Sector, size, stability, and scandal
Explaining the presence of female executives in *Fortune* 500 firms

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Abstract

Purpose – Although women remain substantially underrepresented in the top echelons of large corporations, a non-trivial presence of female executives has emerged in recent years. The purpose of this paper is to focus on the firm characteristics that predict the sex of the executive office holder, classifying the plausible firm characteristics that could explain the presence of female executives into four explanations: sector, size, stability, and scandal.

Design/methodology/approach – This paper provides perhaps the first large-sample analyses of the sex of executive officers in *Fortune* 500 firms by analyzing a sample of 3,691 executives in 444 *Fortune* 500 companies.

Findings – In the paper's sample, 252 of the executives, or 6.4 percent of the sample, are women. The authors' analyses reveal that women are less likely to be chief executive officers and chief operations officers, but more likely to be chief corporate officers and general counsels. Female executives are somewhat less likely to be present in the construction sector, but there is evidence that they are more likely to be present in retail trade. Firms with greater assets and sales growth are less likely to have female executives. Using originally collected data, it is shown that firms that have experienced a scandal in recent years are more likely to have female executives. However, the nature and quantity of scandals do not have significant effects.

Originality/value – Ultimately, the authors' analyses reveal that key firm characteristics predict whether an executive office is held by a woman.

Keywords Fortune 500 companies, Women executives, Gender, United States of America

Paper type Research paper

One of the visible manifestations of contemporary gender inequality is the paucity of women at the top of large organizations. Research has drawn attention to a variety of kinds of organizations in which women are underrepresented as leaders, and the organizational

processes driving women's presence in leadership positions (Paxton and Kunovich, 2003; Valian, 1999; Viterna *et al.*, 2008). Consistent with the scholarship on gender in organizations generally, this literature contributes to understanding where and when women are more likely to emerge as a substantial presence.

As is well known, women continue to be dramatically underrepresented among the top leadership positions in US corporations (Adler and Izraeli, 1994; Daily *et al.*, 1999). A 2006 Catalyst report concluded that women held only 16.4 percent of corporate officer positions and represented only 6.4 percent of corporate officer top earners. Strikingly, women comprised < 10 percent of the highest executive positions, and female chief executive officers (CEOs) led only eight *Fortune* 500 firms (Catalyst, 2006). In 2008 and 2009, women held 15.2 percent of board seats at *Fortune* 500 companies. Almost 90 percent of companies in both 2008 and 2009 had at least one women director, but < 20 percent had three or more (Soares *et al.*, 2009). Some studies have demonstrated that where women are most strongly represented at board and top-management levels, organizational performance is stronger than at companies without this representation of women at the top (McKinsey and Co., 2007). Even though this suggests that diversity at the top of organizations matters to firm performance, there still is a dearth of women at the highest levels. Therefore, although it is well known that managers are less likely to be women overall (Reskin and McBrier, 2000; Schein, 2007), the very top of corporations presents a unique and intriguing case of gender exclusion (Brett and Stroh, 1999).

Scholars have learned a great deal about the organizational processes that influence gender stratification generally (Tomaskovic-Devey and Skaggs, 2002) as well as women's presence in mid-level managerial positions (Reskin *et al.*, 1999; Stainbeck and Tomaskovic-Devy, 2009). Partly because of a lack of data and few cases of female executives, there has not been a great deal of research on the organizational processes leading to women to reach the very top of large corporations (for exceptions, see Cappelli and Hamori, 2004; Ezzedeen and Ritchey, 2009; Morrison *et al.*, 1987; Ragins *et al.*, 1998). A few scholars concentrate on the capacities of certain women to navigate gender scripts and cultivate social networks within the organizational constraints that they face (Blair-Loy, 1999; Eagly and Carli, 2003; Nicholson and West, 1988; Reeves, 2000). Others focus on how organizational barriers interact with and shape the preferences of women executives to defer or abstain from parenthood in order to pursue the rigors of top-level management (Henning and Jardin, 1977; Hardesty and Jacobs, 1986).

Despite the valuable contributions of previous research, there is a clear need for further research on how organizational characteristics and processes influence the presence of female executives in large corporations. We investigate the influence of a wide variety of firm characteristics in predicting where female executives are likely to be present. As highlighted below, a few key studies have analyzed the role of organizational and institutional influences on the presence of female executives (Guthrie and Roth, 1999). We build upon these studies as well as the broader literature on the organizational sources of gender inequality. Our contribution is to apply these literatures to a large sample analysis of female executives in *Fortune* 500 firms. To the best of our knowledge, there have been no such large sample analyses of female executives in *Fortune* 500 firms. To organize our analyses, we classify likely influential firm characteristics into four categories: sector, size, stability, and scandal.

Four sets of firm characteristics[1]

Firm sector

Sector (i.e. industry) is perhaps the mostly commonly studied firm characteristic in analyses of female executives and managers. Previous research provides both descriptive (Bilimoria, 2006; Cappelli and Hamori, 2004; Nelson and Levesque, 2007; Tharenou, 2001) and theoretical (Blum *et al.*, 1994; Goodman *et al.*, 2003; Helfat *et al.*, 2006) accounts of the differential presence of female executives across sectors. As is well known, there is a great deal of horizontal segregation across businesses. Companies in which the clientele is mainly female or child-centered have been the earliest to promote or hire women into management. This tends to be the basis for explanations for the variation in female executives across sectors.

