.

Unlike corporations, universities have strong incentives to be selective in choosing customers because of the quality of output−student academic performance, job placement, and life time achievement− depends on the quality of input−student quality and effort. That is, universities employ a customer-input technology (Rothschild and White, 1995). Furthermore, peer effects of fellow students generate externalities to the quality of output; e.g., having good students helps to improve the academic performance of fellow students (Sacerdote, 2001). This is one of the reasons universities subsidize their customers (students) with financial aid and maintain certain admission standards.

Students' learning is also enhanced by research activities (Clotfelter, 1999). Elite universities receive feedback effects from maintaining high quality research and teaching because they tend to attract more high-quality faculty and students who can further improve their quality and reputation. That is, high-quality research and teaching has a "multiplier effect" (Hoxby, 1997; Winston, 1999).

These various attributes and effects give an elite university strong incentive to maintain its high-quality research and teaching and selective admission standards. The result is a continuation of high-quality products to serve their stakeholders, who will, in turn, provide the necessary financial resources for the university to carry on its knowledge creation and dissemination activities. At the same time, high quality students and faculty agglomerate in elite universities with ample financial resources.

In contrast, a new university with low intellectual capital may have little chance to receive private gifts and endowments to support high-quality teaching and research. The present value of the revenue-cost difference will be higher if it forgoes costly research activities and maximizes tuition revenue by relaxing admission standards. Such

universities have little chance of survival if they imitate selective admission standards and pursuit of costly research activities of elite universities, unless they can obtain unusually large public subsidies or private gifts. In other words, to universities with low intellectual capital, survival is of greater concern than taking advantage of the customer-input technology, peer effects, and the multiplier effects that are important to elite universities. Therefore, universities with low intellectual capital will be more reliant on tuition revenue and compete for customers (students) by using less selective admission standards.

Thus, we hypothesize that universities will self-select into either highly reputable institutions with high-quality teaching and research or largely tuition-dependent institutions that appear financially driven. We predict that these two types will follow different strategies in both knowledge creation and dissemination activities. Whereas the highly reputable will devote considerable resources to research and maintain highly selective admission standards, the tuition- dependent will maximize tuition revenues with relaxed admission standards.

III.2.B. Economic motives for overseas ventures

Are highly reputable universities or tuition-dependent ones more likely to provide overseas degree programs? The answer is not obvious. Tuition-dependent universities will view overseas programs as opportunities to increase revenues and to distinguish themselves from rival schools in terms of international presence; thus, they will be more willing suppliers.[30] However, a successful, financially viable program requires a demand

[30] Winston (1999) points out U.S. universities with low financial resources tend to employ less costly teaching methods such as distance learning and also recruit more foreign and older students to generate more revenues.

for its services in the local economy. Because education is a large, one-time investment for students, demand is determined by a trade-off between school reputation and the costs of education. The local market will be less receptive to a program offered by a U.S. university with moderate reputation, unless it offers a deep discount in tuition. In contrast, more reputable schools will be able to charge higher tuition and/or enjoy greater demand.[31] However, an elite university may be less willing to supply overseas programs because of its concern about controlling quality from a distance. They have more to lose by putting their reputation at stake.

In this section, we provide an overview of the costs and benefits affecting the supply- and-demand for U.S. overseas programs. We then explore non-pecuniary factors that may affect the programs. In the following empirical section, we analyze the interplay of these supply-and-demand considerations by examining the characteristics of universities offering overseas programs and of countries hosting the programs.

B.1. Supply

B.1.i. Financial benefits

The singular, most obvious financial benefit is tuition revenue. Successfully operating overseas programs also broaden a university's name recognition globally and attract future foreign donors. Universities with moderate reputations may have less to lose reputationally if their overseas programs lack quality. And because they are more tuition-dependent, their programs will offer more expansive admission standards.

[31] Hoxby (1997) argues that only elite universities are able to compete for the best students at the national level. Elite universities also enjoy advantages in the global education market due to yearly publication of various worldwide university rankings readily available on the internet.

Highly esteemed U.S. universities, by contrast, may be less willing to provide overseas programs because of their concerns for quality control, possible dilution of their brand names, and diversion of faculty resources from research. However, when foreign governments seek to expand higher education opportunities for their citizens through overseas programs, they are more likely to allow/invite highly ranked universities to establish programs, and may even entice them with financial subsidies. Consequently, successful programs are more likely to be in those disciplines in which the sponsoring universities already enjoy comparative strengths.

B.1.ii. Financial costs

Universities need physical assets (e.g., classrooms and equipment) and human capital (e.g., faculty and staff) to establish overseas programs. However, compared to manufacturing firms, universities require fewer physical assets. Although this may help keep fixed costs relatively low, variable costs tend to be higher than domestic programs because faculty often garner extra compensation for teaching in overseas programs. For example, Carnegie Mellon University gives their U.S.-based faculty teaching on its Qatar campus a 25% salary increase and provides them with amenities.[32] The Global MBA Program at the University of Michigan pays its faculty an additional 18.75% of their base salary plus an overseas trip inconvenience fee of 2.5% to teach a ten-day, 2.25 credit-hour course in Asia.

To cover these higher costs, universities may pass through the additional costs as a tuition surcharge, which lowers demand and keeps class sizes small. An alternative strategy is to hire local faculty and/or offer joint programs with local universities, which

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[32] Bollag, Burton. "American's hot new export: higher education." *The Chronicle of Higher Education*, February 17, 2006.

tends to lower the quality and prestige of the program. Some top ranked universities also may be able to convince local governments to provide financial support to cover costs.

B.2. Demand

In developing countries, the university attendance rate of the college age population is below 15%, much lower than the 40% to 50% in developed countries.[33] To the extent that an insufficient supply of higher education opportunities contributes to the low college-attendance rate in developing countries, overseas programs provide a valuable service in satisfying the unmet demand.

B.2.i. Alternative choices

The extent that overseas programs resolve the unmet educational demand depends on alternative choices available to local students. The choices include attending a local university and going abroad for their degrees. Students will weigh the costs and benefits of these alternatives against attending an overseas program.

a) Local colleges

Students' college choices are highly sensitive to university rankings, as there is a universal belief that a degree from a higher ranked university will enable a graduate to find a better job with a higher salary (Brewer, Eide, and Ehrenberg, 1999; Black and Smith, 2006). Whether students perceive undergraduate overseas programs as higher-quality than programs offered by their local colleges depends upon the reputation of the provider. If the provider is a top ranked American university, students are more likely to consider the program as better than domestic programs and will be attracted to it. However, most undergraduate overseas programs are offered by moderately ranked U.S.

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[33] Mcmurtrie, Beth. "The global campus, American colleges connect with the broader world." *The Chronicle of Higher Education*, March 2, 2007.

universities. These programs are not necessarily viewed as superior to domestic colleges and tend to be in low demand among top high school graduates. Moreover, many overseas programs hire local faculty to staff some courses, which may affect students' perceptions of program quality. The education market is considered a "trust market" where the quality of output is difficult to judge. Thus, it may take a while for overseas programs to build up their reputation, limiting the demand for the program and the price they can charge for their products.

Overseas programs usually offer courses in a limited number of disciplines, typically focusing on areas such as computer science and business, whereas local colleges offer a greater variety of courses in a wider range of disciplines. Because of their narrower offerings, students may think that overseas programs do not provide a comprehensive college experience, deterring many qualified students from enrolling. Furthermore, students may be concerned with the continuity of overseas programs. The uncertainty over the continuity may pose a risk on the value of the degree, although the adverse effects can be mitigated if the degree granting institution has a proven track record at its home campus.

b) Studying in the U.S.

Local students may instead choose to attend universities in the U.S. This choice gives a better opportunity to improve their English language skills, a highly valued commodity in the global market. To some students, experiencing American culture throughout their campus lives is almost as important as their college degrees. Studying in the U.S. also provides some students an interim step to immigrate to the U.S. Those who highly value these non-degree experiences or opportunities will not be attracted to

overseas programs. Furthermore, degrees earned through overseas programs may be perceived as less prestigious.

However, attending a university in the U.S. tends to be more costly. Students have to spend several years away from their family and friends, incurring high traveling and living expenses. They also may have to risk their career opportunities with their current employers. Overseas programs offer a less expensive alternative to studying abroad, targeting students who want foreign degrees without leaving their homeland. Individuals unwilling to incur the higher expenses, unable to obtain visas to study in the U.S., and/or unwilling to leave their current jobs because of high opportunity costs (e.g., managers interested in executive MBA programs) are the primary targets of the overseas programs. Most of these overseas programs also offer the opportunity for an American campus experience before graduation.

B.2.ii. Host country environment

Demand also depends on the host country's institutional characteristics, which are shown to have significant impacts on how foreign ideas and systems are accepted. Djelic (1998) documents significant differences in the level of acceptance and adoption of American corporate capitalism between France, Germany, and Italy after World War II, which are attributed to the difference in local political and economic environments. Similar forces may apply to overseas programs: They are more likely to be offered and be successful in countries where government policies are friendly in terms of financial support and/or regulation.[34]

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[34] See Green (2007) for a description of government policies regulating foreign providers of higher education.

Many U.S. universities have recently established overseas programs in the Education City of Qatar and Knowledge Valley of United Arab Emirates (UAE) because of favorable government policies and generous financial support. Some Asian countries, such as Hong Kong, Singapore, and South Korea, in their pursuit of becoming regional education hubs, actively encourage overseas programs by foreign universities.

III.2.C. Non-pecuniary factors

Firms venture abroad mainly to generate profits, and their location choices are largely determined by economic considerations.[35] Their decisions also are influenced by non-pecuniary factors. Because universities' stakeholders are more diverse without clearly defined pecking order, non-pecuniary factors may play a more important role in setting up overseas programs.

C.1. Network dynamics

Implementation decisions, such as location choice, are influenced by organizational and network dynamics. Setting up educational programs in foreign countries is not an easy task. It may take years to complete the whole process from selecting program location, signing a mutual agreement (if a local partner is involved), seeking government approval (if required), campus planning, to admitting the first class of students. To facilitate this process, some schools choose locations where they already have established connections either officially or unofficially through personal contacts. For instance, Cornell Medical School set up a branch campus in Qatar because one of

[35] For instance, firms in natural resource industries invest in countries where the resources are located. Manufacturing firms invest in less developed countries to take advantage of cheap labor. Service industries invest in countries with large customer bases. See Caves (1996) for a review on foreign direct investment of U.S. multinational firms.

their trustees encouraged them to do so and helped arrange financial support.[36] Overseas programs often have faculty directors who are born or have ethnic roots in the country of the program location.

C.2. Campus internationalization

An important benefit of offering overseas programs is broadening international perspectives of American faculty and students. Faculty benefit from face-to-face interactions with foreign students and researchers. They gain valuable international experience from staying abroad, which helps expand the scope of teaching and research. Some overseas programs facilitate American students study abroad, enriching their cultural experience. Courses are usually taught in English and credits can be easily transferred back to their home campuses. However, these benefits are not without costs. Faculty have to be away from home, spend less time on research, and teach in unfamiliar foreign surroundings, all of which make it difficult to secure a sufficient number of U.S. faculty for the long term.

C.3. Status competition

"Prestige maximization" (James, 1990) and "the pursuit of excellence" (Clotfelter, 1996) are often considered most important objectives for university administrators. Universities compete for high quality faculty and students. They compete for faculty at the national level using tenure, lighter teaching loads, and plentiful research grants. This competition is especially severe among research oriented elite universities. To the extent that universities with higher status tend to receive greater endowments and gifts (e.g., Harvard), the status competition is not unrelated to economic motives.

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[36] This was pointed out to us by Ronald Ehrenberg during the NBER Conference on US Universities in a Global Market.

Universities compete for students using various means, ranging from merit- and need-based financial aid to large expenditures to improve campus facilities (e.g., Clotfelter, 1999). Like firms, universities advertise the beauty of their campuses and recreational facilities (Hutchins, 1936). They may also collude to ease the burden of competition. In 1991, The U.S. Justice Department charged eight Ivy League schools and MIT with violations of antitrust laws. Soon thereafter, the Ivy League universities agreed to stop comparing the aid packages of students admitted.[37] Perhaps as a consequence, the competition became stiffer, as Stanford and Harvard introduced early admission policies and other schools such as Yale and Princeton adopted a variety of financial aid packages (Clotfelter and Rothschild, 1993; Winston, 1999).

The international presence through overseas program may give a university an edge in this status competition. Setting up overseas programs signals a university's commitment to internationalization, which is given an important weight in various influential college ranking systems. For example, the U.S. News and World Report ranking considers campus internationalization an important aspect of college competitiveness. Higher undergraduate college rankings help recruit not only higher-quality students but also higher caliber research faculty through the halo effect (Kim, Morse, and Zingales, 2009).

C.4. Altruism

It is possible that there is an altruistic motive in offering overseas programs. It is not unreasonable for American educators to believe their higher education system is the best. In their desire to help fellow mankind, they may want to set up American-style

[37] Jaschik, Scott. "Justice Department asks at least 15 colleges for detailed information on admissions." *The Chronicle of Higher Education*, July 24, 1991.

higher education institutions in countries lacking good higher education systems. What we have in mind are universities set up by missionaries in developing countries. But these are not overseas programs. They are full pledged local universities founded by missionaries.

Anecdotal evidence suggests many overseas programs set up by elite universities receive substantial financial support from foreign countries. Our empirical results indicate that universities establish programs in countries where there are sufficient student population that can afford an American-style higher education. If altruism were an important motive for the recent surge in U.S. overseas programs, we should have observed more media coverage of attempts to establish overseas programs in low income countries where people cannot afford higher education. However, this is not what we observe. The Chronicle reports very few U.S. overseas programs in Africa, a continent desperately in need of improvement in both quantity and quality of higher education.[38]

III.3. Anecdotal evidence

There is a dearth of empirical evidence on U.S. universities' overseas programs. Thus, our initial step is to gather pertinent information about the overseas activities of U.S. universities. We choose the Chronicle of Higher Education because it is the leading source of information on university activities. Its International Section provides numerous anecdotes on overseas activities, which vary from student exchange programs, international research collaboration, to overseas degree programs. We focus on overseas degree programs. Some are financially supported by foreign governments and partners,

[38] It may be that there is insufficient high school graduates capable of handling course work offered by American universities overseas, discouraging even the altruistic from attempting to establish overseas programs in Africa.

but many programs must be financially self-sufficient to avoid draining resources from home campuses. In this regard, these programs have to be run, at least partially, like business models.

When we examine the historical archive of the Chronicle, an interesting pattern emerges. Most of the Chronicle articles on overseas programs are published in two time periods: between the late 1980s and early 1990s, and more recently, beginning in the early 2000s. The earlier articles are simple. They either announce initiation of new programs or report program failures and campus closures. The articles are short and the contents lack details. Then, after almost a decade of sporadic coverage and relative silence about overseas programs, there is a resurgence of articles beginning in 2000. They provide rather extensive coverage of overseas programs initiated mostly by top ranked U.S. universities. These recent articles provide more details about the overseas programs, including how the deals are structured with foreign governments.

Why have elite U.S. universities suddenly started to offer overseas programs? Is this a second wave of overseas programs with different players? Or does the new spate of articles simply reflect a resurgence of the first wave? To analyze these questions, we use the Integrated Postsecondary Education Data System (IPEDS) at the National Center for Education Statistics (NCES) and download the overseas enrollment data from IPEDS enrollment surveys conducted in 1986, 1987, 1994, 1995, 1996 and 1998. In these surveys, universities are asked to report their student enrollment numbers on branch campuses in foreign countries. In 1986, 110 schools report overseas enrollment; by 1998 the number of schools reporting overseas enrollment shrinks to 61. The total overseas

enrollment[39] reported on all branch campuses in 1986 is 21,090 students, peaks in 1995 at 48,043 students, and gradually decreases to 23,534 students in 1998. The majority of these overseas programs are started by lesser-known American universities and colleges without doctoral programs. Less than 5% of the programs during this time period are sponsored by top research universities with doctoral programs. IPEDS dropped overseas enrollment questions from their enrollment surveys after 1998, presumably due to a significant decrease in the number of overseas programs and a concomitant decline in media interest.

The decline in the first wave of U.S. overseas programs was preceded by a spectacular failure of American overseas programs in Japan. During the Japanese economic boom in the late 1980s, more than 30 U.S. universities established branch campuses there, hoping their western-style education programs would attract sufficient Japanese students. However, most programs struggled with low student enrollment and were closed by the mid 1990s. Temple University Japan is one of the rare survivors after 16 years of operation. It currently has about 3,000 students enrolled (Bhandari and Chow, 2007); however, at least until 2000, the branch campus reportedly lost $50 million a year.[40]

Most U.S. universities involved in these Japanese overseas programs had low name recognition and, as a result, they were not able to attract students who could get into the upper tier Japanese universities. Location was another contributing factor. A number of U.S. universities, lured by financial support from local governments, set up

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[39] Total enrollment includes full-time and part-time students enrolled at the undergraduate, graduate, and professional degree levels.
[40] McMurtrie, Beth. "Culture and unrealistic expectations challenge American campuses in Japan." *The Chronicle of Higher Education*, June 2, 2000.

their programs in small towns, which hoped to use the presence of U.S. overseas programs to stem the flight of their young people to larger metropolitan areas. However, these locations only made the programs less attractive to those who preferred to attend college in large cities. Language was also a problem. Even with English preparatory courses, students struggled to achieve sufficient English proficiency to enroll in degree programs. To make matters worse, many U.S. universities got into financial disputes with local partners, who often sacrificed academic integrity in exchange for tuition money. Some partners even committed outright financial fraud.[41] These problems contributed to eventual closure of most of the programs.

During the recent resurgence in overseas programs by U.S. universities, the leading players are different. They tend to be well established, highly ranked research universities with doctoral programs. They also appear to follow the recent globalization trend, somewhat analogous to U.S. multinationals' FDI outflows.

There is a perception that U.S. universities are not as involved in FDI as MNCs, which derive about 30% of their total sales revenue from foreign affiliates. The perception could be wrong because appropriate comparisons are knowledge-based service industries such as information and banking, which have less FDI. Table III.1 shows that contributions made by foreign affiliates to U.S. firms' total sales revenue during 1999 through 2004 increased for most industries. More important, it shows that for information and financial services industries, foreign affiliates' contribution to total sales revenue averages only about 15%. Although we do not have sufficient data to make a general comparison, the case of University of Chicago Booth School of Business is

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[41] McMurtrie, Beth. "Culture and unrealistic expectations challenge American campuses in Japan." *The Chronicle of Higher Education*, June 2, 2000.

illustrative. Chicago offers overseas Executive MBA programs in London and Singapore. According to its website, tuition revenue from the overseas programs represents about 14% of its total tuition revenue in 2006.[42] This is quite comparable to that of the other knowledge-based industries, suggesting that some units of U.S. universities are as active in generating overseas revenues as U.S. multinational corporations.

Of late, overseas programs getting the most press coverage are those set up by upper tier U.S. research universities in the Middle East (mainly Qatar and UAE). The Education City in Qatar, founded by the Qatar Foundation, spends $2 billion a year to host the branch campuses of Cornell University, Carnegie Mellon University, and others.[43] The Qatar Foundation pays for all the costs of these overseas programs. For example, it offered Cornell medical school $750 million to provide medical programs in the Education City.[44]

Money seems to be an important determinant in decisions to offer these overseas programs. According to one Chronicle article, the University of North Carolina declined to set up an overseas program in the Middle East region because the university was offered only $10 million, falling short of the $35 million the university requested.[45] Another article reports that New York University chose Dubai over Abu Dhabi because Abu Dhabi did not meet the university's demand for a $50 million upfront fee, plus

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[42] Our calculation is based on tuition data information obtained from the University of Chicago Booth School of Business website at http://www.chicagobooth.edu/, accessed August 2007. Because their overseas tuition includes costs of books, materials, and other fees, the 14% may be a slight overestimation of the actual contribution made by the school's overseas programs.
[43] Krieger, Zvika. "An academic building boom transforms the Persian gulf." *The Chronicle of Higher Education*, March 28, 2008.
[44] Mangan, Katherine S. "Cornell's medical school will open degree granting branch in Qatar." *The Chronicle of Higher Education*, April 20, 2001.
[45] Mangan, Katherine S. "Qatar courts American colleges." *The Chronicle of Higher Education*, September 6, 2002.

payment for construction and expenses.[46] Michigan State University will open a branch campus in the UAE and receive a line of credit with favorable terms in several million dollars from Tecom Investments.[47]

Asia is another popular destination for overseas programs. In their efforts to become regional higher education hubs, Hong Kong, Singapore, and South Korea offer financial support and tax exemptions to attract foreign universities' overseas degree programs. Many U.S., U.K., and Australian universities have responded by setting up degree programs there, or are currently in negotiations to do so. However, local government support does not guarantee success. The University of New South Wales set up the first comprehensive foreign university in Singapore with partial financing from Singapore's Economic Development Board. It hoped to enroll 300 students in the first semester and had a target enrollment number of 15,000 students by 2020. However, it attracted only 148 students and projected a deficit of $15 million. The branch campus was shut down in June 2007 after only three months of operation.[48] Johns Hopkins University's Biomedical Center in Singapore also closed in 2007 because of its failure to attract sufficient scientists and Ph.D. students despite the $50 million the Singapore government spent to support the program.[49]

Other Asian countries, especially those with large college age populations, such as China and India, also attract numerous U.S. universities. Although we were unable to

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[46] Krieger, Zvika. "An academic building boom transforms the Persian gulf." *The Chronicle of Higher Education*, March 28, 2008.
[47] Fischer, Karin. "How the deal was done: Michigan State in Dubai." *The Chronicle of Higher Education*, March 28, 2008.
[48] Forss, Pearl. "University of New South Wales Singapore campus to shut in June." *Channel NewsAsia*, May 23, 2007.
[49] Overland, Martha Ann. "Singapore to close Johns Hopkins Biomedical Center." *The Chronicle of Higher Education*, August 11, 2006.

find profiles of many of these programs, one Chronicle article reports that at least 66 such programs exist in India.[50] Again, the huge potential demand in these countries does not guarantee success for overseas programs. Some business schools failed in China because they could not attract enough executives with sufficient English proficiency to enroll in their programs.[51]

Europe attracts relatively few U.S. overseas programs, although it shares the same Western culture and is a popular destination for FDI outflow from the U.S. Several factors weaken the competitive edge of U.S. overseas programs there. First, Europe enjoys the presence of several prominent, highly-ranked universities. Second, it is easier for European students to come to the U.S. for higher education. Income disparities, culture, and language present lower barriers for Europeans. It is also much easier for Europeans to obtain U.S. visas in comparison to other nationalities, especially after 9/11. For similar reasons, Australia and New Zealand attract relatively few U.S. overseas programs.

European and Oceania universities are also the main competitors of U.S. universities for foreign students. According to a report by the Organization for Economic Cooperation and Development (2007), U.S. universities enrolled about 540,000 foreign students in 2005, making it the most popular destination for international students. U.K. and Australia are not far behind; their universities enrolled approximately 324,000 and 162,000 foreign students, respectively. These two countries have also been very active in

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[50] Neelakantan, Shailaja. "In India, limits on foreign universities lead to creative partnerships." *The Chronicle of Higher Education*, February 8, 2008.
[51] Damast, Alison. "China: why western b-schools are leaving." *Business Week*, May 15, 2008.

setting up overseas programs.[52] The University of Nottingham was the first foreign university to set up a branch campus in China and the University of New South Wales was the first to set up a branch campus in Singapore. However, recent overseas activities of Australian universities are slowing down,[53] presumably due to low demand for their degrees.[54] Failures of U.K. overseas programs have also been reported in the media.[55]

For those few U.S. universities offering overseas programs in Europe, location is important. For example, Chicago initiated a part-time executive MBA program in Barcelona in 1994, but moved to London in 2005. London is the financial center for Europe. Chicago, best known for finance, wanted to move closer to its potential clients.

There are also a number of U.S. overseas programs in South America. The majority of these programs are established by American universities located in the southern and western regions, which are more heavily populated with Hispanics.[56] Their geographic and cultural proximity may explain why these universities are more likely to offer programs in South America.

Few U.S. overseas programs in Africa are reported in the press.[57] Income disparities, insufficient high school graduates able to handle course work offered by American universities, government instability, and volatility in the region all may play a

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[52] New Zealand Ministry of Education (2001), available at http://www.minedu.govt.nz/educationSectors/InternationalEducation/Initiatives/Offshore%20Education/NZsOffshorePublicTertiaryEducationProgrammes.aspx , accessed August 2008.
[53] Cohen, David. "Australian universities cull overseas programs." *The Chronicle of Higher Education*, July 20, 2007.
[54] Slattery, Luke. "'Beer and beaches' image said to hurt Australia's higher-education 'brand'." *The Chronicle of Higher Education*, November 30, 2007.
[55] Damast, Alison. "China: why western b-schools are leaving." *Business Week*, May 15, 2008.
[56] See: http://www.censusscope.org/us/map_hispanicpop.html.
[57] Redden (2007) reports that through a World Bank grant Cornell University offers a master's degree program in Agriculture and Rural Development in Ethiopia. See Redden, Elizabeth. "Cornell degree, offered in Africa." *Inside Higher Ed*, September 21, 2007.

role in keeping U.S. overseas programs out of a continent that desperately needs improvement in the quantity and quality of higher education.

III.4. Empirical analysis

To conduct an empirical investigation of the interplay of supply and demand, we collect data on overseas programs, university characteristics, and host country characteristics. We use these data to identify which universities are more likely to offer overseas programs, what characteristics of host countries are important in attracting U.S. university programs, and how overseas programs are priced relative to their home campus tuitions.

III.4.A. Sample construction

A.1. Data on overseas programs

Our dataset covers U.S. overseas programs from January 1988 through August 2008 because our online access to The Chronicle of Higher Education via Proquest Research Library starts in January 1988. The data is hand-collected using a three-step search process. We first search the Chronicle of Higher Education using terms "overseas," "offshore," and "branch campus." We read all newspaper articles and identify universities with overseas programs in foreign countries during this period. We supplement the data with Observatory on Higher Education (OBHE) breaking news and special reports headlines,[58] American Council on Education (ACE) publications (Green, 2007; Green, Luu, and Burris, 2008), and Institute of International Education (IIE) Open Doors Report 2007 (Bhandari and Chow, 2007). We include an overseas program in our sample whether it is failed, struggling, or forthcoming (i.e., agreement reached). An

[58] We read the publicly available headlines of their news articles and special reports on the OBHE website at http://www.obhe.ac.uk/news/ and http://www.obhe.ac.uk/products/reports/ .

overseas program may or may not have a partner in the host country, and it may have a "brick and mortar" presence in the host country or offer degree programs only through online education. We exclude those in the discussion stage, or those awarding only certificates rather than degrees.[59] All the degree programs included in our sample require significant commitment from U.S. universities (i.e., awarding degrees overseas) and put their reputation at stake.

For each overseas program we identify, we run additional Chronicle of Higher Education searches using the sponsoring university name and the location of the overseas program to obtain necessary information. When available, we record information on discipline, establishment date, curriculum, size, and financing of the programs.

For information concerning tuition and other program characteristics not covered in the articles, we search the websites of the overseas programs using the university's name and location of the program, and record additional information on tuition. Sometimes this additional search leads to more overseas degree programs offered by the same universities. Based on these sample selection processes and criteria, we identify 159 overseas programs offered by 86 U.S. universities in 46 countries. [60]

A.2. Data on university characteristics

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[59] Medical programs are an exception. Medical programs offered by U.S. institutions abroad usually do not award foreign students degrees or certificates qualifying them to practice medicine in the U.S. However, the students are mainly trained by U.S. institutions, and we include these medical programs in our sample.

[60] The CGS (2007) survey of graduate schools finds that 29% of American graduate schools have established collaborative overseas degree programs. Our sample is smaller because their survey includes programs that award certificates. Our sample is also smaller than Green, Luu, and Burris's (2008) survey that identifies 101 U.S. degree granting institutions. The discrepancy here seems to be mainly due to media coverage bias; namely, overseas programs offered by lower level schools and small colleges are less likely to be reported. These omissions should not affect our results because our empirical analyses focus only on overseas activities of doctoral and master degree level institutions.

U.S. universities come in many different forms and shapes in both intellectual and physical contexts. To categorize university types, we rely on the Carnegie Basic Classification (2005),[61] which categorizes universities into very high research universities, high research universities, research universities, master's universities, baccalaureate colleges, associate's colleges, and other specialized institutions.

To obtain an objective measure of the ranking among research universities, we use the 2007-2008 university rankings from four sources[62]: American's best national universities from U.S. News & World Report[63], Top 100 Global Universities from Newsweek[64], THE-QS World University Rankings from The Times Higher Education Supplement (THES) and Quacquarelli Symonds (QS) [65] and Academic Rankings of World Universities from Shanghai Jiaotong University.[66] The last two are compiled by ranking agencies outside the United States (British and Chinese, respectively) and reflect the reputation and competitiveness of U.S. universities outside the U.S., which suits our purpose of analyzing U.S. degree programs abroad. The U.S. News & World Report and Newsweek rankings are the most widely cited and are readily available on the internet to all foreign students interested in U.S. universities. Moreover, these four rankings employ

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[61] The data is obtained from Integrated Postsecondary Education Data System (IPEDS) 2005 Institutional Characteristics Survey. Each UnitID is treated as a university. UnitID is a unique identification number assigned to postsecondary institutions surveyed by IPEDS. Institutions participating in Federal financial assistance programs are required to complete IPEDS surveys.

[62] Worldwide ranking sources can be found at Wikipedia (http://en.wikipedia.org/wiki/College_and_university_rankings).When these ranking sources include foreign universities, we re-rank American universities excluding foreign universities. The Newsweek ranking is for year 2006.

[63] Available at http://colleges.usnews.rankingsandreviews.com/college/national-search/c_final_tier+1, accessed December 2008.

[64] Available at http://www.msnbc.msn.com/id/14321230/ , accessed August 2007.

[65] Available at http://www.topuniversities.com/worlduniversityrankings/results/2007/overall_rankings/top_400_universities/, accessed December 2008.

[66] Available at http://www.arwu.org/rank/2007/ARWU2007_TopAmer.htm, accessed December 2008.

a broad range of ranking methodologies and measure different dimensions of university reputation. For example, U.S. News & World Report uses evaluations from peer institutions, faculty and financial resources, and student selectivity to construct the ranking. In contrast, Shanghai Jiaotong University bases its university ranking on the numbers of publications in Science and Nature, Nobel laureates, and Fields Medal winners. Relying on these four rankings takes into account both domestic and international reputation and alleviates some of the subjectivity inherent in using a single ranking methodology.

Table III.2 shows the correlation between the four ranking sources. They are all highly correlated with each other. Yet, the correlations also indicate substantial variation across the rankings. This table also contains 2005 university endowment per full time equivalent (FTE) enrollment, *Endow_FTE*, which is obtained from 2005 IPEDS college finance survey. All four university rankings are highly correlated with the level of endowment, demonstrating the important role endowment plays in university visibility and reputation.

Sixty-seven U.S. universities appear at least once as top 50 in at least one of the four rankings.[67] We follow Kim, Morse, and Zingales (2009) and use the Borda Count method to average the relative rankings within this group of 67 universities. A university ranked first in a ranking study is given a score of 50; the second is given 49; and so on. We then take the simple average of the scores each university gets from the four ranking sources. The average Borda Count Scores (BCS) are reported in Table III.3, which shows a natural break point at the sixteenth university. We classify these top 16 research

[67] In Newsweek's 2006 top 100 global university ranking, only 44 are U.S. universities.

universities as “Elite”, and the remaining 48 research universities (excluding specialized institutions) as “Good”.[68] The other research universities not included in the list of 67 are defined as “Moderate.” We follow 2005 Carnegie Basic Classification and define all other universities that award at least 50 master's degrees and fewer than 20 doctoral degrees per year as “Master.” To check the sensitivity to the choice of different ranking sources, we add six more ranking sources to classify university categories. The results (unreported) are robust.[69]

We retrieve university level enrollment and financial data for these universities from the IPEDS. We use a number of IPEDS surveys, including its Institutional Characteristics Surveys, Enrollment Surveys, and Finance Surveys. From these sources we construct the following variables: full time equivalent enrollment*, Enrol_FTE*, which is full time enrollment plus 0.38[70] times part-time enrollment; *Part_Time*, percentage of part-time enrollment to total enrollment;[71] *Non_Resid*, percentage of nonresident alien enrollment to total enrollment; tuition revenue dependence, *Tui_Dep*, the ratio of tuition

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[68] We exclude from our sample highly regarded but specialized institutions such as Rockefeller University, University of California at San Francisco, and University of Texas Southwestern Medical Center at Dallas.
[69] The six additional university ranking sources are: Faculty Scholarly Productivity Index from Academic Analytics, Top American Research Universities from the Center for Measuring University Performance at Arizona State University, United States National Research Council Rankings, Washington Monthly College Rankings, Avery et al. (2005), and Webometrics Ranking of World Universities by the Cybermetrics Lab. Ninety-five universities appear at least once as top 50 in at least one of the 10 rankings. We use the Borda Count method to average the relative rankings within this group of 95 universities. We classify the top 31 universities as “Elite”, and the remaining 64 schools as “Good.” The other research universities not included in the list of 95 are defined as “Moderate.” We follow 2005 Carnegie Basic Classification and define all other universities that award at least 50 master's degrees and fewer than 20 doctoral degrees per year as “Master.” All our empirical results remain qualitatively the same.
[70] This number is the average full time equivalent of part-time enrollment reported in 2005 IPEDS Enrollment Survey.
[71] Total enrollment is the sum of full time enrollment and part-time enrollment.

revenue to total revenue;[72] and university endowment, *Endow_FTE*, the market value of endowment assets divided by full time equivalent enrollment.

A.3. Data on host country characteristics

We obtain host countries' real gross domestic product (GDP) per capita, *GDP_PPP,*[73] and growth rate of real GDP per capita, *Growth,* in years 1999 through 2003 from Penn World Tables (Heston, Summers, and Aten, 2006). The tertiary school age population, *Stu_Pop,* in years 1999 to 2003 is from United Nations Educational Scientific and Cultural Organization (UNESCO) Institute for Statistics Data Center. The U.S. FDI outflows to other countries from 1999 to 2003 are obtained from Bureau of Economic Analysis (BEA) website. We also obtain measures of government stability *Gov_Stab*[74] and strength of legal system *Law_Order*[75] from the International Country Risk Guide in years 1999 to 2003 (Political Risk Services Group) and the ease of doing business index *Ease_Bus* in years 2004 to 2009 from the Doing Business website.[76]

III.4.B. Summary statistics

Table III.4 reports the number of universities with overseas programs, separately for nonprofit public, nonprofit private, and for-profit universities in each of the seven categories: Elite, Good, Moderate, Master, baccalaureate colleges, associate's colleges,

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[72] Total revenue includes tuition revenue; revenue from federal, state, and local governments; endowment income; private gifts and grants; sales and services income; auxiliary income; hospital income; independent operations income; investment income; and others.

[73] It is measured in 2000 constant international dollars. An international dollar has the same purchasing power as U.S. dollar over U.S. GDP.

[74] It ranges from 1 to 12 with 12 indicating the highest governance stability.

[75] It ranges from 1 to 6 with 6 representing the strongest judicial system.

[76] Available at http://www.doingbusiness.org/CustomQuery/, accessed August 2008. The ease of doing business index ranks business regulations for 181 countries. It covers ten aspects including starting a business, dealing with construction permits, employing workers, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts, and closing business. A higher ranking means simpler regulation and stronger protection of property rights.

and other specialized institutions. In terms of percentage, elite universities are dominant players, with 66.7% of public universities and 53.8% of private universities having overseas programs. It also shows relatively higher participation rates by public research universities than by their private counterparts. One possible explanation is that relative to private universities, public universities face greater operational constraints imposed by local governments and state legislators. For example, they are often required to charge in-state students lower tuition and give them preferential treatment in admission. These constraints no longer apply when these public universities go abroad.

Table III.4 also shows that less than 1% of schools belonging to the categories of baccalaureate colleges, associate's colleges, and other specialized institutions offer overseas programs. This extremely low percentage may be due partially to the lack of press coverage on those institutions. However, the Chronicle usually covers newsworthy activities even by very small and little known colleges. Among for-profit universities, none belong to the Elite or Good universities, and most belong to Associates or Others. Of 2,764 for-profit universities, we are able to identify only seven that offer overseas programs, with five belonging to Masters. There are probably many more overseas programs offered by for-profit universities, which are not covered by the press and, hence, are not identified through our search process. Based on these data considerations, we focus our investigation only on nonprofit universities in the Elite, Good, Moderate, and Master categories.

Table III.5 shows the number of overseas degree programs offered by the four categories of universities and by nine broadly defined disciplines. Arts & Sciences includes foreign languages, economics, physics, and others. Engineering includes

mechanical engineering, chemical engineering, material engineering, and other traditional engineering programs. EECS refers to electrical engineering, computer science, and IT programs. Business includes finance, accounting, marketing, and management. Public affairs includes international relations and public policy. Medicine includes medical education, nursing, and health care. Other includes film, theater, and hotel management.