Several studies reveal the greater representation of women in executive offices in non-manufacturing and service sector firms compared to manufacturing firms (Bilimoria, 2006; Blum *et al.*, 1994; Goodman *et al.*, 2003; Cappelli and Hamori, 2004; Helfat *et al.*, 2006). A series of sector-level metrics have been collected from US *Fortune* 500 companies to show the percentage of women corporate officers, CEOs, and board members in these firms. Health care, social services, and retail trade have a higher total percentage of women in these positions than the manufacturing, mining, and construction sectors (Catalyst, 2008). Relatedly, in an investigation of the organizational predictors of board composition, Hillman *et al.* (2007) find greater female representation in industries with larger shares of female employment. Since the service sector tends to have a higher concentration of female employees (Charles and Grusky, 2004), these results corroborate each other (Guthrie and Roth, 1999).

Whereas this research documents significant sectoral differences, some studies suggest otherwise. Nelson and Levesque (2007) find few significant differences between women's executive presence in high-growth, high potential, technology-intensive industries and other sectors, such as wholesale and retail trade. Tharenou (2001) and Stroh *et al.* (1992) fail to find a significant relationship between sector and women's executive presence. Yet, Nelson and Levesque (2007) and Tharenou (2001) limit the sectors analyzed in the sample or the sectors used as comparison groups. Tharenou (2001) and Stroh *et al.* (1992) focus on processes of career progression for female managers rather than the strict presence of women at top executive levels. As such, there remains uncertainty in the literature about sectoral differences. Still, a consensus in the literature seems to be forming: female executives are more likely to be present in non-manufacturing (especially service) firms.

Three types of explanations have been proposed to explain this sectoral pattern (Blum *et al.*, 1994; Goodman *et al.*, 2003). First, an interactional account, relying on gender stereotypes and schemas, suggests that firms in sectors that rely more heavily on personal interactions may be more likely to have women in top executive offices. Second, an institutional explanation distinguishes between different legitimation strategies employed by manufacturing and non-manufacturing companies (Baron *et al.*, 1986; Salancik, 1979). Non-manufacturing firms, which often produce intangible outcomes, are more likely to adopt bureaucratic practices, such as equal opportunity policies in the hiring of executives, in order to gain legitimacy. Manufacturing firms, on the other hand, tend to create tangible products and, may be less prone to isomorphism, resulting in lower levels of female executive hiring. Third, there is evidence that there is a propensity for managers to consider candidates from a frame of reference familiar to themselves,

while excluding other potential candidates (Alimo-Metcalfe, 1994; Kahneman *et al.*, 1982). In manufacturing firms that are predominantly male, male managers tend to scan their local environment for potential hires, thinking first of males because they are the majority sex in managerial positions. Hence, well-known gender biases in how leadership is defined and socially constructed (Alimo-Metcalfe, 1995; Ridgeway, 2001) are likely to perpetuate sectoral tendencies to favor men for executive positions. The consequence is that in industries where men have always traditionally held executive offices, there is tremendous inertia for the office to be held by men. All three mechanisms provide plausible reasons why female executives may be less common in manufacturing firms.

Firm size

Although less commonly analyzed than sector, firm size may have implications for female executives. Studies often use firm size as a control in models of other organization-level predictors accounting for female executives, rather than as an explanatory variable of interest (Guthrie and Roth, 1999). Additionally, firm size is operationalized differently across studies. Some use the number of employees as a proxy for firm size (Goodman *et al.*, 2003; Guthrie and Roth, 1999), while others use variations on the magnitude of firm profits (e.g. revenues in Bilimoria, 2006; sales in Hillman *et al.*, 2007). There appear to be few attempts to compare different operationalizations of firm size in prior work.

The results regarding the connection between firm size and the presence of female executives are mixed[2]. Some find no relationship between firm size and the presence of female executives (Cappelli and Hamori, 2004; Goodman *et al.*, 2003). Among those finding a significant association, there is uncertainty about the direction of the relationship. For example, Guthrie and Roth (1999) conclude that larger organizations are less likely to have a female CEO. In their study of females among boards of directors, however, Hillman *et al.* (2007) find that organizational size increases the likelihood of female representation.

Since much of the existing literature on firm size and female executives is descriptive (Cappelli and Hamori, 2004; Helfat *et al.*, 2006), few suggest any causal explanation for why firm size is linked to the presence of female executives. In the few that do (Goodman *et al.*, 2003; Hillman *et al.*, 2007), scholars have relied on institutional theory (Baron *et al.*, 1986; Salancik, 1979). According to this reasoning, larger firms are more exposed to societal and state pressures to hire women at the executive level since they are highly visible in the public sphere and more likely to have enacted institutional scripts (e.g. establishing human resources offices/policies and diversity officers) encouraging gender equity (Dobbin and Sutton, 1998).