Panel A shows that among the 91 undergraduate overseas programs, only one is offered by Elite universities. The main suppliers of the undergraduate programs are Master universities, with 70% of market share. In contrast, Panel B shows a higher participation rate by Elite universities in graduate level programs, offering 9% of the master's degree programs. Master universities are still the biggest suppliers, offering 48% of the master's degree programs. This dominance by Master universities simply reflects the fact that Master universities outnumber Elite universities by 688 to 16. Although not included in the table, when Master universities offer overseas programs, they are much more likely to offer both undergraduate and graduate programs in a variety of disciplines at the same location.

In terms of discipline, Business and EECS are by far the most popular majors offered in overseas programs. Finally, Panel C shows U.S. universities offer significantly fewer doctoral-level overseas programs, perhaps because they require substantial research expenditures without generating sufficient tuition revenue.

Table III.6 shows the average university financial and enrollment data in years 1995 to 2005 by university category and by whether or not they have overseas programs. Higher-ranked schools are generally larger and better endowed than lower-ranked schools. Private schools are better endowed, depend more on tuition revenue, are smaller, have

more nonresident alien students, and have more part-time students than public schools. This table also shows that universities with overseas programs are larger and more dependent on tuition revenue.

III.4.C. Regression results

C.1. Likelihood of having overseas programs

Our first inquiry is what university characteristics help explain the likelihood of having overseas programs. For this purpose, we use the following probit specification:

$$Pr\ (overseas_i) = G\ (\beta_0 + \beta_1 \times Enrol\_FTE_i + \beta_2 \times Part\_Time_i + \beta_3 \times Non\_Resid_i + \beta_4 \times Tui\_Dep_i + \beta_5 \times Log(Endow\_FTE)_i + \beta_6 \times Reputation_i + \beta_7 \times Public_i + \beta_8 \times interaction\ terms_i + \varepsilon_i)$$

The dependent variable *Pr (overseas)* is equal to 1 if a university has overseas programs and 0 otherwise. *Enrol_FTE* is full time equivalent enrollment and measures the size of a university. *Part_Time* is the percentage of part-time student enrollment. *Non_Resid* is the percentage of nonresident alien enrollment and measures a university's openness to foreigners. *Tui_Dep* is tuition revenue as a percentage of total revenue. Log (*Endow_FTE)* is the log value of university endowment per full time equivalent student. *Reputation* is proxied by indicator variables, *Elite, Good,* and *Moderate*. *Public* is an indicator variable for public university. We also include interaction terms between university ranking categories and the *Public* indicator. Subscript *i* refers to university *i*. G is the probit cumulative distribution function.

Because overseas programs affect tuition revenue, expenditure, and the percentage of nonresident alien enrollment, we lag all financial and enrollment variables by using 1995 university enrollment and financial data. Of the 144 current overseas

programs offered by advanced-degree awarding institutions, only four existed in 1995. At that time, both public and private schools followed the same accounting standard (the Old Form), making their financial data more directly comparable.[77] As a robustness check, we also use 2005 data as independent variables in unreported regressions. The results are quantitatively the same.

When universities have missing data in 1995, we use the average values of universities in the same category (in terms of reputation and the public/private classification) in 1995. Table III.7 presents the summary statistics of the 1995 university enrollment and financial data.[78] The 1995 data are highly correlated with their 2005 data, indicating persistency in university characteristics.

Table III.8 reports the estimates using probit regression.[79] University size, measured by full-time-equivalent enrollment, has a positive and significant effect on the probability of having overseas programs, indicating larger universities are more likely to offer overseas programs. A 1,000 increase in full-time-equivalent enrollment increases the probability of having an overseas program by 0.8%, holding all other variables constant at the mean. This impact of size is non-trivial, considering that the likelihood of sponsoring overseas programs for an average university[80] is only 5.33%. Nonresident

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[77] Public institutions used the Old Form until 2002, and were required to follow New GASB no later than 2004. Private institutions used the Old Form until 1997, when they switched to FASB. These accounting standards differ in their treatment of revenue and expenditure composition.

[78] The average tuition dependency in Table VII is much higher than those reported by the Digest of Education Statistics (2007) for the academic year 2004 - 2005. The difference is mainly due to the difference in computing the average. The averages reported by DES are value-weighted—calculated as total tuition revenue of all public (or private nonprofit) institutions divided by total revenue of all public (or private nonprofit) institutions, whereas the average in Table VII is equal-weighted. Thus, the DES averages give greater weights to top tier, larger schools with greater endowment, which Table VI shows are less tuition dependent.

[79] We also estimate OLS and Logistic regressions. The results (unreported) are quantitatively the same.

[80] An average university implies all independent variables are held at their mean values. Mean values of independent variables are reported in Table VII.

enrollment also has a positive and significant effect on the likelihood of having overseas programs. A 1% increase in nonresident enrollment increases the probability of having overseas programs by 0.4%, holding all other variables constant at the mean. Tuition revenue dependence has a significant positive effect as well.[81] A 1% increase in tuition revenue dependence increases the likelihood of having overseas programs by 0.1%, holding all other variables constant at their mean. Elite universities are more likely to have overseas programs. Moving from Master to the Elite category increases the likelihood of having overseas programs by 44.9% for private schools, holding all other variables constant at their mean.[82]

These results suggest that the most active participants in overseas programs are large Elite research universities. Schools more open to foreign students are also more likely to have overseas programs. It appears that the best schools are making efforts to globalize their institutions and to provide higher education opportunities overseas.

The regression estimates also indicate that universities with higher tuition dependency are more likely to have overseas programs, suggesting that finance plays a role in the decision making process. How much economics matter in offering of overseas programs is the subject of investigation in the next two sections.

C.2. Location choice

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[81] We also use two alternative measures of tuition dependency that account for student financial aid. The first is the ratio of tuition revenue net of financial aid to total revenue; the second ratio is based on the same numerator divided by total revenue net of financial aid. The results (unreported) are quantitatively the same.

[82] We are not interpreting the marginal effects of the interaction terms, because we have three interaction terms in the probit regression. Interpreting interaction effect in nonlinear models is complicated and the widely-used Norton, Wang, and Ai (2004) interaction effect correction can only be applied to probit specification with one interaction term. Not correcting for interaction effect does not affect the marginal effects of other independent variables.

If finance plays an important role, universities' location choice may not be much different from those of multinational corporations making FDI. Thus, to examine how host country characteristics are related to the location of overseas programs, we follow the international trade literature. Specifically, we relate the number of overseas programs in a host country to measures of economic development, the recent economic growth rate, the size of the market for higher education, the U.S. outflow of FDI, and other local environmental factors by estimating the following regression:[83]

$$Density_j = \beta_0 + \beta_1 \times GDP\_PPP_j + \beta_2 \times Growth_j + \beta_3 \times Stu\_Pop_j + \beta_4 \times FDI_j + \beta_5 \times Gov\_Stab_j + \beta_6 \times Law\_Order_j + \beta_7 \times Ease\_Bus_j + \beta_8 \times Continent_j + \varepsilon_j$$

Density measures the number of overseas programs located in host country j. It includes all overseas degree programs offered by advanced-degree awarding U.S. universities in that country. As a robustness check, we include overseas programs offered by all categories of universities and colleges. The results (unreported) do not change.

All independent variables are averaged values from 1999 to 2003 except for *Ease_Bus*, which is available only from 2004 to 2009. *GDP_PPP* is the host country real gross domestic product (GDP) per capita. *Growth* is the growth rate of *GDP_PPP*. These two variables measure the level and the slope of economic development of host country j. *Stu_Pop* is the tertiary school age population, which measures the potential size of the host country's higher education market. *FDI* is U.S. foreign direct investment outflow to host country j. *Gov_Stab* is government stability of the host country, which is a proxy for political risk. *Law_Order* measures the strength of judicial system and *Ease_Bus*

[83] As a robustness check, we also estimate a conditional (fixed-effect) logit and a standard logit model with clustered standard errors (at university level) by relating a university's probability of having overseas programs in a host country (1 if having overseas programs in the host country and 0 otherwise) to host country characteristics. The results (unreported) are very similar.

measures the ease of conducting business in the host country. *Continent* is a set of dummy variables that indicates whether the host country j is located in Africa, Asia, Europe, Middle East,[84] North America (Canada), and Oceania. We would have liked to include the likelihood of obtaining local financial support, and the quality and openness of local higher education markets; unfortunately, we can obtain such data only for a handful of countries, making it impossible to conduct meaningful tests.

Table III.9 reports the regression estimates. We use the Negative Binomial model because the variance of the dependent variable (2.68) is much larger than the mean (0.77). A likelihood ratio test confirms the existence of over-dispersion.

The regression estimates in Table III.9 indicate that economics play an important role in location decisions of U.S. universities. The two significant variables, the level of GDP per capita and student population, are both critical ingredients for financial viability. U.S. universities target countries with large potential markets where the local population has the economic means to pay for their programs.

The regression estimates imply that a one thousand dollar increase (in 2000 constant international dollars) in real GDP per capita increases the expected number of overseas programs in a country by 7.1%, holding all other variables constant. The size of the local market also has an important impact. An increase in the tertiary school age population by one million increases the expected number of overseas program in a country by 4.4%, holding all other variables constant. U.S. universities also seem to follow U.S. FDI outflow, perhaps because they regard the countries with close U.S. trade

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[84] Following Bhandari and Chow (2007), the Middle East region includes Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian Authority, Qatar, Saudi Arabia, Syria, United Arab Emirates, and Yemen.

relationships as having friendlier environments for U.S. entities to conduct business and having a higher demand for U.S. style higher education. An increase of one billion dollars (in 2000 constant international dollars) in U.S. FDI outflow increases the expected number of overseas programs in a country by 4.9%.

U.S. universities also are more likely to have overseas programs in countries with business friendly environments and weaker regulations. A one point improvement in the ease of doing business index[85] increases the expected number of overseas programs by 1.6%, and a one point increase in the strength of judicial system[86] decreases the expected number of overseas program by 31.6%. We doubt that U.S. universities purposefully target countries with weaker judicial systems; rather, the correlation seems to be due to the fact that de-facto barriers against setting up overseas programs are less effective in countries with weaker judicial systems.

Table III.9 also shows that Asian and Middle Eastern countries are more popular destinations for overseas programs. U.S. universities offer more overseas programs in Asia because of its large market for higher education and greater local demand for U.S.-style higher education. The main attraction to the Middle East appears to be its financial support with oil money.

To examine whether geographical and cultural proximity also matter when universities make decisions about location, we divide U.S. universities into four regions according to U.S. Census Bureau geographic locations: Northeast, Midwest, South and

[85] This variable ranges from 1 to 181, where 1 is the country where it is easiest to do business.
[86] This variable ranges from 1 to 6, where 6 indicates the strongest judicial system.

West.[87] Table III.10 tabulates the number of overseas programs located in the seven continents by the region. It shows that Asia and Europe have more or less equal representation from all four regions (relative to the total number of overseas programs offered by universities in each region). The Middle East has a high representation of universities from the Northeast region. Middle Eastern countries tend to target top U.S. universities with substantial financial aid and the Northeast region has more top ranked universities. The only indication of cultural and geographic proximity affecting location decisions is the relatively higher representation of universities from the South and West regions in Latin America (relative to the total number of overseas programs offered by universities in each region). In short, although geographic and cultural distance may matter, the overriding factor in location decisions seems to be economics.

C.3. Tuition discounts

If universities behave like firms, they will adjust product pricing to suit the local environment. In this section we investigate this pricing issue by focusing on tuition discounts. We hypothesize that universities adjust their tuition based on affordability; that is, they offer higher tuition discounts in countries with lower income to attract a sufficient number of students. Other factors relevant to the local demand include the reputation of the sponsoring university, the degree level, and the discipline.

Tuition discounts may also be influenced by the cost structures of overseas programs. Costs can be lowered by inviting a local university as a partner and by employing local faculty at lower salaries than U.S. faculty. Costs can also be lowered by

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[87] Northeast includes ME, NH, VT, MA, CT, NY, NJ, PA, and RI. Midwest includes MI, OH, IN, IL, WI, MN, IA, MO, KS, NE, SD, and ND. South includes TX, OK, AR, LA, MS, AL, TN, KY, GA, FL, SC, NC, VA, WV, DC, MD, and DE. West includes WA, OR, CA, NV, ID, UT, AZ, NM, CO, WY, MT, AK, and HI.

obtaining financial aid from the local government and/or a third party such as the World Bank. Thus, we use the following specification to analyze overseas program tuition:

$$Discount_{ijk} = \beta_0 + \beta_1 \times GDP\_PPP_j + \beta_2 \times Stu\_Pop_j + \beta_3 \times Gov\_Stab_j + \beta_4 \times Reputation_i + \beta_5 \times Public_i + \beta_6 \times Prof_k + \beta_7 \times BA_k + \beta_8 \times Joint_k + \varepsilon_{ijk}$$

$Discount_{ijk}$ is 1 minus the ratio of overseas sub-program k's tuition in host country j to the tuition of a comparable program at the same degree level and in the same discipline on university i's U.S. home campus. Because some universities offer several degree programs in multiple disciplines at the same location and tuition varies across degree levels and disciplines, we break down an overseas program at each location into sub-programs by their degree levels and disciplines. We make tuition comparable across programs and locations by assuming that a student takes, on average, four 3-credit courses per semester, or equivalently, eight 3-credit courses per academic year.[88]

The average tuition discounts are 21%, 26%, 28%, and 8% for Master, Moderate, Good, and Elite universities, respectively. The discounts are significantly greater than zero at the 1% level for all types except Elite universities.

$Prof_k$ is an indicator variable for professional schools, equal to 1 if the overseas sub-program is in engineering, EECS, business, law, medicine, or other professional disciplines, and 0 otherwise. BA_k is equal to 1 if the overseas sub-program is a bachelor's program and 0 otherwise. $Joint_k$ is equal to 1 if the overseas sub-program has a partner university in the host country or has received full or partial local financial support. This variable is our proxy for lower cost. Other independent variables are defined earlier.

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[88] If overseas program tuition is in foreign currency, we convert it to U.S. dollars using foreign exchange rates as of August 29, 2008.

Table III.11 reports the OLS regression estimates with robust and clustered (at the university level) standard errors. We exclude overseas Ph.D. programs, because doctoral students often work as research and/or teaching assistants, receiving financial stipends and tuition waivers.

Three variables show statistical significance: real GDP per capita, Good university category, and bachelor's degree programs. Overseas programs offer lower tuition discounts in higher income countries. An increase in real GDP per capita by a thousand dollars (2000 constant international dollar) leads to a 2.2% decrease in tuition discount, holding all other variables constant.

Tuition discounts for baccalaureate programs are 25.5% more than master's programs, holding all other variables constant. We attribute this greater discount to the stiffer competition undergraduate degree programs face from local universities, relative to advanced degree programs.

Indicator variable *Good* has a significant effect on tuition discounts, while *Elite* and *Moderate* do not. Moving from the Master university group to the Good group increases tuition discounts by 23.6%, holding all other variables constant. However, Elites do not offer higher tuition discounts even though tuition is much higher at Elite universities' home campuses than at Masters. Because of their high visibility and reputation, they may not have to offer tuition discounts to attract students. Good universities, by contrast, lack the same visibility and reputation and, thus, have to offer substantial tuition discounts to fill their classrooms.[89]

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[89] Differences in home campus tuition charged by Moderate and Master level universities are much smaller than those between Good and Master; hence, Moderate schools may not need to offer significantly more tuition discounts than Master schools. The average private university home campus tuitions for the 2007 – 2008 academic year are $35,082,

Finally, but equally interesting, our proxy for lower costs, *Joint,* has no effect on tuition discounts, implying that U.S. universities do not pass on any cost savings to local students in the form of lower tuition. This pricing behavior is similar to that of profit-seeking corporations.

III.5. Conclusion

This paper examines U.S. university overseas programs because if universities ever behave like firms, they are more likely to do so when they make investments overseas. When operating abroad, universities are not bound by the same set of implicit and explicit contracts entered over time with domestic stakeholders.

We unearth an abundance of evidence in support of our hypothesis that U.S. universities behave like firms when they make overseas investments. Universities with higher tuition dependency are more likely to offer overseas programs. They target markets with a large pool of potential clients, in business friendly environments, with loose regulation. Upon entering these markets, they price their products to suit local affordability and local competition. Furthermore, when they save costs by forming local partnerships or by obtaining local financial support, we find no evidence that they pass on the savings to local clients. These behaviors are exactly what one would expect from profit-seeking multinational firms in their foreign direct investments.

These findings do not necessarily imply that U.S. universities behave like firms in their domestic operations. Because nonprofit universities face various constraints from explicit and implicit contracts entered over time with multiple stakeholders, their domestic behavior may differ substantially from their overseas behavior. Nevertheless,

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$34,941, $25,220, and $21,084 for Elite, Good, Moderate, and Master groups, respectively. The corresponding averages for public schools are $8,259, $8,030, $6,318, and $5,374.

one can easily think of similarities in governance structures between large universities and large, diffusely held public corporations with clear separation of ownership and control: centralized administration, bureaucratic behavior, the me-first attitude often observed among those who participate in the governance process, and finally, but most important, the need to ensure sustainability by ensuring sufficient financial resources. Whether these similarities lead large modern U.S. universities to emulate profit-seeking public corporations in operating home campuses within the U.S. borders is an interesting subject for future research.

Finally, our results have an implication on how U.S. universities' overseas programs affect their domestic programs. In a recent hearing by the House Committee on Science and Technology, lawmakers questioned whether university ventures abroad are undermining American economic competitiveness. Rep. David Wu of Oregon says that he "wanted to be sure that colleges that established branches overseas did not price themselves too cheaply and 'start giving away the store'."[90] Our results suggest that the public can rest assured that U.S. universities are not diverting resources to the benefit of overseas students. Quite the contrary, U.S. universities seem to price their products strategically, like U.S. multinational corporations, using their competitive edge in attempts to generate more resources for the benefit of their home institution.

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Table III.1. U.S. foreign direct investment (selected industries)
This table shows the percentage of sales from majority-owned foreign affiliates, calculated as sales revenue of majority-owned foreign affiliates divided by the total sales of U.S. parent firms and majority-owned foreign affiliates. The numbers are based on worldwide sales of U.S. parent firms and majority-owned foreign affiliates from 1999 to 2004 obtained from Bureau of Economic Analysis website.