Firm stability and scandal

There are several plausible reasons to expect that women are more likely to ascend to positions of leadership when the environment is especially volatile, unstable, or turbulent. Firm instability could involve particularly poor or declining stock performance, an obligatory restatement of financial earnings, scandal, fraud, large lay-offs or restructurings, or mergers and acquisitions. These kinds of instability could create opportunities for organizations to break from the status quo of organizational inertia and alter hiring and promotion practices (Khurana, 2002; Reskin and McBrier, 2000). For example, a recent study shows that women's promotion rates benefit from

workforce reductions and the reorganization of human resource management systems. Moreover, these benefits grow with job rank (Dencker, 2008). Of course, improvements or "positive" instabilities like increases in profits, sales, and revenue should be distinguished as likely to have the opposite effect (Edwards *et al.*, 1999; Woodall *et al.*, 1997). In our analyses, we expect that declines and "negative" instability should increase women's presence in executive offices, whereas positive instability should have negative effects similar to stability. Of course, a plausible null hypothesis is that even negative instability simply reproduces gender hierarchies (Skuratowicz and Hunter, 2004).

Ryan and Haslam (2005, 2008) theorize that unstable environments provide an opportunity for women to attain leadership positions because the risk of failure is higher. This has been referred to as a "glass cliff" because women, rather than men, are put in precarious and high-risk leadership positions. Ryan and Haslam (2005, 2008) provide observational (from large firms) and experimental evidence (with business graduate students) that demonstrates a greater likelihood of selecting a female leader when firm performance has been declining. Because executive positions in unstable firms are likely to be less prestigious, the competition from male candidates may be less intense. Indeed, Stainbeck and Tomaskovic-Devey (2009) find that women's growing presence in management has been circumscribed mostly to emergent sectors and to larger workplaces where they manage other women. Following Reskin and Roos' (1990) queuing theory, as executive-level positions become less desirable – due to scandal or instability, which are linked to lower job security/earnings – their order in the queue changes. As these jobs become less desirable to men, this allows women to move ahead in the queue to fill these positions. For example, Furst and Reeves (2008) contend that turbulence in four key industries – financial services, consumer products, technology, and media – has facilitated the emergence of female executives in those fields. Similarly, Blair-Loy (1999) concludes that turbulence – within organizations, across industries, or the economy – significantly affects the career trajectories of female finance executives, creating risk, but also mobility and advancement opportunities. In a survey of 800 business leaders, women leaders were found to have a competitive edge in or after a crisis mainly because women were more likely to inspire others by presenting a compelling vision of the future and to define expectations and reward achievement targets (McKinsey and Co., 2009). Relatedly, in the wake of a scandal, the corporate social responsibility of a firm may be called into question. As a response, female executives may be installed strategically to signal that firms are attempting to become more "socially responsible." In a similar vein, Skaggs (2009) finds that after a racial discrimination lawsuit, firms respond to external pressure by becoming disproportionately likely to promote African-Americans into management positions.

The visibility of a scandal and the public perception of mismanagement should pose a particular threat to executive office holders, and thus create opportunities for appointments of women. For example, Arthaud-Day *et al.* (2006) find that CEOs and chief financial officers (CFOs) of firms filing financial restatements were more than twice as likely to exit their firms. They also find that board members to firms who posted financial restatements were approximately 70 percent more likely to leave their firms. The obligatory restatement of financial information undermines the perceived legitimacy of the firm's behavior independent of firm performance. For reasons including but beyond financial restatement, high staff turnover may indicate unstable

firm environments. Goodman *et al.* (2003) find that women are more likely to hold top positions in industries with higher rates of management turnover.

Ultimately, we expect turbulent environments increase the likelihood that an executive office is held by a woman. Partly, this is because a lack of change encourages a firm to maintain the status quo, and organizational inertia tends to sustain the prevalence of male executives (Reskin and McBrier, 2000). Moreover, we specifically expect that firms that have experienced a scandal are more prone to have female executives (Furst and Reeves, 2008). When firms are faced with public relations crises, a female appointment to an executive office is more likely to signal to key stakeholders that the organization intends to change. In turbulent environments, where change is perceived as desirable or necessary (Khurana, 2002), a firm may be more likely to appoint female executives because they are more likely to connote a transformational leadership style (Druskat, 1994; Rosener, 1990). Hence, female executives are more likely to be present when firms have experienced a period of instability, and crisis-level instability involving scandal may have a particularly strong impact.

Methods
Our unit of analysis is the individual executive (i.e. executive office). Linking firms to each executive, we examine whether firm characteristics predict if the executive office is held by a female. We utilize logistic regression to analyze the binary dependent variable of the sex of the executive. Because firms often contribute more than one executive to the sample, we use the Huber-White estimator to robust cluster the errors by firm.

Data and sample
The analyses are based on the Compustat Executive Compensation database[3]. This database contains detailed information on executive compensation and firm-level characteristics provided annually by Standard and Poor (S&P) 1,500 companies[4]. These data are available continuously beginning in 1992, based on reporting at the end of each fiscal year. We include five recent years (2001-2005) of data. Compustat collects information on executives from annual proxy statements required by the US Security and Exchange Commission (SEC). The database includes up to nine executives per firm for each year, though most companies only report information for five. Therefore, multiple executives are present in the sample from each firm.