Majority Owned Foreign Affiliates (%)	1999	2000	2001	2002	2003	2004	Average
All industries	27.1	27.3	27.1	28.4	30.5	31.8	28.7
Mining	48.6	25.0	25.0	35.3	38.9	37.3	35.0
Utilities	12.8	14.9	15.0	15.7	11.6	10.2	13.4
Manufacturing	34.7	35.4	36.1	37.8	40.2	41.7	37.7
Wholesale trade	28.7	26.6	25.8	19.2	21.6	23.1	24.2
Information	13.1	12.4	12.3	13.8	14.8	17.2	13.9
Finance (except depository institutions) and insurance	15.3	17.8	17.3	17.4	18.5	18.8	17.5
Professional, scientific, and technical services	36.8	34.7	36.2	36.4	40.2	38.7	37.2
Other industries	13.0	14.2	15.3	15.8	16.7	15.8	15.1

Table III.2. Correlation matrix
USNews refers to America's best national universities from U.S. News & World Report, NewsWeek refers to Top 100 Global Universities by Newsweek, Times refers THE-QS World University Rankings from The Times Higher Education Supplement (THES) and Quacquarelli Symonds (QS), and SJTU refers to Academic Rankings of World Universities from Shanghai Jiaotong University. Endow_FTE is the 2005 market value of endowment assets divided by full time equivalent enrollment obtained from 2005 IPEDS College Finance Survey.

	USNews	NewsWeek	Times	SJTU
NewsWeek	0.61			
Times	0.76	0.72		
SJTU	0.54	0.90	0.70	
Endow_FTE	0.68	0.48	0.57	0.45

Table III.3. Relative ranking of universities using average Borda Count Scores
We use the Borda Count method to average the relative rankings from four ranking sources. A university ranked first in a ranking study is given a score of 50, the second is given 49, and so on. We then take the simple average of the scores each university gets from the four ranking sources to calculate the average Borda Count Score (BCS). When the ranking sources include foreign universities, we re-rank American universities excluding foreign universities. Diff is the difference in BCS scores between a university and the university ranked one place above it. A natural breakpoint in BCS is at the sixteenth university. We classify the first 16 universities as "Elite" and the remaining 48 research universities (excluding specialized institutions Rockefeller University, University of California at San Francisco, and University of Texas Southwestern Medical Center at Dallas) as "Good".

Institution Name	BCS	Diff
Harvard University	50	-
Yale University	46.75	-3.25
California Institute of Technology	46.25	-0.5
Stanford University	46.25	0
Massachusetts Institute of Technology	46	-0.25
Princeton University	44.75	-1.25
Columbia University in the City of New York	43.75	-1
University of Chicago	42.25	-1.5
University of Pennsylvania	41.25	-1
University of California-Berkeley	40.25	-1
Cornell University	38.5	-1.75
Duke University	38	-0.5
Johns Hopkins University	36	-2
University of California-Los Angeles	35	-1
University of Michigan-Ann Arbor	33.5	-1.5
Northwestern University	33.25	-0.25
University of California-San Diego	29	-4.25
University of Wisconsin-Madison	28	-1
University of Washington-Seattle Campus	27.75	-0.25
New York University	26	-1.75
Washington University in St Louis	24.75	-1.25
Brown University	24.25	-0.5
Carnegie Mellon University	23	-1.25
University of Illinois at Urbana-Champaign	22.5	-0.5
Vanderbilt University	22	-0.5
The University of Texas at Austin	22	0
University of California-San Francisco	19.75	-2.25
University of Maryland-College Park	16.75	-3
University of Southern California	16.75	0

Dartmouth College	16.5	-0.25
Emory University	16.5	0
University of Pittsburgh-Main Campus	16.25	-0.25
University of California-Santa Barbara	14.75	-1.5
University of Colorado at Boulder	14.5	-0.25
University of Minnesota-Twin Cities	14.5	0
University of North Carolina at Chapel Hill	14.5	0
Rice University	13.25	-1.25
University of Rochester	13	-0.25
Boston University	12.75	-0.25
University of Virginia-Main Campus	12.5	-0.25
Purdue University-Main Campus	10.5	-2
Case Western Reserve University	10.5	0
Georgetown University	10.25	-0.25
University of California-Davis	10.25	0
North Carolina State University at Raleigh	9.25	-1
University of Notre Dame	8.25	-1
Georgia Institute of Technology-Main Campus	7.5	-0.75
Rockefeller University	7.25	-0.25
Pennsylvania State University-Main Campus	7.25	0
University of California-Irvine	6.75	-0.5
Tufts University	5.75	-1
Wake Forest University	5.75	0
Michigan State University	5.25	-0.5
University of Texas Southwestern Medical Center at Dallas	5.25	0
Brandeis University	5	-0.25
University of Florida	5	0
College of William and Mary	4.75	-0.25
Texas A & M University	4.75	0
Ohio State University-Main Campus	4.5	-0.25
Boston College	4.25	-0.25
Rutgers University-New Brunswick/Piscataway	4	-0.25
Lehigh University	4	0
University of Arizona	3.25	-0.75
Rensselaer Polytechnic Institute	2.5	-0.75
University of Massachusetts-Amherst	1.75	-0.75
Indiana University-Bloomington	1.25	-0.5
Yeshiva University	0.25	-1

Table III.4. Universities with overseas programs
Column (1) shows the total number of universities in each category based on our average Borda Count Score and Carnegie 2005 basic classification. Column (2) shows the number of universities with overseas programs in each category. Column (3) shows the percentage of universities with overseas programs in each category, which is calculated as number of universities with overseas programs divided by the total number of universities in that category. Each UNITID in IPEDS is treated as a university.

Type	Public			Private Nonprofit			Private For-Profit		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Elite	3	2	66.7%	13	7	53.8%	0	0	-
Good	27	9	33.3%	21	5	23.8%	0	0	-
Moderate	136	18	13.2%	74	10	13.5%	8	0	0.0%
Masters	270	8	3.0%	375	18	4.8%	43	5	11.6%
Baccalaureates	149	0	0.0%	511	1	0.2%	77	1	1.3%
Associates	1,073	1	0.1%	132	0	0.0%	589	0	0.0%
Others	547	0	0.0%	908	0	0.0%	2,047	1	0.0%
Total	2,205	38	1.7%	2,034	41	2.0%	2,764	7	0.3%

Table III.5. Summary statistics of overseas programs
A&S (Arts & Sciences) includes foreign languages, economics, physics, and others. Edu (Education) refers to education programs. Engine (Engineering) includes mechanical engineering, material engineering, and other traditional engineering programs. EECS refers to electrical engineering, computer science, and IT programs. Bus (Business) includes finance, accounting, marketing, and management. PA (Public Affairs) includes international relations and public policy. Med (Medicine) includes medical education, nursing, and health care. Other includes film, theater, and hotel management.

Panel A:Bachelor	A&S	Edu	Engine	EECS	Bus	PA	Law	Med	Other	Total
Elite	1	0	0	0	0	0	0	0	0	1
Good	1	1	2	2	1	1	0	0	0	8
Moderate	6	1	0	3	3	2	0	1	2	18
Master	15	1	1	13	27	5	0	1	1	64
Total	23	3	3	18	31	8	0	2	3	91
Panel B:Master	A&S	Edu	Engine	EECS	Bus	PA	Law	Med	Other	Total
Elite	2	0	0	1	4	2	0	1	1	11
Good	1	0	1	8	5	2	0	1	0	18
Moderate	0	4	1	6	16	1	1	3	1	33
Master	5	5	1	3	32	6	0	3	2	57
Total	8	9	3	18	57	11	1	8	4	119
Panel C:Ph.D.	A&S	Edu	Engine	EECS	Bus	PA	Law	Med	Other	Total
Elite	0	0	0	0	0	0	0	2	0	2
Good	1	0	1	1	0	0	0	0	0	3
Moderate	0	0	1	1	1	0	1	1	0	5
Master	0	0	0	0	0	0	1	0	0	1
Total	1	0	2	2	1	0	2	3	0	11

Table III.6. Summary statistics of financial and enrollment variables
All variables are averaged values from 1995 to 2005. Enrol_FTE is full time equivalent enrollment, which is full time enrollment plus 0.38 times part-time enrollment. Part_Time is the percentage of part-time enrollment to total enrollment. Non_Resid is the percentage of nonresident alien enrollment to total enrollment. Tuition revenue dependence, Tui_Dep, is the ratio of tuition revenue to total revenue. Endow_FTE is market value of endowment assets divided by full time equivalent enrollment. Endow_FTE is adjusted by inflation and is in 2005 constant dollars. Financial variables are available in 1995, 2000, 2001, 2002, 2003, 2004, and 2005 IPEDS Finance Surveys. Enrollment variables are available in all IPEDS Enrollment Surveys from 1995 to 2005. IPEDS surveys were not conducted in 1999. Both public and private schools follow the Old Form accounting standards until 1997, after which most of the public schools follow Governmental Accounting Standards Board (GASB) accounting rules while the others follow Financial Accounting Standards Board (FASB) accounting standards. GASB and FASB treat revenue items differently, which render the financial data for public and private schools not directly comparable after 1997.

Category	Control	Over-seas	Enrol_ FTE	Part_Time (%)	Non_Resid (%)	Tui_Dep (%)	Endow_ FTE
Elite	Public	Yes	33,047	8.6	9.0	15.3	65,557
		No	35,214	4.5	6.2	8.3	13,573
	Private	Yes	14,308	16.6	15.0	17.3	347,639
		No	13,729	13.9	17.9	8.4	633,932
Good	Public	Yes	29,997	16.8	8.1	19.7	8,349
		No	29,377	14.6	5.9	17.2	29,200
	Private	Yes	17,472	18.4	13.6	35.3	112,854
		No	8,800	10.8	9.7	29.6	210,896
Moderate	Public	Yes	21,338	27.6	5.8	20.9	7,846
		No	14,158	27.6	4.6	22.8	6,888
	Private	Yes	10,037	34.4	8.1	60.0	29,953
		No	5,936	32.4	6.8	60.0	29,059
Masters	Public	Yes	11,633	30.4	4.2	34.0	910
		No	6,619	31.7	2.2	26.1	2,291
	Private	Yes	3,829	42.0	4.8	69.3	10,271
		No	2,449	33.6	3.2	62.7	17,533

Table III.7. Summary statistics for independent variables in the likelihood regression Enrol_FTE is full time equivalent enrollment, which is full time enrollment plus 0.38 times part-time enrollment. Part_Time is the percentage of part-time enrollment to total enrollment. Non_Resid is the percentage of nonresident alien enrollment to total enrollment. Tuition revenue dependence, Tui_Dep, is the ratio of tuition revenue to total revenue. Endow_FTE is market value of endowment assets divided by full time equivalent enrollment. All variables are based on data obtained from 1995 IPEDS College Enrollment and Finance Surveys.

Variable Name	Obs	Mean	Median	Std. Dev.	Min	Max	Correlation with 2005 data
Enrol_FTE	913	6,614.5	4,026.8	6,986.6	61.9	43,860.7	0.98
Part _Time	913	33.0	30.0	17.9	0.2	99.1	0.79
Non_Resid	913	3.7	2.3	4.4	0.0	35.7	0.79
Tui_Dep	913	44.7	40.6	22.7	4.9	100.0	0.89
Endow_ FTE	913	17,761.4	3,352.8	73,845.3	0.0	1,703,445.0	0.88

Table III.8. Probit regression on the likelihood of having overseas programs
The dependent variable is equal to 1 if a university has overseas programs and 0 otherwise. Enrol_FTE is full time enrollment plus 0.38 times part-time enrollment in thousands. Part_Time is the percentage of part-time student enrollment. Non_Resid is the percentage of nonresident alien enrollment. Tui_Dep is tuition revenue as a percentage of total revenue. Log(Endow_FTE) is the log value of university endowment per full time equivalent student in thousands. All financial and enrollment variables are 1995 value. Elite is an indicator variable equal to 1 if a university's Borda Count Score is ranked in the top 16 and 0 otherwise. Good is equal to 1 if a university's Borda Count Score is ranked between 17 and 67 (specialized institutions excluded). Moderate is equal to 1 if a university is considered a research university by the Carnegie 2005 report but is ranked below 67. Public is an indicator variable for public university. Robust standard errors are reported in parentheses. ***, **, and * indicate the significance level at 1%, 5%, and 10%, respectively.

Variable Name	Coefficient	Marginal Effect
Enrol_FTE	0.074***	0.008***
	(0.015)	
Part_Time	0.006	0.001
	(0.004)	
Non_Resid	0.035***	0.004***
	(0.012)	
Tui_Dep	0.011*	0.001*
	(0.006)	
Log (Endow_FTE)	-0.043	-0.005
	(0.077)	
Elite	1.640***	0.449***
	(0.505)	
Good	0.617	0.102
	(0.401)	
Moderate	0.180	0.021
	(0.234)	
Public	-0.166	-0.018
	(0.337)	
Elite*Public	-0.855	
	(0.930)	
Good*Public	-0.576	
	(0.554)	
Moderate*Public	0.020	
	(0.317)	
Constant	-2.839***	
	(0.495)	
Observations	913	
Pseudo R-Squared	0.22	

Table III.9. Negative Binomial location regression

Dependent variable is Density, which measures the number of overseas programs offered in a host country by U.S. institutions that award advanced degrees. All our independent variables (except for Ease_Bus, which is averaged from 2004 to 2009) are averaged values from 1999 to 2003. GDP_PPP is host country real gross domestic product (GDP) per capita in 2000 constant international dollars (in thousands). Growth is the growth rate of GDP_PPP. Stu_Pop is the tertiary school age population in millions. FDI is the U.S. foreign direct investment outflows to the host country in 2000 constant U.S. dollars (in billions). Gov_Stab measures government stability. Law_Order measures the strength of legal system. Ease_Bus measures the easiness of doing business. Africa, Asia, Europe, Middle East, and Oceania are dummy variables indicating the location of host country. The Middle East region includes Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian Authority, Qatar, Saudi Arabia, Syria, United Arab Emirates, and Yemen. Robust standard errors are reported in parentheses. ***, **, and * indicate the significance level at 1%, 5%, and 10%, respectively.

Variable Name	Negative Binomial Coefficient	Percentage Change (%)
GDP_PPP	0.069**	7.1**
	(0.029)	
Growth	-0.006	-0.6
	(0.046)	
Stu_Pop	0.043***	4.4***
	(0.006)	
FDI	0.048**	4.9**
	(0.021)	
Gov_Stab	0.015	1.5
	(0.138)	
Law_Order	-0.379*	-31.6*
	(0.226)	
Ease_Bus	-0.016**	-1.6**
	(0.008)	
Africa	-0.183	-16.7
	(0.751)	
Asia	1.054**	186.9**
	(0.452)	
Europe	-0.350	-29.5
	(0.683)	
Middle East	1.078**	193.9**
	(0.518)	
Oceania	0.196	21.7
	(0.726)	
Constant	0.446	
	(1.655)	
Observations	117	
Log Pseudo Likelihood	-111.47	

Table III.10. Overseas programs by geographic location
Northeast includes ME, NH, VT, MA, CT, NY, NJ, PA, and RI. Midwest includes MI, OH, IN, IL, WI, MN, IA, MO, KS, NE, SD, and ND. South includes TX, OK, AR, LA, MS, AL, TN, KY, GA, FL, SC, NC, VA, WV, DC, MD, and DE. West includes WA, OR, CA, NV, ID, UT, AZ, NM, CO, WY, MT, AK, and HI. Middle East region includes Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian Authority, Qatar, Saudi Arabia, Syria, United Arab Emirates, and Yemen. This table includes all 159 overseas programs identified from the press.

U.S. region	Africa	Asia	Europe	Latin America	Middle East	North America	Oceania	Total
Midwest	0	29	6	1	3	0	0	39
Northeast	2	27	7	4	11	1	2	54
South	1	25	8	5	6	0	1	46
West	0	10	3	4	0	3	0	20
Total	3	91	24	14	20	4	3	159

Table III.11. Tuition discount regression

Discount is the ratio of overseas sub-program tuition to the tuition of a comparable program on the sponsoring U.S. university's home campus. We make tuition comparable across programs and locations by assuming that a student takes an average of four 3-credit courses per semester or eight 3-credit courses per academic year whenever necessary. GDP_PPP is host country's real per-capita GDP in 2000 constant international dollars (in thousands). Stu_Pop is the tertiary school age population in millions. Gov_Stab measures government stability, which is a proxy for political risk. Elite is an indicator variable equal to 1 if a university's Borda Count Score is ranked in the top 16 and 0 otherwise. Good is equal to 1 if a university's Borda Count Score is ranked between 17 and 67 (three specialized institutions excluded). Moderate is equal to 1 if a university is considered a research university by the Carnegie Classification but is ranked below 67. Variable Public is an indicator variable for public university. Prof is equal to 1 if the overseas sub-program is in engineering, EECS, business, law, medicine, and other professional disciplines and 0 otherwise. BA is equal to 1 if the overseas sub-program is a baccalaureate program and 0 otherwise. Joint is equal to 1 if the overseas sub-program has a partner university in the host country or has received local financing support. Robust and clustered (at university level) standard errors are reported in parentheses. ***, **, and * indicate the significance level at 1%, 5%, and 10%, respectively.

Variable Name	OLS Coefficient
GDP_PPP	-0.022***
	(0.004)
Stu_Pop	-0.000
	(0.001)
Gov_Stab	-0.050
	(0.054)
Elite	0.021
	(0.187)
Good	0.236**
	(0.114)
Moderate	0.046
	(0.113)
Public	0.006
	(0.074)
Prof	0.050
	(0.053)
BA	0.255*
	(0.131)
Joint	0.032
	(0.068)
Constant	0.913
	(0.572)
Observations	86
R-squared	0.510

Chapter IV

Earnings Restatements and Costs of Raising Equity

IV.1. Introduction

The integrity of financial reporting by public corporations and its ramifications for firm value have long been subjects of significant interest to capital market participants, regulators, and academic researchers. Transparent and truthful representations of firm performance and financial conditions facilitate accurate pricing of securities and ensure efficient allocation of capital. High-profile corporate scandals at Enron, WorldCom, and other major corporations in the early 2000s led to more stringent listing requirements by NYSE and NASDAQ and to the passage of the Sarbanes-Oxley Act of 2002. Reports published by the United States General Accounting Office (GAO) indicate that financial misreporting is a more widespread problem than the few major cases. For example, the period of 1997 to 2006 witnessed over 2,700 announcements of earnings restatements.

It is well documented that revelations of financial misreporting cause immediate, large declines in share value (see, e.g., Dechow, Sloan, and Sweeney (1996), Anderson and Yohn (2002), and Palmrose, Richardson, and Scholz (2004)). As such disclosures call into question the integrity of a firm's financial reporting system, firms are likely to also experience long-lasting repercussions in their contracting in the factor and product markets given the reliance on accurate financial information by various contracting parties (Ball (2001) and Holthausen and Watts (2001)). Research on this issue has been

limited. Graham, Li, and Qiu (2008) examine the effects of earnings restatements on the contracting between firms and creditors in a sample of bank loans. But the literature has been largely silent on the contracting implications of financial misrepresentation in the equity market. Since equity market transactions are particularly susceptible to information asymmetry and adverse selection problems (Myers and Majluf (1984)), financial reporting integrity may have potentially more profound effects on contracting outcomes. In addition, while prior research focuses on the response by either shareholders or creditors, firms as a nexus of contracts interact with many other parties (Jensen and Meckling (1976)). It remains unknown whether corporate disclosures of financial misreporting change the contracting terms between firms and non-investor groups or entities. Finally, to the extent that firms committing financial misrepresentation subsequently take corrective measures to improve internal control and governance and restore credibility to their financial reporting (Farber (2005), Cheng and Farber (2008), and Hennes, Leone, and Miller (2008)), it is an interesting yet unexplored issue whether these remedial actions are able to mitigate any elevated contracting costs faced by misreporting firms.

We aim to answer these questions by examining the underwriting contracts between firms and investment banks in seasoned equity offerings (SEOs). We investigate how prior incidences of financial misrepresentation by issuing firms affect the price and nonprice aspects of these contracts. Investment banks provide services and expertise to firms on a variety of corporate finance activities, such as securities issuance, mergers and acquisitions, and restructuring. As sophisticated players in the financial markets, they are likely to take into account an issuing firm's past misreporting when negotiating terms of

the underwriting contracts for a number of reasons. First, an issuing firm's past misreporting reduces the credibility of its financial statements. As a result, the due diligence process becomes more challenging for underwriters since they cannot rely solely on the information furnished by the issuing firm. Instead, they may need to expend more resources on fact finding and verification.

Second, by entering into an underwriting contract, investment banks implicitly certify the value of issuers' securities to the capital market. If the issuers are found out later to have misled investors through an inaccurate portrayal of their financial conditions, both the underwriters and the issuing firms will be subject to investor lawsuits and potentially liable for investor losses (DuCharme, Malatesta, and Sefcik (2004)). If past reporting violations make a firm's financial disclosure less trustworthy, investment banks may perceive a higher litigation risk from underwriting the company's stock offering.

Third, since investor demand is likely to be weak for stock offerings by misreporting firms, these issues would entail more marketing and placement efforts from underwriters and expose underwriters to greater inventory risk. Based on these considerations, we hypothesize that investment banks will design the underwriting contracts (price and nonprice terms) in ways that account for the extra work and risk involved with SEOs of misreporting firms, especially if the issuers have not addressed adequately the internal control and corporate governance weaknesses that may have led to the misreporting.[91]

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[91] There is a strand of literature that examines whether financial reporting quality is linked to costs of equity capital measured by either realized stock returns or implied discount rates estimated based on an assumed stock valuation model and analyst forecasts of earnings and dividends. While some researchers find that

We find supportive evidence for our conjecture in a sample of 2,337 firm-commitment SEOs issued by U.S. firms during the period from 1997 to 2008. Specifically, we show that firms with past earnings restatements pay significantly higher underwriting spreads when compared both to themselves prior to restatements and to non-restatement firms. The results are primarily driven by restatements due to accounting irregularities, i.e., deliberate manipulation, rather than unintentional errors. This suggests that underwriters discriminate between restatements of varying nature and severity and firms committing more serious financial misreporting face greater contracting costs. In addition, our findings are robust to controlling for the issuing firm's information asymmetry (Altinkilic and Hansen (2000) and Lee and Masulis (2009)), stock market liquidity (Butler, Grullon, and Weston (2005)), and corporate governance (Amiyatosh and Kim (2010)), and to correcting for potential self-selection bias arising from firms' decisions to issue equity.

Moreover, we show that restatement firms can restore credibility to their financial reporting and regain investor trust by implementing corporate governance improvements. Specifically, the effect of restatements on underwriting fees decreases as restatement firms increase the percentage of independent directors on their boards and replace a larger percentage of audit committee members present at restatement announcements.

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lower-quality financial reporting are associated with higher costs of equity capital (e.g., Botosan (1997), Francis et al. (2004), and Hribar and Jenkins (2004), Beneish, Billings, and Hodder (2008)), others argue that financial reporting quality is a diversifiable risk and find no relation between financial reporting quality and costs of equity capital (e.g., Ball and Brown (1969), Kasznik (2004), and Ogneva, Subramanyam, and Raghunandan (2007), Core, Guay, Verdi (2008), Hughes, Liu, and Liu (2009)). The literature is also faced with the empirical challenge of measuring costs of equity, since realized stock returns are poor proxies for expected stock returns (Fama and French (1997)) and implied cost of equity estimates are flawed due to biases in analyst forecasts (Kasznik (2004) and Guay, Kothari, and Shu (2006)). By focusing on the underwriting contracts in SEOs and the actual costs of raising equity, our analysis is free both of any assumption of equilibrium asset pricing model that specifies whether financial reporting quality is priced and of the aforementioned measurement issues.

The higher underwriting fees due to restatements display other cross-sectional variations as well. In particular, we find that the effect of restatements on underwriting fees is stronger in SEOs that attempt to issue a larger number of shares relative to shares outstanding. This is consistent with the idea that larger offerings by restatement firms involve especially greater underwriting risk and efforts (Butler, Grullon, and Weston (2005)). We also find that that the effect of restatements is more pronounced in the first few years after restatements, suggesting that investor concerns over the integrity of a firm's financial reporting are heightened immediately after earning restatements and appear to lessen over time in the absence of further reporting violations.

Variations in other dimensions of the underwriting contracts are also consistent with restatement firms losing credibility in their financial reporting and facing more obstacles and weaker demand in equity issuance. For example, we find that restatement issuers employ significantly larger underwriting syndicates with more lead managers. They are also more likely to utilize an extensive book building process than the faster and cheaper accelerated underwriting method that either bypasses or substantially curtails the conventional book building. Consistent with evidence from the gross spread analysis, both of these results are driven by restatements due to accounting irregularities, and suggest that offerings by restatement firms entail greater due diligence, marketing, and placement efforts from underwriters.

In addition to the characteristics of underwriting contracts between issuing firms and investment banks, we examine the stock price reaction to SEO announcements as another gauge of the costs firms incur in accessing the equity market. The adverse selection model in Myers and Majluf (1984) predicts stock price declines upon SEO

announcements and has received empirical support from a large number of studies (see Eckbo, Masulis, and Norli (2007) for a comprehensive literature review). Consistent with past restatements rendering a firm's financial disclosure less trustworthy and exacerbating investor concerns about adverse selection problems, we find significantly more negative stock price reactions to the SEO announcements by restatement firms. Again, this result is primarily concentrated in firms that have intentionally manipulated their earnings.

Our study makes three contributions to the literature. First, we provide clear evidence on how financial misrepresentation affects firms' contracting outcomes in the equity financing setting. Our findings of higher underwriting fees, larger underwriting syndicates, and lengthier and costlier underwriting process associated with SEOs of restatement firms suggest that misreporting firms experience higher costs in contracting with outside parties. To the extent that firms anticipating especially severe penalties will avoid accessing the equity market, the effects we uncover are a lower bound of the incremental contracting costs levied on restatement firms in equity issuance. In addition, our analysis yields several novel cross-sectional variations in the effect of financial misreporting on contracting costs. For example, we find that higher underwriting fees due to previous restatements can be mitigated through corporate governance improvements that rebuild investor confidence in firms' financial reporting and are more pronounced in the first few years after restatements.

Second, we identify the issuer's financial reporting integrity indicated by previous financial misrepresentation as a new determinant of SEO underwriting costs. Prior research shows that firms with greater information asymmetry (Altinkilic and Hansen

(2000)) and Lee and Masulis (2009)) and poorer stock market liquidity (Butler, Grullon, and Weston (2005)) incur higher flotation costs when issuing seasoned equity. Our evidence indicates that the issuer's financial reporting integrity is another factor that investment banks take into account in pricing underwriting contracts, and its effect on flotation costs is incremental to those of other determinants.

Third, our findings highlight the importance of differentiating among earnings restatements based on their causes. Hennes, Leone, and Miller (2008) develop a sophisticated classification scheme to separate restatements into those due to accounting irregularities and those due to unintentional errors. They show that such a distinction significantly enhances the power of tests to detect the effect of restatements on executive turnovers. In a different setting, we find highly consistent results throughout our analysis that it is the irregularity-related restatements that are significantly related to SEO underwriting fees, underwriting syndicate structure, underwriting method, and announcement returns. This lends further support to the validity of Hennes et al.'s methodology.

The rest of the paper is organized as follows. Section II describes the construction of the SEO sample and the identification of restatement firms. Section III presents the results from our empirical analysis. Section IV concludes.

IV.2. Sample construction

We begin our sample construction by extracting from the SDC Global New Issues database all firm-commitment seasoned equity offerings (SEOs) by U.S. firms from January 1, 1997 to December 31, 2008. For each SEO in the initial sample, we require that the offering size is at least $10 million, the offer price is at least $5, the percentage of

secondary shares in the offering is less than 100%, and the issuer has financial statement information available from Compustat and stock return data available from CRSP. We also follow literature conventions to exclude units, rights, closed-end fund and simultaneous international offerings. The final sample consists of 2,337 SEOs. Table IV.1 presents the sample distribution by offer year. The number of SEOs is at the highest level in 1997, the beginning of our sample period, but declines significantly after that and drops to its lowest level in 2000 and 2001, coinciding with the burst of the internet bubble. The offering activity starts to recover from 2002 and reaches another high point of 252 issues in 2004. Then it declines gradually to 146 offerings in 2008, the last year of our sample period and also the year when the stock market plummeted due to the financial crisis.

Our sample of restatement firms comes from two reports issued by the U.S. General Accounting Office (GAO) in 2003 and 2007, which include a list of companies that restated their financial statements during the period from 1997 to 2006. According to the GAO, "a restatement occurs when a company, either voluntarily or prompted by auditors or regulators, revises public financial information that was previously reported." The GAO sample includes both financial reporting frauds or irregularities (intentional misreporting) and accounting errors (unintentional misstatements). Hennes, Leone, and Miller (2008) develop a methodology that classifies a restatement as an irregularity if it satisfies at least one of the three criteria: (i) variants of the words "irregularity" or "fraud" were explicitly used in restatement announcements or relevant filings in the four years around the restatement; (ii) the misstatements came under SEC or DOJ investigations; and (iii) independent investigations were launched by boards of directors of restatement

firms. In a sample of restatements between 2002 and 2005, they demonstrate the importance and effectiveness of their classification scheme by showing that compared to error restatements, irregularity restatements are met with significantly more negative announcement returns (on average: -14% vs. -2%), are followed by shareholder class action lawsuits at a significantly higher rate, and lead to significantly more CEO/CFO turnovers. We obtain from Andrew Leone's website the irregularity-error classification for the GAO sample of restatements.[92]

We match the samples of restatements and seasoned equity offerings, and find that 202 of the 2,337 SEOs are by restatement firms after their restatements, while the rest are either by firms that have never restated earnings or by restatement firms prior to their restatements.[93] The small number of offerings by restatement firms after restatements is consistent with Chen, Cheng, and Lo's (2009) finding that firms face greater financial constraints after restatements. As shown in Table IV.1, 162 of these 202 SEOs are issued by companies whose restatements are due to unintentional accounting errors, and 40 are issued by firms whose restatements are due to intentional misreporting.

IV.3. Empirical results

IV.3.A. The effect of restatements on underwriting fees

A.1. Baseline analysis

Our main test is to examine whether investment banks charge higher underwriting fees for SEOs by companies that have restated their financial statements, especially when

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[92] We thank Karen Hennes, Andrew Leone, and Brian Miller for generously sharing their data.

[93] Since the GAO reports identify firms that restated earnings during the period from 1997 to 2006, it is possible that some SEOs in our sample are by firms that restated earnings prior to 1997 or after 2006. These SEOs will be classified as offerings by non-restatement firms, and their presence would bias against us finding support for our hypothesis that SEOs of restatement firms are associated with higher issuance costs.

restatements are due to intentional misreporting. Our measure of underwriting fees is the gross spread per share scaled by the offer price. In firm commitment offerings, underwriters purchase shares from issuing firms at a discount and sell the shares to investors at the offer price. The gross spread is the difference between the offer price and the purchase price paid by underwriters to issuing firms. Table IV.2 presents the summary statistics for the whole sample, as well as for different sub-samples. For the full sample, the mean and median percentage gross spread are 4.9% and 5%, similar to what Butler, Grullon, and Weston (2005) and Lee and Masulis (2009) find for their samples. The average (median) offering size measured by the principal amount is $170 ($80) million, representing about 22.5% (17.7%) of the pre-issue market value of equity for the average (median) issuer in our sample.

When we partition the sample into SEOs by firms that have restated earnings and those by firms that have not, we find that the former are associated with slightly lower gross spreads. For example, the gross spreads of SEOs by restatement firms have a mean (median) of 4.5% (4.8%), while the mean (median) gross spread of offerings by non-restatement firms is 5.0% (5.0%). This is most likely driven by the fact that the principal amount of SEOs by restatement firms tends to be much larger and that there is a well-documented negative relation between percentage gross spread and principal amount (see, e.g., Altinkilic and Hansen (2000) and Butler, Grullon, and Weston (2005)). The average (median) offering size by restatement companies is $442 ($116) million, while the average (median) principal amount by non-restatement issuers is only $145 ($77) million. Therefore, in order for us to draw reliable inference on the effect of past restatements on

underwriting fees, it is important to control for offering size and other known determinants of gross spread in a multivariate regression framework.

We classify these control variables into two groups: firm characteristics and issue characteristics. The former group includes firm size, leverage, Tobin's q, return on assets (ROA), stock return volatility, share turnover, and NYSE listing. The second group includes whether an issue is shelf registered, the proportion of secondary shares offered, lead underwriter reputation, as well as offering size measured by the logarithmic transformation of the principal amount. Appendix IV.A contains the definitions of these variables.

Larger firms are likely to have more analyst coverage and attract more institutional shareholders. Greater analyst coverage reduces the information asymmetry between firms and outside investors. A more transparent information environment is conducive to eliciting greater demand from investors for a firm's equity offering. Therefore, underwriters may find it easier to market and place offerings by larger firms and thus charge a lower gross spread. We measure firm size by the logarithmic transformation of the issuer's book value of total assets at the pre-issue fiscal year end (Compustat data 6).

Since underwriters guarantee the success of an offering in a firm-commitment issue by agreeing to purchase the entire offering from the issuer at a fixed price, they will take on more price risk in SEOs of firms with greater stock price fluctuations. To compensate for the additional risk, we expect investment banks to charge higher fees for such issues. We measure stock price fluctuations by the standard deviation of daily stock returns during the 250 trading days prior to the offer date. To the extent that firms with

higher stock return volatilities may also be associated with greater information asymmetry, underwriters may find that certifying the value of these companies entails more efforts and brings more litigation risk. As a result, they demand higher compensation for their services.

Firm leverage is defined as the sum of long-term debt (data 9) and short-term debt (data 34) over the book value of total assets at the pre-issue fiscal year end. Since highly levered issuers are associated with higher probabilities of financial distress and are likely to use offer proceeds to repay debt rather than take advantage of profitable growth opportunities, investors may be less enthusiastic about the SEOs of these firms. As a result, placing these offerings requires greater efforts from and carries more risk to underwriters, who in response charge higher fees.

The adverse selection problem for companies with higher Tobin's q tends to be less of a concern, since these firms are more likely to have profitable growth options. We expect that shareholders are more receptive to the equity offerings from firms with more profitable growth options. As a result, underwriters charge lower fees for these issuers. We define Tobin's q as the ratio of an issuer's market value of assets over its book value of assets at the pre-issue fiscal year end, where the market value of assets is computed as the book value of assets minus the book value of common equity (data 60) plus the market value of common equity (data 25 x data 199).

Butler, Grullon, and Weston (2005) argue that underwriters face lower inventory risk when placing shares that are liquid and they show that stock liquidity has a negative impact on gross spread. To control for the market liquidity of a stock, we include share turnover as an explanatory variable for gross spread. Share turnover is defined as the ratio

of the average daily trading volume during the 250 trading days prior to the offer date over the number of shares outstanding.[94]

Investment banks may find it easier to place shares listed on the NYSE, since firms trading on the NYSE tend to have a larger shareholder base. To control for this possibility, we include an indicator for NYSE listing in the regression model of gross spread.

With respect to issue-specific characteristics, we include an indicator for shelf registrations, a measure of lead underwriter reputation, and the percentage of secondary shares in an offering. Autore, Kumar, and Shome (2008) find that SEOs using shelf registrations have lower underwriting fees. More reputable underwriters may provide better-quality service and can charge a higher spread if their service is in high demand. Alternatively, if higher-ranked underwriters are able to conduct the underwriting in a more efficient manner, they may be able to pass some of the cost savings onto the issuers, resulting in a lower spread. We measure the reputation of each SEO's lead manager by its Carter and Manaster (1990) ranking updated by Jay Ritter and made available on his website.[95] For SEOs with multiple lead managers, we use the average ranking of these managers. Secondary shares are shares owned by existing shareholders, normally insiders of issuing firms. The effect of secondary shares on underwriting fees depends on the motive behind insider selling. If insider selling is mostly for liquidity needs, we do not expect it to have any bearing on underwriting fees, but if insiders sell to take advantage

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[94] For stocks listed on Nasdaq, we follow Gao and Ritter's (2010, Appendix B) algorithm to adjust their trading volumes for the different ways in which Nasdaq and NYSE-Amex volumes are computed. We thank Jay Ritter for suggesting this approach. Our results are robust if we simply divide Nasdaq volumes by two.

[95] Loughran and Ritter (2004) use this ranking in their study of time-series variations in IPO underpricing.

of favorable price levels, the adverse selection effect of their action may make a successful offering more difficult and call for higher underwriting compensation. Finally, we also control for calendar year fixed effects and Fama-French 12-industry fixed effects to account for any time-specific or industry-specific factors that could influence underwriting fees.

We present the coefficient estimates of our regression model of underwriting gross spread in Table IV.3. In parentheses are two-sided *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and firm clustering (Petersen (2009)). The dependent variable is the log transformation of percentage gross spread.[96] In column (1), our key explanatory variable is an indicator variable, *restatement*, that is equal to one for SEOs by firms that have previously restated earnings, regardless of whether the restatements are due to errors or irregularities. The coefficient estimate of the "restatement" dummy variable is -0.025, insignificantly different from zero with a *p*-value of 0.479.