The sample was first restricted to 2005 *Fortune* 500 firms. We sought to maximize the number of female executives in our analysis of these firms. As a result, we selected all executives in these firms in a five-year period of the database. An executive could appear in the database for several years, so the five years of data (2001-2005) were sorted so that the most current case for each executive was retained. By using this strategy, the sample attempts to capture the highest position attained by each executive in those five years of the database.

Executive titles were further screened to include only top executive officers. The following were included in the sample: CEO, president, chief administrative officer, CFO, chief corporate officer (CCO), chief information officer, general counsel, chief operation officer (COO), executive/senior vice president, vice chair/executive vice chair, vice president, and division/region/group head, advisor/consultant and miscellaneous executive[5]. In analyses available upon request, we reestimated all models while excluding the last five categories of executives (i.e. including only

executive/senior vice president and higher) to more strictly define the executive class. All of our results were robust under this stricter sampling standard (but see [17]). Consequently, we present the results with all executives included.

Overall, this sample yields a cross-section of executives in 2005 *Fortune* 500 companies over a five-year period. It includes 3,691 executives (252 women; 6.4 percent of sample) in 444 different companies over the 2001-2005 time period (2,248 executives in 2005; 511 executives in 2004; 452 executives in 2003; 372 executives in 2002; and 378 executives in 2001)[6]. Because of missing data for a few variables, the *n* is occasionally $<3,961$. In the final models, however, there are no missing data.

The Compustat database also provides variables of interest on firm and sector characteristics. As discussed below, we collected and coded original data on firm scandals. One significant limitation of the Compustat database should be mentioned, however. The database includes a wide variety of variables for the individual executives' careers (e.g. tenure in firm/position, background, and socio-demographics). However, the data on almost all individual-level variables is unfortunately missing in a widespread and systematic way. As but one example, data on the age of the executive is missing for more than 75 percent of the sample. Thus, one cannot include individual-level characteristics without severely compromising the sample. Because of this problem, we do not include individual-level variables besides the sex and title of the executive[7]. Ultimately, although this database is severely limited for individual-level variables, it has clear virtues of large sample size, generalizability, and extensive firm-level variables. The descriptive statistics for all variables are presented in the Appendix.

Dependent variable
Our dependent variable is the sex of the holder of an executive office. We coded all executives as female = 1 and male = 0. As mentioned above, 6.4 percent of the sample is female.

Independent variables
Our analyses proceed by examining each of the sets of explanations for the presence of female executives. Our models build progressively by retaining the most important variables from prior tables. Throughout, we control for the year of the observation with four binary variables for 2001-2004 and 2005 as the omitted reference.

We first consider the role of executive title and sector. We introduce binary variables for 14 executive title categories that we coded manually from the official titles reported in the database (listed in sample section above). Thus, our models include 13 binary variables and one omitted reference category, executive vice president, which comprises 29 percent of the sample and is the largest category, followed by CEO with 21 percent, and CFO with 13 percent. We code sector using the one-digit standard industrial classification. Because our data are restricted to the private sector, our models include binary variables for the following: mining; construction; manufacturing; transportation, communication, electric, gas, and sanitary services; wholesale trade; retail trade; and services. The omitted reference is finance, insurance, and real estate (FIRE), which is about 14 percent of the sample[8]. The largest sector is manufacturing with 38 percent of the sample.

Next, we examine the size of the firm with four variables, measured in the year the executive is observed[9]. Assets are measured in millions of dollars. The mean executive worked in a firm that possessed $47.6 billion in assets. To be certain that any effect

of this variable was not due to skew or outliers, we also examined logged assets (natural log)[10]. We measure the net income of the firm in millions of dollars, and the mean value was almost $859 million. We also examine firm size with the number of employees in thousands of employees. The average executive in our sample worked in a firm with almost 58,000 employees.

We then consider the potential influence of firm stability, and conversely instability, with three variables. Net income change is an annual rate of change in the aforementioned net income variable. On average, the executives in our sample worked in firms that experienced a 7 percent decline in net income, but we note there was enormous variation in this variable. We also include the three-year growth rate of sales, which is the rate of change over a three-year period. The mean value of sales growth was 9.5 percent[11]. Finally, we include the Black-Scholes volatility measure, which is a standard deviation estimate of the fluctuation in the price and value of shares over 60 months (the mean is 0.4).

Finally, we gathered and coded original data to measure the occurrence, quantity, and nature of firm scandals. We created these variables under the assumption that substantial public attention to a scandal is evidence that a scandal has reached a threshold of significance. Media coverage should serve as a valid and reliable indicator of a threat to the firm's public reputation.

Data on firm scandal were gathered using *The New York Times*. This periodical was chosen both because it is regarded as a reliable news source, often considered a national "newspaper of record" and because it has one of the larger circulations in the USA using the LexisNexis Academic database as a search engine, three conditions were entered into the database fields[12]. First, the search was limited to articles in *The New York Times*. Second, the date of the LexisNexis search was specified to include both the year(s) that a firm was present in the sample as well as two years prior to the observation[13]. Finally, the primary search terms included:

- the name of the firm; and
- a series of terms to identify articles describing firm scandals[14].

These conditions were set so that an article needed to contain the name of the firm within the relevant timeframe and at least one instance of a scandal-related term – although in most cases, relevant articles included multiple different scandal-related terms.