In column (2) of Table IV.3, we replace the "restatement" dummy with two indicator variables, one for restatements caused by errors, and the other for restatements due to irregularities. We find that the indicator for errors has a negative and insignificant coefficient, but the indicator variable for irregularities has a positive coefficient of 0.099, which is highly significant with a *p*-value of 0.002. This suggests that firms that committed deliberate earnings manipulations suffer more damage to the credibility of

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[96] Butler, Grullon, and Weston (2005) and Lee and Masulis (2009) use this measure as well. The logarithmic transformation offers the convenience that the coefficient estimates can be interpreted as the percentage change in gross spread per one-unit increase in independent variables, and this is especially convenient for dichotomous explanatory variables. Our results are robust to using the percentage spread as the dependent variable.

their financial reporting and investment banks charge higher fees for these firms' SEOs to compensate for the greater underwriting efforts and risk involved. In terms of the economic significance of the coefficient, it appears that ceteris paribus, the percentage gross spread is about 10% higher for SEOs by irregularity-restatement firms, and this translates into 50 basis points (bps) for the typical SEO in our sample with a 5% (500 bps) gross spread. In dollar terms, a 50 bps increase in gross spread raises the underwriting fee by about $3.8 million for the average SEO by an irregularity-restatement firm.

The effect of irregularity-induced restatements on underwriting fees is even more striking when we introduce issuer fixed-effects in column (3) to control for any time-invariant firm characteristics that might be responsible for the effect of restatements uncovered by the regression in column (2). We find that the indicator for error-induced restatements is still not significant, and the indicator for irregularities has a positive coefficient that is significant with a *p*-value of 0.03. Comparing to the results in column (2), the coefficient of the irregularity dummy nearly doubles in magnitude to 0.192. This suggests that compared to themselves prior to restatements, firms that intentionally misstated financial reports have to pay almost 20% higher percentage gross spreads, which translates into 100 bps in spread.[97]

With respect to the control variables, their coefficients are largely consistent with the evidence in Butler, Grullon, and Weston (2005) and Lee and Masulis (2009). Specifically, as shown in column (2), underwriting spreads are significantly lower for

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[97] This evidence should be viewed with caution since only nine firms issued SEOs both before and after irregularity-induced restatement. This low frequency of repeat equity issues by irregularity-restatement firms, which biases against finding significant results from the firm fixed effects specification, is consistent with firms facing substantially higher contracting costs after irregularity restatements and thus having less incentive to access the equity market.

larger offerings and offerings by larger firms traded on the NYSE that have higher Tobin's q, better stock market liquidity, and lower stock return volatility. Consistent with Autore, Kumar, and Shome (2008), we also find that shelf-registered offerings are associated with significantly lower underwriting spreads.

A.2. Matched-sample analyses

One potential concern with the regressions in Table IV.3 is that they may not be able to control adequately for the differences in issue- and issuer-specific characteristics between the restatement and non-restatement subsamples. In particular, as shown in Table IV.2, both the size of the issuing firm and the size of the offering are much larger for the restatement subsample than for the non-restatement subsample. These differences could affect underwriting spread in non-linear fashions that linear regressions such as those in Table IV.3 cannot fully capture.

We take three approaches to address this potential problem. First, we note that the size differences actually bias against us finding higher underwriting spreads for SEOs by restatement firms, since it is well documented that the percentage underwriting spread is lower for larger offerings and for offerings by larger firms (see, .e.g., Altinkilic and Hansen (2000) and Butler, Grullon, and Weston (2005)). Second, we include higher-order, such as quadratic and cubic, terms of firm size and offering size as additional controls in the spread regressions in Table IV.3 and find that our results on the effect of restatements continue to hold.

Third, we conduct a matched-sample analysis in which for each restatement firm's SEO, we select a matching SEO by a non-restatement firm based on the following three criteria: (1) the matching SEO's offer date is within one year of the offer date of the

restatement firm's SEO, (2) the non-restatement firm's size measured by total assets falls between 75% and 125% of the restatement firm's size, and (3) conditional on the first two conditions being met, the matching SEO's offer size measured by principal amount is closest to that of the restatement firm's SEO. We are able to find matches for all 202 SEOs by restatement firms, resulting in a sample of 404 SEOs.

Panels A-C of Table IV.4 show that the SEOs by restatement firms and non-restatement firms in the matched sample are very similar in terms of issuer size and offer size, validating the effectiveness of our matching. We then estimate gross spread regressions using the matched samples and present the results in Panel D of Table IV.4. We find that the restatement dummy in column (1) has an insignificant coefficient, suggesting that SEOs by restatement firms as a whole are not associated with higher underwriting fees. However, there is strong evidence of higher underwriting fees charged on SEOs by firms with irregularity-induced restatements, as indicated by the significantly positive coefficient on the irregularity-restatement dummy in column (2). These inferences are consistent with those we draw from the full sample regressions in Table IV.3. Also worth noting is that the magnitude of the effect of irregularity restatements on gross spread is similar between the full sample and the matched sample. Overall, our analysis in this section shows that our findings are not driven by any potential inadequate control for size differences among SEOs and issuing firms.

A.3. Controlling for issuing firm governance characteristics

An alternative interpretation of our findings on the effect of restatements on underwriting fees is that SEO firms with prior restatements may be associated with poor

corporate governance[98], and firms with poor corporate governance pay higher underwriting fees when floating seasoned equity. In other words, the effect of restatements we identify could be an artifact of that of issuing firm corporate governance.

To address this concern, we control for each issuing firm's internal and external governance characteristics at the time of the offering in the gross spread regression. Toward that end, we merge our sample of SEOs with the IRRC database to obtain information on firms' anti-takeover provisions (ATPs) and board characteristics. In column (1) of Table IV.5, we control for the issuer's Gompers, Ishii, and Metrick (GIM, 2003) index based on 24 ATPs, and in column (2), we control for board size, the percentage of independent directors, and CEO/Chairman duality, which is an indicator variable equal to one if the CEO is also the chairman of the board and zero otherwise. Since IRRC covers mostly large companies while our sample spans a wider spectrum of firm size, the number of observations used in these two regressions is substantially smaller than that in previous tables. Nevertheless, we find that the coefficient on the irregularity-restatement dummy continues to be positive and significant. The governance variables we control for, on the other hand, do not enter significantly in the gross spread regressions. These findings suggest that the effect of restatements is not driven by issuer corporate governance.

A.4. Controlling for additional measures of information asymmetry

[98] Note that the evidence has been rather mixed on whether poor corporate governance leads to earnings restatements (see, e.g., Beasley (1996), Dechow, Sloan, and Sweeney (1996), Agrawal and Chadha (2005), Farber (2005), Larcker, Richardson, and Tuna (2007), and Baber, Kang, Liang, and Zhu (2009)). To the extent that poor corporate governance indeed contributes to earnings restatements, firms appear to take steps to improve their corporate governance practice that led to financial misreporting (Farber (2005) and Cheng and Farber (2008)). But if a restatement firm has not been able to implement all necessary corporate governance improvements by the time of a seasoned equity offering, it may still be associated with poor corporate governance at the offering.

In this section, we control for more measures of information asymmetry in addition to firm size and stock return volatility included in our baseline regressions in Table IV.2. Specifically, we follow Graham, Li, and Qiu (2008) by controlling for the dispersion (standard deviation) of analyst forecasts of current-fiscal-year earnings per share scaled by stock price, since Palmrose, Richardson, and Scholz (2004) find that analyst forecast dispersion increases for firms announcing restatements. We further control for the number of analysts covering each issuing firm to capture the possibility that restatement firms receive less analyst coverage. We also include the consensus (mean) analyst forecast for current-fiscal-year earnings per share scaled by book assets per share as an additional control to account for the possibility that restatement firms have poorer future performance, which could lead to higher underwriting spreads. We construct these new variables based on information from the I/B/E/S database in the month prior to each SEO. Requiring data availability from I/B/E/S reduces our sample size to 1,767 SEOs. We re-estimate models (1) and (2) in Table IV.3 with these additional controls and present the results in Table IV.6. We find that the number of analysts covering an issuing firm has a significantly negative effect on underwriting spread while the analyst forecast dispersion has a significantly positive effect, consistent with underwriters charging higher fees on issuers with higher information asymmetry. The coefficient on the average analyst forecast of future earnings is negative but insignificant. More importantly, we continue to find that SEOs by issuers with irregularity restatements are associated with significantly higher underwriting fees, as indicated by the significant and positive coefficient on the irregularity-restatement dummy in column (2).

In addition to analyst based variables, we also control for information asymmetry measures based on earnings accruals.[99] Lee and Masulis (2009) find that seasoned equity issuers with lower accruals quality pay higher underwriting fees. We construct two measures of accruals quality. The first measure is the absolute value of the issuer's performance-adjusted discretionary accruals (Kothari, Leone, and Wasley (2005)).[100] Our sample size is reduced to 1,254 because we cannot estimate discretionary accruals for about half of the sample due to lack of data. The regression results are shown in column (1) of Table IV.7. Consistent with Lee and Masulis (2009), the coefficient of the accrual quality measure is significant and positive. More importantly, we continue to find significantly positive coefficients for the irregularity dummy variable, even in this smaller sample.

Our second measure of accruals quality is the one developed by Dechow and Dichev (2002), namely, the standard deviation over the previous five years of a firm's annual accruals unexplained by cash flows in the current year, prior year, and next year. We control for this alternative measure in column (2) of Table IV.7. We find that it has a significant and positive effect on gross spread, but the coefficient on the irregularity restatement dummy remains significantly positive. Overall, our results indicate that a firm's financial reporting integrity has an incremental effect on its SEO contracting costs that is beyond that of accruals-based measures for information asymmetry.

A.5. Correcting for self-selection bias

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[99] A caveat of accruals-based measures is that they potentially suffer from measurement errors and capture differences in firms' operating environment and production functions, making interpretations difficult (Dechow, Sloan, and Sweeney (1995), Ball and Shivakumar (2008), and Costello and Wittenberg-Moerman (2011)). Restatements, on the other hand, provide a strong and unambiguous signal about the reliability of a firm's financial reporting.

[100] Please see Appendix IV.B for more details on the construction of this measure.

We recognize that a self-selection bias potentially complicates our analysis since firms issuing SEOs are not a random sample. This issue could be especially relevant in our setting, since our tests are intended to identify the effect of a firm's past financial misreporting on its SEO issuance costs, and past financial misreporting is likely to impact the firm's likelihood of issuing seasoned equity in the future.

To correct for any potential self-selection bias, we adopt the Heckman (1978) two-step procedure. In the first step, we estimate a probit model using all COMPUSTAT firms with necessary data during our sample period to predict the likelihood of a firm issuing seasoned equity in a given year. The dependent variable is equal to one if a firm issues seasoned equity during a year according to the SDC and zero otherwise. The explanatory variables include the dummy variables for error and irregularity restatements, firm size, leverage, Tobin's q, ROA, stock return volatility, the ratio of capital expenditure to the book value of total assets, the ratio of corporate cash holding to the book value of total assets, a dividend-paying status dummy, and the buy-and-hold market-adjusted return over the previous year. Other than the two restatement dummy variables, the model specification is very similar to that used by DeAngelo, DeAngelo, and Stulz (2010). The estimation results presented in Panel A of Table IV.8 show that firms with irregularity-induced restatements are less likely to issue seasoned equity, as are dividend-paying firms and firms with higher stock return volatilities. On the other hand, larger and more levered firms and firms with higher Tobin's Q, ROA, capital expenditure, cash holdings, and buy-and-hold excess returns over the previous year are more likely to issue seasoned equity. All these relations are statistically significant at the 5% level or better. Overall, it appears that equity issuing firms have better performance,

lower risk, and more growth opportunities, and they have been using more debt capital and making more capital investments.[101]

In the second step of the Heckman procedure, we construct an inverse Mills' ratio (IMR) based on the coefficient estimates from the first-step probit model, and include the IMR as an additional explanatory variable in the gross spread regression. Panel B of Table IV.8 presents the estimation results. We find that the IMR has a significantly negative coefficient, consistent with the interpretation that firms with a higher ex ante probability of issuing equity are associated with lower underwriting fees. More importantly for our purpose, the irregularity-restatement dummy still has a significant and positive coefficient with similar magnitude to that in Table IV.3. Therefore, we conclude that our results are robust to correcting for potential self-selection bias arising from a firm's decision to issue equity.

A.6. Cross-sectional variation in the effect of restatements on underwriting fees

Having established the robustness of our finding that firms with previous restatements due to accounting irregularities pay higher underwriting fees in SEOs, we next explore potential cross-sectional variations in the effect of restatements to add more texture to our evidence.

We first examine whether the restatement effect varies with offering size. In their study of firm stock market liquidity and SEO issuance costs, Butler, Grullon, and Weston (2005) argue and show that the effect of liquidity is more pronounced for larger offerings,

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[101] We also estimate the probit model only using firm-years associated with restatement firms. We find that restatement firms with higher leverage, better ROA, more capital expenditure, lower stock return volatilities, and higher stock returns in the previous year are significantly more likely to issue equity. These patterns are similar to those observed among all firms. Therefore, it does not appear to be the case that restatement firms resorting to equity financing are in dire financial conditions and in desperate needs for capital, and as a result, pay higher underwriting fees.

which require more marketing and placement efforts from underwriters. Similarly, we expect the effect of financial reporting integrity on underwriting costs to be greater for larger SEOs. To test this hypothesis, we create two indicator variables, one for SEOs whose relative size, defined as the number of shares offered divided by the pre-issue number of shares outstanding, is above sample median and the other for SEOs whose relative offer size is below sample median. In light of the evidence in Tables IV.3 and IV.4, we focus exclusively on irregularity restatements and interact the irregularity restatement dummy with each of the two indicator variables. We then re-estimate the gross spread regression with the two interaction terms as key explanatory variables. Results presented in column (1) of Table IV.9 support our conjecture. The significantly positive effect of irregularity restatements on underwriting fees is mostly concentrated in larger deals, while the effect, albeit still positive, is insignificant in smaller deals.

In addition to offering size, we also examine whether the restatement effect depends on how recent a restatement is relative to an offering. We expect the effect to be stronger immediately after restatements and weaken as more time lapses since the most recent restatement, because firms are found to take steps to improve their corporate governance practice that led to financial misreporting and to regain investor confidence (Farber (2005) and Cheng and Farber (2008)). It is also possible that the longer a firm can avoid further reporting violations since its last transgression, the more trust it can regain from capital market participants in its financial statements. To the extent that the restatement effect may not vary over time in a linear fashion, we create two indicator variables, one for SEOs taking place within three years of the most recent restatements and the other for SEOs happening more than three years after the most recent

restatements.[102] We then interact the irregularity restatement dummy with each of the two newly created indicator variables and include the interaction terms as our key explanatory variables in the gross spread regression. Results in column (2) of Table IV.9 show that investment banks charge significantly higher underwriting fees (by about 16%) only on SEOs happening within three years of a restatement. This is consistent with our prediction and suggests that the higher contracting costs faced by restatement firms indeed are more pronounced during the period immediately following restatements and lessen over time.

Finally, we directly examine whether restatement firms can restore credibility to their financial reporting and mitigate the increased contracting costs by making corporate governance improvements. Given the importance of board and audit committee independence in a firm's financial reporting process (Klein (2002)), for each irregularity-restatement issuer in our sample, we examine its proxy statements and measure (i) the change in the percentage of independent directors on its board from immediately prior to the restatement announcement to immediately prior to the SEO announcement and (ii) the percentage of audit committee members replaced from immediately prior to the restatement announcement to immediately prior to the SEO announcement.[103] We interact each of the two corporate governance improvement measures with the irregularity-restatement dummy and include the interaction term as an additional explanatory variable in the gross spread regression.

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[102] Farber (2005) finds that fraud firms exhibit governance characteristics similar to or better than non-fraud firms three years after the fraud revelation.
[103] During our sample period, audit committees of most firms are fully independent.

Table IV.10 presents the regression results. In column (1), we find that the irregularity-restatement dummy itself continues to have a significant and positive coefficient, but its interaction with the change in board independence has a significantly negative coefficient, suggesting that increasing board independence can reduce the additional underwriting fees that restatement firms have to pay for their SEOs. It appears that reconstituting the audit committee has a similar effect on underwriting fees, evidenced by the significantly negative coefficient on the interaction between the irregularity-restatement dummy and the percentage of audit committee members replaced (see column (2)). However, the governance improvements are unlikely to completely eliminate the higher contracting costs imposed on restatement issuers. The change in the percentage of independent directors has a median of around 0.07 with an inter-quartile range of about 0.21, while the percentage of audit committee members replaced has a median of 0.45 with an inter-quartile range of 0.55. These numbers, combined with the magnitude of the coefficient estimates in Table IV.10, imply that a large majority of the restatement issuers still pay higher underwriting fees despite the post-restatement governance changes implemented.

IV.3.B. The effect of restatements on underwriting syndicate size

In this section, we design an auxiliary test to the gross spread analysis and examine how past restatements by issuing firms impact the size of underwriting syndicates. Our hypothesis is that if a firm's prior financial misreporting tarnishes its financial reporting integrity and makes its equity offering unappealing to investors, the firm is likely to enlist the service of more underwriters in order to tap into a broader investor base through underwriters' connections and ensure the successful placement of

its offering. Lead underwriters may also have the incentive to bring more investment banks into the underwriting syndicate to share the potentially heavier work load and greater risk associated with underwriting SEOs by firms with financial reporting transgressions.

To test this prediction, we examine both the number of lead underwriters and the number of all syndicate members in relation to issuer past restatements, and present the results in Table IV.11. The regression models are largely the same as those in Table IV.3, except that the dependent variable is the number of syndicate members in columns (1) and (2) and the number of lead underwriters in columns (3) and (4). We find that SEOs by firms with past restatements due to irregularities are underwritten by significantly larger syndicates with more lead managers than other SEOs. All else being equal, irregularity-restatement firms' SEOs on average have 0.893 more managers and 0.415 more lead underwriters. Both numbers are economically significant given that the average syndicate has about 4 underwriters and 1.4 lead managers. These results suggest that offerings by firms with irregularity-induced restatements require greater efforts and risk sharing by underwriters.