For each firm, we identified the first 100 articles, which were sorted by relevance. In reviewing articles, we coded each event of scandal once in the three-year period that allegations of the activity were lodged and once in the three-year time period in which the allegations of the activity were settled. When allegations and settlements occurred in the same period, the activity was coded as only one scandal. Allegations were coded as a scandal regardless of subsequent outcome, while settlements were coded as scandal only when unfavorable to the defendant. We reasoned that both the allegation of misconduct as well as the formal determination of misconduct created a negative image for the firm[15].

Based on these coding procedures, we include the number of total scandals, the logged number of total scandals, and a binary measure of the presence of scandals (reference = no scandals). The average executive worked in a firm that had experienced 1.5 scandals, and 55 percent of executives worked in firms that had experienced a scandal. In addition, we created ten-count variables for the number of scandals by the domain in which

the scandal occurred: anti-trust, book-keeping, marketing, product, personnel, discrimination, environmental, labor, financial other, and miscellaneous[16]. Since these variables are counts, and are not mutually exclusive, the reference is no presence of any type of scandal (45 percent of cases). The most common scandal types were financial other and product related.

In the analyses that follow, we begin with Table I by including the variables for titles, sectors, and year. We then consider the variables for firm size and stability separately. In Table II, we add measures for firm size, while retaining the variables from Table I. Then, in Table III, we include measures for firm stability, along with the variables from Table I but without the measures from Table II. Finally, Table IV includes the measures of scandals. This final table includes the measures from Table I. In addition, at this point, we bring back the best performing measures from Tables II and III. To specify the final models, we consider the significance, robustness, and magnitude of variables while seeking to avoid redundancy and missing data.

Results

Table I begins with models of the odds that the executive is female on the executive titles and sector variables. All three models control for year, and importantly,

	Models					
	1		2		3	
CEO	0.397**	(−4.10)			0.404**	(−4.00)
President	1.183	(0.41)			1.139	(0.32)
Chief administrative officer	1.984	(1.42)			1.803	(1.20)
CFO	1.007	(0.04)			1.034	(0.17)
CCO	11.243**	(11.52)			9.748**	(6.76)
Chief information officer	1.709	(0.84)			1.429	(0.54)
General counsel	1.702*	(2.28)			1.782*	(2.44)
COO	0.366**	(−2.73)			0.368**	(−2.66)
Vice chair/executive VC	0.821	(−0.54)			0.800	(−0.62)
Vice president	0.924	(−0.21)			1.077	(0.19)
Division/region/group VP	0.822	(−0.77)			0.861	(−0.59)
Advisor/consultant	2.126	(0.71)			2.589	(0.89)
Miscellaneous executive	3.001	(1.14)			3.271	(1.24)
Year 2001	0.817	(−0.77)	0.862	(−0.86)	0.798	(−0.86)
Year 2002	1.067	(0.29)	1.155	(0.27)	1.063	(0.27)
Year 2003	0.766	(−1.19)	0.835	(−1.20)	0.761	(−1.20)
Year 2004	0.847	(−0.81)	0.890	(−0.81)	0.845	(−0.81)
Mining sector			0.710	(−0.79)	0.660	(−0.79)
Construction sector			0.294 +	(−1.69)	0.302 +	(−1.69)
Manufacturing sector			0.874	(−0.81)	0.843	(−0.81)
Transportation, communications, electric, gas, and sanitary services sector			0.970	(−0.02)	1.005	(0.02)
Wholesale trade sector			0.756	(−0.64)	0.755	(−0.64)
Retail trade sector			1.893**	(2.76)	1.876**	(2.76)
Services sector			1.258	(0.53)	1.200	(0.53)

Table I.
Odds ratios for logistic regression of being female on executive title, sector variables

Notes: Significance at: *5, **1, and ***10 percent; $n = 3,961$; robust z-statistics in parentheses; the reference category for the executive dummies is executive vice president; the reference category for year is 2005; the reference category for the sector dummies is the FIRE sector

none of the dummies for 2001-2004 is significant. As there is no significant difference across 2001-2005, pooling multiple years does not present a problem. Model 1 also shows that two executive offices are less likely to be held by women (CEO and COO). Compared to executive vice-presidents, if the office is CEO, the odds of being female are reduced by a factor of about 2.5[17]. Compared to executive vice-presidents, if the office is COO, the odds of being female are reduced by a factor of about 2.7. By contrast, two offices are more likely to be held by women (CCO and general counsel). Compared to executive vice-presidents, if the office is CCO, the odds of being female are increased by the dramatic factor of 11.2. However, this finding is largely because there are only four CCOs in our sample. Compared to executive vice-presidents, if the office is general counsel, the odds of being female are increased by a factor of 1.7. These results suggest that although women are underrepresented among all executive titles, their presence is more common among general counsels and the rare office of CCO, and more uncommon at the very top (CEOs) and among COOs.

Model 2 demonstrates that there is some variation across sectors in the presence of female executives. Compared to the FIRE sector, the odds the executive is female is reduced by a factor of about 3.4 in the construction sector (significant at 0.10 level). By contrast, compared to FIRE, the odds the executive is female increases by a factor of 1.9 in the retail trade sector. Finally, Model 3 (including all year, executive, and sector variables) provides broadly similar results to Models 1 and 2. In the remaining models, we retain all variables from Model 3. We do not show the results for these variables, however, and treat them henceforth as controls.