IV.3.C. The effect of restatements on offering methods

In keeping with most of the SEO literature, our analysis thus far focuses on firm-commitment underwritten offerings that involve the conventional book-building process through which the issuers and underwriters gauge the interest of institutional investors and drum up demand for the new issues. Since the turn of the century, however, a new breed of SEOs that either bypass or significantly shorten the traditional book building process have been gaining popularity (Bartolotti, Megginson, and Smart (2008) and Gao

and Ritter (2010)). These issues include bought deals, block trades, and accelerated book-built offers. Collectively, they are called accelerated offers.[104] Compared to conventional offers, accelerated offers are conducted by smaller underwriting syndicates, completed much more quickly, and associated with lower underwriting costs, since they do not require from underwriters as much due diligence, marketing, and placement efforts as conventional offerings do (Bartolotti et al. (2008)). Despite the speed and cost advantages, an accelerated offering is not suitable for all issues or issuers. Gao and Ritter (2010) examine the factors driving SEO firms' choice between the accelerated and conventional underwriting, and find that the accelerated underwriting is more common for smaller offerings and for issuers with less information asymmetry and more elastic demand curves for their stock.

To the extent that firms with past restatements face more questions about their financial reporting and weaker demand from investors, their SEOs would benefit from an extended book building process, which can generate higher investor interest by bridging the information gap between issuing firms and investors. Underwriters of restatement firms' offerings may also prefer the conventional book-building approach, as it gives them an opportunity to obtain more accurate price and demand information from potential investors to ensure a successful placement. Therefore, we predict that firms with past restatements are less likely to choose the accelerated underwriting for their offerings.

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[104] Block trades and bought deals are similar; in both cases, issuing companies sell shares directly to an investment bank at an auction-determined or negotiated price with little or no book-building process, and the investment bank will then resell the shares to institutional investors. Accelerated book-built offerings are similar to conventional book-built offerings in that underwriters gather price and demand information and form syndicates, but they are executed much more rapidly. Please see Bartolotti et al. (2008) for more detailed descriptions of these offering methods.

To test this hypothesis, we extract from SDC all seasoned equity offerings by U.S. companies from 1997 to 2008 that are designated as block trade, bought deal, or accelerated book built by SDC. After imposing the same selection criteria as those in the beginning of Section II, we end up with 471 accelerated offers. Merging these deals with the sample of 2,337 firm-commitment offers creates a sample of 2,808 SEOs. Using this combined sample, we estimate a probit model where the dependent variable is equal to one for accelerated offers and zero otherwise. Table IV.12 presents the marginal effects of explanatory variables from probit regressions. In column (1), the key explanatory variable is the restatement dummy, and it has a negative but insignificant marginal effect. In column (2), we replace the restatement dummy with the error dummy and the irregularity dummy. We find that the error dummy has an insignificant effect on an issuer's choice of offering method, while the marginal effect of the irregularity dummy on the probability of an accelerated offering is negative and statistically significant with a *p*-value of 0.016. The irregularity dummy retains its significantly negative marginal effect when we drop the error dummy from the regression model in column (3). These results suggest that firms that restated due to irregularities are less likely to issue new shares in an accelerated offering. In economic terms, such restatements reduce the probability of an accelerated offering by about 5.7%, which is a meaningful effect since the unconditional probability of an accelerated offering is about 16%. In summary, the evidence from the probit model of offering method choices is consistent with the hypothesis that past restatements, in particular those caused by deliberate earnings manipulations, raise significant concerns about firms' financial reporting integrity that

preclude them from taking advantage of faster and cheaper accelerated underwriting options for their SEOs.

With respect to control variables, their coefficient estimates are largely consistent with those found by Gao and Ritter (2010). Specifically, we find that issuers that are larger, have higher Tobin's Q, have more liquid stock, and are traded on the NYSE are more likely to choose the accelerated approach, while issuers with higher stock return volatility and better operating performance and issuers trying to raise more proceeds and sell a higher percentage of secondary shares in the offerings are more likely to use traditional book building to float their shares.

As a robustness check, we repeat our earlier analyses using the combined sample that includes both conventional and accelerated SEOs. All our results continue to hold.

IV.3.D. The effect of restatements on SEO announcement returns

In this section we examine the effect of restatements on SEO announcement returns. Prior studies document negative stock market reactions to SEO announcements whose magnitude increases with the adverse selection problems between issuers and outside investors (Eckbo, Masulis, and Norli (2007)). Prior earnings restatements, especially those due to deliberate manipulations, are likely to exacerbate investor concerns about adverse selection by making a firm's financial reporting less trustworthy and increasing the uncertainty over its true value. Therefore, we expect restatement firms to experience more negative abnormal returns upon SEO announcements.

For our analysis of announcement returns, we exclude offerings through shelf registrations. Shelf registrations allow an issuer to defer the equity offer until a much later date after shelf filings. Managers at the issuing firm can pick a date to offer shares

within two years after the shelf filing date when they believe their company's stock is overvalued. As a result, there is little adverse selection problem around shelf filings. Consistent with this argument, Autore, Kumar, and Shome (2008) find that the average cumulative abnormal return (CAR) during the three-day window centered on the filing date for shelf offers is only -0.30% and not statistically different from zero. We have 1,228 non-shelf offers left after excluding SEOs through shelf registrations.

We calculate abnormal stock returns by subtracting the CRSP value-weighted market returns from a firm's daily returns.[105] We compute 3-day CARs during the window encompassed by event days (-1, +1), where event day 0 is the SEO announcement date. Studies on SEO announcement returns often use the SEO filing date as the announcement date. Kim and Purnanandam (2009) find that sometimes the initial announcement date in Factiva is different from the filing date recorded by SDC, but typically is off by no more than two trading days. To identify the correct announcement date, we use a correction procedure based on trading volume. Our assumption is that the trading volume immediately after the SEO announcement would be abnormally higher than the company's typical daily trading volume. Among the 5 trading days from 2 days before the filing date to 2 days after the filing date, we compare the date with the largest trading volume and the filing date. If they are different and the volume on the former date is more than twice the average daily volume over the previous 90 trading days, we select the date with the largest trading volume as the announcement date. Otherwise, we treat the filing date provided by SDC as the correct announcement date.

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[105] We prefer this approach over the market model approach because the post-restatement announcement abnormal return patterns could bias the coefficient estimates of the market model. Our results, however, are robust to using the abnormal returns estimated from the market model.

The mean (median) three-day CAR is -1.73% (-1.86%), both significantly different from zero with *p*-values less than 0.001. These statistics are also similar to those reported by Gao and Ritter (2010) and Kim and Purnanandam (2009). Table IV.13 presents the results from OLS regressions of announcement returns. The dependent variable is the three-day CAR over the event window (-1, +1) in percentage points. Our key independent variable in column (1) is the indicator for restatements. We find that it has a negative coefficient estimate that is insignificant. In column (2), we replace the restatement dummy variable with the error dummy and irregularity dummy. We find that the coefficient of the error dummy is insignificant, but the indicator for irregularity restatements has a coefficient of -3.108 that is significant with a *p*-value of 0.040. In column (3), we only include the irregularity dummy, and its coefficient barely changes in both magnitude and statistical significance from column (2). It appears that ceteris paribus, the announcement returns of SEOs by irregularity restatement firms on average are significantly lower by over 3%. This is substantial considering the typical SEO announcement returns. Overall, the evidence on announcement returns suggests that the market reacts more negatively to SEO announcements made by firms that intentionally misreported financial statements, adding to the higher issuance costs of these firms.

IV.4. Conclusion

We examine whether prior financial reporting violations affect the terms of underwriting contracts between firms and investment banks in SEOs. Financial misrepresentation undermines the credibility of a firm's future financial disclosure and reduces its appeal to potential capital providers. As a result, its stock offering requires greater due diligence, certification, marketing and placement efforts from underwriters.

In response, investment banks demand higher gross spreads as compensation for the additional work and risk involved. Such an offering also entails choosing a syndicate structure and an underwriting process that are conducive to creating more investor demand.

We find strong support for these conjectures. Specifically, firms that restated earnings due to deliberate manipulations subsequently pay higher underwriting fees (about 10-20% in relative terms or 50-100 basis points in absolute terms), and the relation is robust to controlling for issuing firm fixed-effects. The effect of restatements on underwriting fees is more pronounced for larger offerings, but declines as more time elapses without further reporting violations and as firms implement more corporate governance improvements. In addition, SEOs of restatement firms tend to be underwritten by larger syndicates with more lead managers through the traditional book building process rather than the faster and cheaper accelerated process. Compounding these costly features of underwriting contracts, we also find that the stock market reacts more negatively to SEO announcements of restatement firms.

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Table IV.1. Frequency of SEOs by offer year
The sample consists of 2,337 firm-commitment underwritten seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008. To be included in the sample, an SEO has to satisfy the following criteria: it is a firm-commitment offer; the size of the offering is at least $10 million; the offer price is no less than $5; the proportion of secondary shares offered is less than 100%; the issuer has financial statement information available from Compustat and stock return data from CRSP. Rights issues, unit offerings, closed-end fund offerings, and simultaneous international offerings are also excluded.

Offer Year	Number of SEOs	Number of SEOs by restatement firms	Number of SEOs by firms that restated due to accounting errors	Number of SEOs by firms that restated due to intentional manipulation
1997	413	1	1	0
1998	214	2	2	0
1999	142	3	3	0
2000	137	3	2	1
2001	137	6	4	2
2002	157	11	9	2
2003	201	18	12	6
2004	252	34	28	6
2005	185	34	30	4
2006	188	32	27	5
2007	165	29	24	5
2008	146	29	20	9
Total	2337	202	162	40

Table IV.2. Summary statistics

The sample consists of 2,337 firm-commitment underwritten seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008. To be included in the sample, an SEO has to satisfy the following criteria: it is a firm-commitment offer; the size of the offering is at least $10 million; the offer price is no less than $5; the proportion of secondary shares offered is less than 100%; the issuer has financial statement information available from Compustat and stock return data from CRSP. Rights issues, unit offerings, closed-end fund offerings, and simultaneous international offerings are also excluded.

Panel A	Full sample (N=2337)		Non-restatement firms (N=2135)		Restatement firms (N=202)	
	Mean	Median	Mean	Median	Mean	Median
Spread	0.049	0.05	0.05	0.05	0.045	0.048
Offering size ($ mil)	170	80	145	77	442	116
Relative offer size	0.225	0.177	0.226	0.181	0.217	0.145
No. of managers	3.998	4	3.892	3	4.98	4
No. of lead managers	1.428	1	1.398	1	1.748	1
Lead manager rank	7.745	8	7.727	8	7.99	8.367
Total assets ($ mil)	8126	381	5633	356	34481	870
Market cap ($ mil)	1811	497	1508	475	5013	750
Leverage	0.315	0.302	0.312	0.296	0.347	0.344
Tobin's q	2.55	1.507	2.606	1.513	1.962	1.456
ROA	-0.03	0.023	-0.032	0.024	-0.002	0.021
Stock return volatility (%)	3.204	2.851	3.232	2.889	2.914	2.604
Share turnover (%)	0.591	0.392	0.566	0.377	0.862	0.664

Panel B	Error firms (N=162)		Irregularity firms (N=40)	
	Mean	Median	Mean	Median
Spread	0.045	0.049	0.044	0.044
Offering size ($ mil)	363	106	761	176
Relative offer size	0.231	0.145	0.159	0.143
No. of managers	4.66	4	5.275	5
No. of lead managers	1.611	1	2.3	2
Lead manager rank	7.951	8	8.152	8.619
Total assets ($ mil)	21316	711	87803	2036
Market cap ($ mil)	3402	708	11536	1464
Leverage	0.349	0.348	0.335	0.335
Tobin's q	2.066	1.499	1.537	1.264
ROA	-0.013	0.02	0.042	0.026
Stock return volatility (%)	2.939	2.624	2.81	2.57
Share turnover (%)	0.867	0.674	0.843	0.655

Table IV.3. Regression analyses of gross spreads
The sample consists of 2,337 firm-commitment underwritten seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008. The dependent variable is the log transformation of gross spread per share as a percent of the offer price. The key explanatory variable in column (1) is an indicator that is equal to one for SEOs by firms that have restated earnings at the time of the offering, regardless of whether the restatements are due to errors or irregularities. In column (2) and (3), the restatement dummy is replaced by an indicator for restatements due to errors (i.e. unintentional misstatements) and an indicator for restatements due to irregularities (i.e. deliberate misreporting). Definitions of other explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in the first two regressions, while year and issuer fixed-effects are included in the third regression.

	(1) OLS	(2) OLS	(3) OLS
Restatement	-0.025		
	(0.479)		
Restatement due to error		-0.054	-0.086
		(0.188)	(0.345)
Restatement due to irregularity		0.099***	0.192**
		(0.002)	(0.030)
Log(Principal amount)	-0.026*	-0.026*	0.023
	(0.072)	(0.072)	(0.539)
Log(Total assets)	-0.078***	-0.079***	-0.107***
	(0.000)	(0.000)	(0.007)
Leverage	-0.001	0.002	0.067
	(0.983)	(0.970)	(0.588)
Tobin's q	-0.014***	-0.014***	-0.017**
	(0.000)	(0.000)	(0.034)
ROA	-0.029	-0.030	0.050
	(0.190)	(0.173)	(0.609)
Stock return volatility	0.012**	0.013**	-0.008
	(0.019)	(0.017)	(0.515)
Share turnover	-0.023*	-0.022*	-0.005
	(0.065)	(0.070)	(0.910)
NYSE listing	-0.066**	-0.064**	0.117
	(0.020)	(0.022)	(0.266)
Shelf registration	-0.059***	-0.059***	0.040
	(0.002)	(0.002)	(0.457)
Lead manager rank	-0.010	-0.009	-0.003

	(0.110)	(0.127)	(0.909)
Percentage of secondary shares	-0.026	-0.023	-0.017
	(0.273)	(0.325)	(0.815)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	No
Issuer fixed effects	No	No	Yes
Number of observations	2,337	2,337	2,337
Adjusted-R^2	0.274	0.276	0.282

Table IV.4. Matched-sample analyses of the effect of restatements on gross spreads
This table is based on a matched sample of 404 seasoned equity offerings that consist of 202 offerings by restatement firms and 202 offerings by non-restatement firms. For each restatement firm's SEO, a matching SEO by a non-restatement firm is selected according to the following criteria: (1) the matching SEO's offer date is between 1 year before and 1 year after the offer date of the restatement firm's SEO, (2) the non-restatement firm's size measured by total assets falls between 75% and 125% of the restatement firm's size, and (3) conditional on the first two conditions being met, the matching SEO's offer size measured by principal amount is closest to that of the restatement firm's SEO. Panels A-C present comparisons of issue size and issuer size between restatement SEOs and their matching offers. Panel D presents regressions of gross spreads based on the matched sample. The dependent variable is the log transformation of gross spread per share as a percent of the offer price. The key explanatory variable in column (1) is an indicator that is equal to one for SEOs by firms that have restated earnings at the time of the offering, regardless of whether the restatements are due to errors or irregularities. In column (2), the restatement dummy is replaced by an indicator for restatements due to errors (i.e. unintentional misstatements) and an indicator for restatements due to irregularities (i.e. deliberate misreporting). Definitions of other explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included.

Panel A: Comparison between SEOs by restatement firms and their matching SEOs

		(1) Restatement SEOs (N=202)	(2) Matching SEOs (N=202)	(1)-(2) Difference	*p*-value for tests in difference
Total Assets (in millions $)	Mean	34481	34559	-78	0.997
	Median	870	791	79	0.882
Principal Amount (in millions $)	Mean	442	338	104	0.435
	Median	116	117	-1	0.962

Panel B: Comparison between SEOs by "error" restatement firms and their matching SEOs

		(1) Restatement SEOs (N=162)	(2) Matching SEOs (N=162)	(1)-(2) Difference	*p*-value for tests in difference
Total Assets (in millions $)	Mean	21316	21576	-260	0.895
	Median	711	726	-15	0.876
Principal Amount (in millions $)	Mean	363	275	88	0.511
	Median	106	108	-2	0.976

Panel C: Comparison between SEOs by "irregularity" restatement firms and their matching SEOs

		(1) Restatement SEOs (N=40)	(2) Matching SEOs (N=40)	(1)-(2) Difference	*p*-value for tests in difference
Total Assets (in millions $)	Mean	87803	87138	665	0.991
	Median	2036	1643	393	0.881
Principal Amount (in millions $)	Mean	761	594	167	0.670
	Median	176	165	11	0.999

Panel D: OLS regressions of gross spreads using the matched samples

	(1)	(2)
Restatement	-0.001	
	(0.975)	
Restatement due to error		-0.028
		(0.548)
Restatement due to irregularity		0.117**
		(0.039)
Log(Principal amount)	0.008	0.011
	(0.877)	(0.827)
Log(Total assets)	-0.088***	-0.096***
	(0.001)	(0.000)
Leverage	0.142	0.153
	(0.259)	(0.226)
Tobin's q	-0.018*	-0.019*
	(0.078)	(0.077)
ROA	-0.070	-0.084
	(0.313)	(0.251)
Stock return volatility	0.022	0.024
	(0.392)	(0.344)
Share turnover	-0.004	-0.002
	(0.903)	(0.959)
NYSE listing	-0.145*	-0.137*
	(0.064)	(0.074)
Shelf registration	-0.123***	-0.121***
	(0.003)	(0.004)
Lead manager rank	-0.019	-0.019
	(0.352)	(0.352)
Percentage of secondary shares	-0.031	-0.018
	(0.648)	(0.792)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Number of observations	404	404
Adjusted-R^2	0.272	0.277

Table IV.5. Controlling for issuer corporate governance
The sample used for column (1) consists of 425 firm-commitment underwritten seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008 that have information on antitakeover provisions from IRRC. The sample used for column (2) consists of 365 firm-commitment underwritten seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008 that have information on board characteristics from IRRC. The dependent variable is the log transformation of gross spread per share as a percent of the offer price. Definitions of explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in all regressions.

	(1) OLS	(2) OLS
Restatement due to error	-0.117	-0.074
	(0.215)	(0.475)
Restatement due to irregularities	0.188**	0.278***
	(0.018)	(0.004)
GIM index	0.007	
	(0.440)	
Board Size		0.012
		(0.295)
Percentage of independent directors		0.196
		(0.241)
CEO/Chairman duality		0.037
		(0.471)
Log(Principal amount)	0.018	0.070
	(0.714)	(0.199)
Log(Total assets)	-0.120***	-0.144***
	(0.000)	(0.000)
Leverage	0.195	0.015
	(0.162)	(0.928)
Tobin's q	-0.066***	-0.077***
	(0.002)	(0.003)
ROA	-0.116	-0.005
	(0.580)	(0.987)
Stock return volatility	0.038	0.029
	(0.271)	(0.541)
Share turnover	-0.003	-0.061
	(0.944)	(0.345)
NYSE listing	-0.051	-0.045
	(0.496)	(0.656)
Shelf registration	-0.082	-0.053

	(0.165)	(0.440)
Lead manager rank	-0.026	-0.039
	(0.253)	(0.140)
Percentage of secondary shares	0.197	0.017
	(0.184)	(0.881)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Number of observations	425	365
Adjusted-R^2	0.211	0.192

Table IV.6. Controlling for analyst forecast variables
The sample consists of 1,767 firm-commitment underwritten seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008 that have information on analyst forecast dispersion from I/B/E/S. The dependent variable is the log transformation of gross spread per share as a percent of the offer price. Analyst forecast dispersion is the standard deviation of analyst forecasts of current-fiscal-year earnings in the month before the SEO offer date, scaled by the stock price. Analyst coverage is the number of analysts issuing earnings forecasts in the month prior to the SEO offer date. Mean earnings forecast is the average analyst forecast of current-fiscal-year earnings in the month before the SEO, scaled by the book value of assets per share. Definitions of other explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in all regressions.