		Models		
	1	2	3	4
Assets (in millions of dollars)	1.000 (1.16)			
Logged assets		0.911 (−1.44)		
Number of employees (in thousands)			0.999 (−1.06)	
Net income (in millions of dollars)				1.000 (0.30)
Observations	3,961	3,961	3,934	3,961

Notes: Significance at: [*]5, [**]1, and [***]10 percent; robust z-statistics in parentheses; all models control for Table I Model 3 variables (titles, year, and sectors)

Table II.
Odds ratios for logistic regression of being female on firm size variables

		Models				
	1		2		3	
Logged assets	0.896	(−1.60)	0.917	(−1.32)	0.907	(−1.50)
Net income change (year to year percentage change)	1.000[*]	(−2.43)				
Three-year growth rate of sales			0.985[**]	(−2.93)		
Black-Scholes volatility					1.119	(0.55)
Observations	3,409		3,961		3,930	

Notes: Significance at: [*]5, [**]1, and [***]10 percent; robust z-statistics in parentheses; all models control for Table I Model 3 variables (titles, year, and sectors)

Table III.
Odds ratios for logistic regression of being female on firm stability variables and preferred firm size variable

| | Models | | | | | | | |
	1		2		3		4	
Logged assets	0.877 +	(−1.78)	0.869 +	(−1.87)	0.870*	(−2.14)	0.873 +	(−1.82)
Three-year growth rate of sales	0.986**	(−2.74)	0.986**	(−2.67)	0.986**	(−2.85)	0.987**	(−2.71)
Number of total scandals	1.051	(1.43)						
Number of miscellaneous scandals			1.180	(0.90)				
Number of financial other scandals			1.133 +	(1.95)				
Number of anti-trust scandals			1.087	(0.48)				
Number of book-keeping scandals			0.966	(−0.26)				
Number of marketing scandals			1.142	(0.76)				
Number of product scandals			1.044	(0.53)				
Number of personnel scandals			0.492	(−0.75)				
Number of discrimination scandals			0.888	(−0.74)				
Number of environmental scandals			0.797	(−1.46)				
Number of labor scandals			1.185	(1.07)				
Logged number of scandals					1.201	(1.55)		
Presence or absence of scandals							1.438*	(2.45)

Table IV.
Odds ratios for logistic regression of being female on firm scandal variables and preferred firm size and stability variables

Notes: Significance at: *5, **1, and *** 10 percent; $n = 3,961$; robust z-statistics in parentheses; all models control for Table I Model 3 variables (titles, year, and sectors)

In Table II, we examine four measures of firm size: assets, logged assets, net income, and number of employees. Importantly, all four fail to reach statistical significance at even the 0.10 level. The only variable that approaches significance and has an odds ratio measurably different from 1.0 is logged assets. This variable provides some suggestive evidence that as firms are larger, the odds of an executive being female are reduced. Moreover, as we show in subsequent tables, this variable becomes significant with the introduction of scandal measures. Therefore, although it is not yet significant, we retain logged assets for the next tables.

Table III introduces three measures of firm stability. Two measures are significant, while the Black-Scholes volatility measure is not. For each percent change in net income, an executive is significantly less likely to be a woman[18]. As the three-year growth rate in sales rises, the odds an executive is a woman is significantly reduced. We note, however, that both effects appear to be substantively modest. As the average firm experienced a 7 percent decline in net income from the previous year, many executive offices have become slightly more likely to be occupied by women. Also, as the average firm experienced a 9.5 percent growth in the rate of sales, the typical executive office has

become slightly less likely to be held by a woman. In short, losses in net income and sales appear to enhance the odds that women are in executive positions. By contrast, positive net income and sales growth appear to protect the status quo and allow most executive positions to remain held by men. In these models, logged assets remains insignificant, but compared to Table II, it is slightly more significant. Because the three-year growth rate is slightly more significant, and because it does not have missing values (unlike net income change), we retain that variable in the next and final table.

Table IV features models with the scandal variables. Also, these models function as final models because we retain the two most important firm size and stability variables in addition to the executive titles, year, and sector variables. Again, we do not show the last three groups of variables as we displayed them in Table I and, for the most part, they are robust[19]. Interestingly, in these final models, logged assets becomes more significantly negative – at the 0.10 level in most models, but at the 0.05 level in Model 3. This provides modest evidence that larger firms are less likely to have women in executive positions. Additionally, the three-year growth rate of sales is robustly significant at the 0.01 level. This demonstrates that growing firms are less likely to have female executives, yet firms that are suffering losses in sales are more likely to have female executives. We suggest that these results provide evidence that stability and growth favor the status quo, while instability and losses favor change. Women are more likely to be in executive offices where firms have struggled in recent years.

Table IV also demonstrates that scandals have an influence on the presence of female executives. Model 1 shows that the number of total scandals is positively signed ($z > 1.4$), but does not quite significantly increase the presence of female executives. Therefore, it is not simply that scandal-ridden firms with very poor reputations and many sources of instability will necessarily be more inclined to promote/hire women for executive offices. Model 2 shows that most of the counts for types of scandals are insignificant. The one exception is that the number of "financial other" scandals is significant at the 0.10 level ($z = 1.95$). For each of these financial other scandals, the odds an executive office is occupied by a woman increase by a factor of 1.13. Other than that effect, however, the count of different types of scandals does not affect the presence of female executives. Additionally, Model 3 demonstrates that the logged number of scandals does not have a significant effect.

Model 4 shows that the existence of any scandal does significantly influence the presence of female executives. As mentioned above, 55 percent of our sample is in a firm that has experienced a scandal. So, scandals are quite common but not universal. If a firm has experienced a scandal, the odds the executive is a woman increases by a factor of 1.44. This provides evidence that the instability, crisis, and reputation loss entailed in a scandal create an environment where firms are more inclined to break with the status quo and promote or hire women. Rather than resulting from a large number of scandals or particular types of scandals, female executives are more likely to be present simply as a result of any scandal.

In sum, Table IV shows that three factors influence the presence of female executives beyond the dummies for executive titles and sectors. Larger firms and firms that are experiencing sales growth are less likely to have female executives. Firms that have experienced a scandal or are smaller or have experienced losses in sales are more likely to have female executives. Female executives are most likely to be present in smaller firms that have experienced a decline in sales and a scandal.

Conclusion

This study examines the role of firm characteristics in predicting the presence of female executives in *Fortune* 500 firms. While a rich literature examines the organizational sources of gender inequality broadly and among middle managers, there has not been a great deal of research on the organizational predictors of the presence of female executives. Our contribution is to apply insights from the literature on the organizational sources of gender inequality to the specific question of female executives in *Fortune* 500 firms. Obviously, the number of executive offices is dramatically lower than the number of middle management jobs. Also, of course, one should be cautious about extending all of our conclusions back to the more general literatures on gender in management or gender composition generally. Still, our study shows the benefits of greater dialogue between the literatures on women executives and on gender inequality at work.

We provide some of the first empirical results on the firm characteristics predicting the presence of female executives. Our analyses show that women are less likely to be CEOs and COOs relative to executive vice presidents, and more likely to be CCOs or general counsels. Female executives are somewhat less likely to be present in the construction sector, and there is some evidence that they are more likely to be present in the retail trade sector. These findings are consistent with previous research showing women are more likely to be managers in the service sector and less likely in male-dominated industries. We show that it is specifically retail trade where women executives are relatively more common and that women executives are quite unlikely in the male-dominated construction sector. It is somewhat surprising that there were not more significant sectoral differences. This could be due to the fact that our data only allow us to examine large sectoral categories. As well, because most sectors have few women executives, there are not large differences between, for example, wholesale trade and manufacturing. Like the sector effects, compressed variation may account for the somewhat surprising finding that greater assets reduce the presence of female executives. As we explain below, it is plausible that this is due to the fact that all of the firms in our sample are very large.

We find that firms with greater sales growth are less likely to have female executives. This is consistent with the theoretical discussion above, which suggests that "positive" instabilities or improvements like increases in profits, sales, and revenue have very different effects than negative instabilities like declines in profits, sales, and revenue. Most likely, sales growth allow firms to maintain the status quo and continue longstanding hiring and promotion practices that have historically tended to advantage men. By contrast, declining sales function as negative instabilities or turbulence that trigger a need for change among executive offices. Finally, we show that firms that have experienced a scandal in recent years are more likely to have female executives. Though the number and type of scandal do not seem to matter, the crisis-level instability that scandals represent results in an opening that enables the appointment and promotion of female executives. We discussed above that this instability could be the result of glass cliff processes or the declining desirability of executive offices in firms that have experienced crises. While our data do not allow us to differentiate among these causal explanations, the results affirm our synthesis of these explanations under the umbrella notion of turbulence. Because it is not particular types of scandals that matter, this effect is not simply due to particular financial, public relations, or legal challenges. Rather, it appears that there is a generalized effect of crisis and turbulence on the appointment

and promotion of women. As a result, turbulence deserves even greater attention by gender and management scholars as an important organizational context that influences diversity and equality in the workplace.

We have no intention of discounting the role of individual characteristics. We reiterate that the Compustat database suffers from systematic and widespread missing data on such variables. Rather, our aim is to demonstrate that key firm characteristics play an important role as well. When data become available on both individual- and firm-level predictors, our study provides a baseline of which firm-level characteristics should be incorporated. Future research can also build on our study by identifying how firm characteristics interact with individual-level predictors of women's attainment of executive offices. It would be interesting to explore how different individual characteristics respond to organizational processes of stability and scandal, for example. Perhaps, particular personality characteristics manifest during particularly unstable moments and certain kinds of female executives will thrive in those turbulent environments. Most likely, the emergence of female executives is due to a confluence of individual characteristics and organizational processes (Blair-Loy, 1999; Ely and Padavic, 2007; Roth, 2006). Beyond integrating individual and firm characteristics, it would be productive for future research to analyze finer grained distinctions in sector than our data allow us to do. Finally, it would be valuable to examine longitudinal data on female executives to assess their prospects after appointment. Following Ryan and Haslam's (2005, 2008) "glass cliff" theory, the turbulence that enhances the likelihood of appointing a female executive may also increase her likelihood of failure once appointed. Given our findings on scandal and instability are relatively novel, we hope to encourage others to investigate precisely the causal processes of how and why these firm characteristics are associated with a greater presence of female executives.