	(1) OLS	(2) OLS
Restatement due to error	-0.016	-0.040
	(0.688)	(0.406)
Restatement due to irregularities		0.072**
		(0.042)
Forecast dispersion	1.299***	1.287***
	(0.000)	(0.000)
Analyst coverage	-0.010**	-0.010**
	(0.027)	(0.031)
Mean earnings forecast	-0.015	-0.014
	(0.556)	(0.578)
Log(Principal amount)	-0.020	-0.020
	(0.263)	(0.258)
Log(Total assets)	-0.060***	-0.062***
	(0.000)	(0.000)
Leverage	-0.031	-0.030
	(0.512)	(0.535)
Tobin's q	-0.011***	-0.011***
	(0.000)	(0.000)
ROA	-0.008	-0.008
	(0.820)	(0.814)
Stock return volatility	0.006	0.006
	(0.362)	(0.351)
Share turnover	-0.013	-0.012
	(0.397)	(0.425)
NYSE listing	-0.074**	-0.071**
	(0.034)	(0.039)
Shelf registration	-0.045*	-0.045*

	(0.075)	(0.075)
Lead manager rank	-0.007	-0.007
	(0.440)	(0.440)
Percentage of secondary shares	-0.019	-0.018
	(0.485)	(0.510)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Number of observations	1,767	1,767
Adjusted-R^2	0.277	0.278

Table IV.7. Controlling for accruals quality measures
The sample in column (1) consists of 1,254 firm-commitment seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008 that have necessary data for estimating the pre-SEO abnormal accruals based on the modified Jones (1991) model. The sample in column (2) consists of 1,162 firm-commitment seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008 that have necessary data for estimating the Dechow-Dichev (2002) accruals quality measure. The dependent variable is the log transformation of gross spread per share as a percent of the offer price. Definitions of explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in all regressions.

	(1) OLS	(2) OLS
Restatement due to error	-0.033	-0.073
	(0.468)	(0.111)
Restatement due to irregularities	0.155***	0.085**
	(0.000)	(0.031)
Absolute value of discretionary accruals	0.033*	
	(0.060)	
Dechow-Dichev accruals quality measure		0.669***
		(0.000)
Log(Principal amount)	-0.019	-0.047**
	(0.304)	(0.025)
Log(Total assets)	-0.109***	-0.062***
	(0.000)	(0.000)
Leverage	0.088*	0.055
	(0.099)	(0.321)
Tobin's q	-0.017***	-0.021***
	(0.000)	(0.000)
ROA	-0.012	0.005
	(0.574)	(0.901)
Stock return volatility	-0.004	0.028***
	(0.606)	(0.002)
Share turnover	-0.020	-0.019
	(0.165)	(0.190)
NYSE listing	-0.061**	-0.098***
	(0.031)	(0.000)
Shelf registration	-0.004	-0.086***
	(0.868)	(0.000)
Lead manager rank	0.005	0.002
	(0.429)	(0.848)
Percentage of secondary shares	-0.004	0.007

	(0.861)	(0.860)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Number of observations	1,254	1,162
Adjusted-R^2	0.398	0.294

Table IV.8. Correcting for self-selection bias

Panel A presents the first-stage probit analysis of SEO issuance decision based on 74,910 firm-year observations from the Compustat universe during the period of 1997 to 2008. The dependent variable is equal to one if a firm issues SEO in a given year and zero otherwise. Panel B presents the second-stage OLS regression of gross spreads based on a sample of 2,337 SEOs from 1997 to 2008. The dependent variable is the log transformation of gross spread per share as a percent of the offer price. IMR is the inverse Mills' ratio constructed based on the coefficient estimates of the probit model in Panel A. Definitions of other explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in all regressions.

Panel A: First-stage probit regression of SEO issuance decisions	
Restatement due to error	0.018
	(0.605)
Restatement due to irregularities	-0.138 **
	(0.037)
Log(Total assets)	0.026***
	(0.000)
Leverage	0.350***
	(0.000)
Tobin's q	0.008***
	(0.000)
ROA	0.073***
	(0.000)
Stock return volatility	-0.062***
	(0.000)
Buy-and-hold market-adjusted return during the past year	0.101***
	(0.000)
Dividend paying status (dummy)	-0.101***
	(0.000)
Cash/Total assets	0.264***
	(0.000)
Capital expenditure/Total assets	0.484***
	(0.000)
Year fixed effects	Yes
Industry fixed effects	Yes
Number of observations	74,910
Pseudo-R^2	0.060
Panel B: Second-stage OLS regression of gross spreads	

Restatement due to irregularities	0.102***
	(0.001)
IMR	-0.223**
	(0.026)
Log(Principal amount)	-0.023
	(0.112)
Log(Total assets)	-0.080***
	(0.000)
Leverage	0.018
	(0.655)
Tobin's q	-0.014***
	(0.000)
ROA	-0.033
	(0.145)
Stock return volatility	0.012**
	(0.028)
Share turnover	-0.022*
	(0.067)
NYSE listing	-0.066**
	(0.020)
Shelf registration	-0.059***
	(0.002)
Lead manager rank	-0.009
	(0.118)
Percentage of secondary shares	-0.024
	(0.315)
Year fixed effects	Yes
Industry fixed effects	Yes
Number of observations	2,337
Adjusted-R^2	0.275

Table IV.9. Variation along offering size and time lapse since restatement
The sample consists of 2,337 firm-commitment underwritten seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008. The dependent variable is the log transformation of gross spread per share as a percent of the offer price. Definitions of explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in all regressions.

	(1) OLS	(2) OLS
Irregularity restatement * Indicator for SEOs with relative offer size above sample median	0.149***	
	(0.002)	
Irregularity restatement * Indicator for SEOs with relative offer size below sample median	0.053	
	(0.160)	
Irregularity restatement * Indicator for restatements within the past 3 years		0.157***
		(0.001)
Irregularity restatement * Indicator for restatements over 3 years ago		0.034
		(0.351)
Log(Principal amount)	-0.034**	-0.034**
	(0.024)	(0.024)
Log(Total assets)	-0.075***	-0.075***
	(0.000)	(0.000)
Leverage	0.001	0.001
	(0.972)	(0.977)
Tobin's q	-0.014***	-0.014***
	(0.000)	(0.000)
ROA	-0.055**	-0.054**
	(0.014)	(0.015)
Stock return volatility	0.008	0.008
	(0.172)	(0.175)
Share turnover	-0.020	-0.020
	(0.102)	(0.102)
NYSE listing	-0.064**	-0.064**
	(0.015)	(0.016)
Shelf registration	-0.061***	-0.062***
	(0.001)	(0.001)
Lead manager rank	-0.012**	-0.012**
	(0.042)	(0.042)
Percentage of secondary shares	-0.026	-0.026
	(0.259)	(0.246)
Year fixed effects	Yes	Yes

Industry fixed effects	Yes	Yes
Number of observations	2,337	2,337
Adjusted-R^2	0.275	0.276

Table IV.10. Variation along corporate governance improvements
The sample consists of 2,337 firm-commitment underwritten seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008. The dependent variable is the log transformation of gross spread per share as a percent of the offer price. Definitions of explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in all regressions.

	(1) OLS	(2) OLS
Restatement due to irregularity	0.147***	0.168***
	(0.000)	(0.000)
Irregularity restatement * Change in the percentage of independent directors	-0.281**	
	(0.029)	
Irregularity restatement * Proportion of audit committee members who departed after restatement		-0.160*
		(0.052)
Log(Principal amount)	-0.026*	-0.026*
	(0.070)	(0.072)
Log(Total assets)	-0.079***	-0.079***
	(0.000)	(0.000)
Leverage	0.002	0.002
	(0.966)	(0.955)
Tobin's q	-0.014***	-0.014***
	(0.000)	(0.000)
ROA	-0.032	-0.033
	(0.149)	(0.148)
Stock return volatility	0.012**	0.012**
	(0.024)	(0.021)
Share turnover	-0.023*	-0.023*
	(0.058)	(0.060)
NYSE listing	-0.065**	-0.065**
	(0.022)	(0.022)
Shelf registration	-0.060***	-0.060***
	(0.001)	(0.001)
Lead manager rank	-0.010	-0.010
	(0.114)	(0.112)
Percentage of secondary shares	-0.021	-0.021
	(0.386)	(0.392)

Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Number of observations	2,337	2,337
Adjusted-R^2	0.275	0.275

Table IV.11. Regression analyses of underwriting syndicate size
The sample consists of 2,337 firm-commitment seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008. The dependent variable in column (1) and (2) is the number of all managers in an underwriting syndicate. The dependent variable in column (3) and (4) is the number of lead managers in an underwriting syndicate. The key explanatory variable in column (1) and (3) is an indicator that is equal to one for SEOs by firms that have restated earnings at the time of the offering. In column (2) and (4), the restatement dummy is replaced by an indicator for restatements due to errors (i.e. unintentional misstatements) and an indicator for restatements due to irregularities (i.e. deliberate misreporting). Definitions for other explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in all regressions.

	Number of all managers		Number of lead managers	
	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Restatement	0.059		-0.019	
	(0.814)		(0.776)	
Restatement due to error		-0.140		-0.122*
		(0.610)		(0.069)
Restatement due to irregularity		0.893*		0.414**
		(0.081)		(0.034)
Log(Principal amount)	1.372***	1.372***	0.196***	0.196***
	(0.000)	(0.000)	(0.000)	(0.000)
Log(Total assets)	-0.069	-0.080	0.038*	0.032*
	(0.416)	(0.340)	(0.053)	(0.090)
Leverage	-0.105	-0.089	0.124*	0.132**
	(0.679)	(0.727)	(0.056)	(0.039)
Tobin's q	0.002	0.002	-0.010**	-0.010**
	(0.908)	(0.905)	(0.019)	(0.020)
ROA	-0.066	-0.075	-0.030	-0.035
	(0.711)	(0.670)	(0.614)	(0.555)
Stock return volatility	-0.092*	-0.091*	0.021*	0.022*
	(0.069)	(0.073)	(0.095)	(0.082)
Share turnover	-0.109	-0.106	-0.047	-0.046
	(0.421)	(0.432)	(0.144)	(0.150)
NYSE listing	0.298**	0.308**	0.137***	0.143***
	(0.039)	(0.031)	(0.002)	(0.001)
Shelf registration	-0.107	-0.108	-0.002	-0.002
	(0.339)	(0.343)	(0.955)	(0.954)
Percentage of secondary shares	0.103	0.121	0.107*	0.116**
	(0.554)	(0.489)	(0.054)	(0.036)

Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Number of observations	2,337	2,337	2,337	2,337
Adjusted-R2	0.348	0.350	0.316	0.322

Table IV.12. Marginal effects from probit analyses of offering method choices
The sample consists of 2,337 firm-commitment seasoned equity offerings (SEOs) and 471 accelerated SEOs made by U.S. firms between 1997 and 2008. The dependent variable is equal to one for accelerated offerings and zero otherwise. The key explanatory variable in column (1) is an indicator that is equal to one for SEOs by firms that have restated earnings at the time of the offering. In column (2) and (3), the restatement dummy is replaced by an indicator for restatements due to errors (i.e. unintentional misstatements) and an indicator for restatements due to irregularities (i.e. deliberate misreporting). Definitions for other explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in all regressions.

	(1) Probit	(2) Probit	(3) Probit
Restatement	-0.025		
	(0.077)		
Restatement due to error		-0.016	
		(0.342)	
Restatement due to irregularity		-0.057**	-0.056**
		(0.000)	(0.000)
Log(Principal amount)	-0.049***	-0.049***	-0.049***
	(0.000)	(0.000)	(0.000)
Log(Total assets)	0.034***	0.035***	0.035***
	(0.000)	(0.000)	(0.000)
Leverage	0.004	0.004	0.004
	(0.866)	(0.881)	(0.870)
Tobin's q	0.007***	0.007***	0.007***
	(0.003)	(0.003)	(0.002)
ROA	-0.067**	-0.066**	-0.067**
	(0.020)	(0.023)	(0.022)
Stock return volatility	-0.015**	-0.015**	-0.015**
	(0.014)	(0.013)	(0.013)
Share turnover	0.025***	0.025***	0.025***
	(0.002)	(0.002)	(0.003)
NYSE listing	0.058***	0.057***	0.056***
	(0.001)	(0.001)	(0.001)
Percentage of secondary shares	-0.164***	-0.165***	-0.164***
	(0.000)	(0.000)	(0.000)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Number of observations	2,808	2,808	2,808
Pesudo-R^2	0.222	0.222	0.221

Table IV.13. Regression analyses of SEO announcement returns
The sample consists of 1,228 non-shelf firm-commitment seasoned equity offerings (SEOs) by U.S. firms from 1997 to 2008. The dependent variable is the issuer's 3-day cumulative abnormal return in percentage points around the SEO announcement date. The key explanatory variable in column (1) is an indicator that is equal to one for SEOs by firms that have restated earnings at the time of the offering. In column (2) and (3), the restatement dummy is replaced by an indicator for restatements due to errors (i.e. unintentional misstatements) and an indicator for restatements due to irregularities (i.e. deliberate misreporting). Definitions for other explanatory variables are in Appendix IV.A. In parentheses are *p*-values based on standard errors adjusted for heteroskedasticity (White (1980)) and issuer clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. Year and industry fixed effects are included in all regressions.

	(1) OLS	(2) OLS	(3) OLS
Restatement	-0.938		
	(0.335)		
Restatement due to error		-0.496	
		(0.654)	
Restatement due to irregularity		-3.108**	-3.068**
		(0.040)	(0.042)
Log(Principal amount)	0.379	0.386	0.385
	(0.364)	(0.356)	(0.357)
Log(Total assets)	-0.048	-0.043	-0.042
	(0.856)	(0.872)	(0.876)
Leverage	0.360	0.358	0.345
	(0.755)	(0.757)	(0.766)
Tobin's q	0.027	0.025	0.026
	(0.828)	(0.839)	(0.834)
ROA	1.755	1.773	1.768
	(0.332)	(0.328)	(0.329)
Stock return volatility	0.263	0.266	0.264
	(0.237)	(0.232)	(0.236)
NYSE listing	0.118	0.111	0.107
	(0.835)	(0.845)	(0.850)
Lead manager rank	0.100	0.098	0.096
	(0.607)	(0.616)	(0.621)
Percentage of secondary shares	-1.950**	-1.978**	-1.968**
	(0.040)	(0.037)	(0.038)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Number of observations	1,228	1,228	1,228
Adjusted-R^2	0.001	0.001	0.001

Appendix IV.A. Variable definitions

Variable	Definition
Restatement	Dummy variable: 1 for firms that restated earnings prior to the SEO, 0 otherwise.
Restatement due to errors	Dummy variable: 1 for restatements due to unintentional errors, 0 otherwise.
Restatement due to irregularities	Dummy variable: 1 for restatements due to intentional manipulations, 0 otherwise.
Gross spread	Underwriting fee per share divided by the SEO offer price.
CAR(-1,+1)	Three-day cumulative abnormal return (in percentage) surrounding the SEO announcement calculated by subtracting the CRSP value-weighted returns from a firm's daily returns.
Offer size	Log of principal amount (in $ mil) offered.
Relative offer size	Number of shares offered divided by number of shares outstanding
Shelf registrations	Dummy variable: 1 for shelf offers, 0 otherwise.
Lead manager reputation	The Carter and Manaster (1990) ranking updated by Jay Ritter.
Firm size	Log of book value of total assets (data6)
Tobin's Q	Market value of assets over book value of assets: (data6-data60+data25*data199)/data6
Leverage	Book value of debts (data34+data9) over book value of assets (data6)
ROA	Net income (data 172) over book value of assets (data 6)
Share turnover	The ratio of the average daily trading volume during the 250 trading days prior to the offer date over existing shares outstanding.
Stock return volatility	The standard deviation of daily stock returns during the 250 trading days prior to the offer date.
NYSE listing	Dummy variable: 1 for firms listed on the NYSE, 0 otherwise.

Appendix IV.B. Construction of performance-adjusted discretionary accruals

We follow the prior literature and estimate discretionary accruals using a modified Jones (1991) model specified as follows:

$TA_{it}/A_{it-1} = \beta_1 \times (1/A_{it-1}) + \beta_2 \times [(\Delta SALES_{it} - \Delta REC_{it})/A_{it-1}] + \beta_3 \times (PPE_{it}/A_{it-1}) + e_{it}$,

where TA_{it} is firm i's total accruals in year t, computed using the statement of cash flows information as the difference between earnings before extraordinary items and discontinued operations (Compustat data 123) and operating cash flows from continuing operations (data 308 – data 124). Hribar and Collins (2002) show that accruals estimated this way are more accurate than those estimated based on successive balance sheets. We obtain quantitatively similar results using accruals estimated from balance sheet data. A_{it-1} is the book value of total assets (data 6) at the beginning of year t, $\Delta SALES_{it}$ is the change in sales (data 12) during year t, ΔREC_{it} is the change in accounts receivable (data 2) during year t, and PPE_{it} is the book value of property, plant, and equipment (data 7) in year t.

We estimate the modified Jones model cross-sectionally using all Compustat firms for each year and Fama-French 48-industry cohort that has at least 10 observations. The modified-Jones model discretionary accruals are simply the residuals from the regressions. Kothari, Leone, and Wasley (2005) show that performance can be correlated with the discretionary accruals estimated from the variants of the Jones model and the reliability of inferences can be enhanced by using performance-matched discretionary accruals. For each company in our sample, we select a control firm in the same Fama-French industry with the closest return on assets (ROA) computed as the ratio of net income (data 172) over the book value of total assets (data 6) at the end of the pre-SEO fiscal year. The performance-matched discretionary accruals is defined as the difference between the sample firm's modified-Jones model discretionary accruals and the matched firm's modified-Jones model discretionary accruals.