We acknowledge that there are reasons to be cautious in implementing our findings into practice. As we note (see [17]), it is unclear as to whether one can apply our findings to the stricter sample of CEOs. Also, several of the key characteristics that we identify are not clearly malleable. Firms are not likely to choose to experience a scandal, become smaller, or reduce sales; nor are firms able to switch industries.

Despite these caveats, our study can propose four general ways firms can increase the presence of female executives. First, our analyses demonstrate that firms can search effectively for more female executives from legal divisions. As women are better represented among general counsels, perhaps this could be a productive pipeline for CEOs[20]. Because candidates for CEO positions are often expected to have profit and loss experience, firms should consider job rotations for female general counsels so that they obtain experience managing profit and loss units. Second, the patterns across sectors show that construction firms will need to search outside their industry to find potential female executives, and firms may find a pool of female executives in the retail trade sector (Broadbridge, 2008). Because a large share of executive offices are filled by external candidates (Khurana, 2002), and glass ceilings tend to be less prohibitive for external hires (Gorman and Kmec, 2009), firms and their search agents could benefit from identifying candidates with legal backgrounds, from the retail trade sector, and from smaller *Fortune* 500 firms[21]. Of course, such women will likely have faced a series of cumulative disadvantages relative to their male counterparts (Cox and Harquail, 1991)[22]. Thus, firms will have to change the trajectories of such women and enable them to make up for lost ground with promotions from these backgrounds

to the highest offices. In addition, firms need to ensure that promotions occurring in legal divisions, the retail trade sector and at smaller *Fortune* 500 firms involve real increases in responsibilities and opportunities such that female candidates emerging from these settings will be competitively prepared for the highest offices.

Third, instability provides an opening for firms to break from the status quo and install female executives with less resistance. Perhaps, because instability creates space for change, firms can "profit" from declining sales and scandals to overcome organizational inertia and search outside established routines for change agents. Perhaps, this instability provides legitimacy to appointments of new executives that do not fit the socially constructed expectation for how an executive should look (Khurana, 2002).

Fourth, we suggest some caution about the effectiveness of size-related bureaucratic factors in elevating women – within the specific world of the *Fortune* 500. By sampling only *Fortune* 500 firms, of course, our analysis sharply limits the range of firm size. However, our intention is not to validate the effects of firm size for gender inequality in firms generally. Rather, we assess if firm size matters within this select (and salient) sub-sample of all firms. A persuasive literature convincingly demonstrates that large firms have formal hiring practices, internal labor markets, and bureaucratization, and these factors are associated with greater opportunities for female managers (Dobbin and Sutton, 1998; Reskin *et al.*, 1999). The firms in our sample are much larger, and probably more bureaucratic, than typical firms. Yet, once a firm crosses the high threshold of being in the *Fortune* 500, the effects of size are less clear – at least for female executives.

Women continue to be underrepresented at the top of large corporations, but a nontrivial presence of female executives has begun to emerge. Although there are certainly biographical factors that assist the attainment of these female executives, firm characteristics matter as well. Our study shows that women are more likely to be executives as general counsels, in retail trade, in smaller *Fortune* 500 firms, and after declining sales or a scandal. The organizational context shapes the chances that an executive office will be held by a woman.

Notes

1. Because the number of female executives has traditionally been very low, previous researchers have often combined categories of women in management; for example, female board members with female executives or female middle managers with female senior managers. Although we focus on executives, we build from literatures concerning female managers, female board members, and female executives.

2. There appears to be a relationship between the presence of female executives and a key factor that is associated with firm size: the size of the pool who could be promoted to top managements ranks (i.e. the "pipeline"). More women in the pipeline is positively associated with the presence of female executives (Bilimoria, 2006; Guthrie and Roth, 1999; Helfat *et al.*, 2006). Unfortunately, as noted below, the database we analyze does not have information on the pipeline or the sex composition of management or even the firm.

3. Previous studies have also used Compustat, as well as similar corporate proxy statements, to study female executives (Daily *et al.*, 1999; Lee and James, 2007). Guthrie and Roth (1999) analyze a random sample of 712 medium/large organizations whose head of human resources was interviewed. Although their sample (with organizations as the unit of analysis) has unique advantages, our sample (with executives as the unit of analysis) updates their analyses by almost ten years.

4. The executive compensation database includes current S&P 1,500 companies, former S&P 1,500 companies that are still trading, and companies requested by clients. For information on the database see: www2.standardandpoors.com/spf/pdf/products/MK-CF1107.pdf

5. The miscellaneous category includes 11 cases (0.3 percent of sample), including two women. Four are "emeritus/former" executives, five are in rare categories (e.g. risk and technology), and two are offices combining above categories.

6. To be clear, the number of executives drops before 2005 because we only use 2001-2004 data if the executive was not present in the 2005 database. As explained above, we collect all unique executives in the database over a five-year period to maximize the number of female executives (analyzing just the latest year of data for each executive). Thus, our sample includes the most recent observation for all executives in 2005 *Fortune* 500 firms from 2001 to 2005.

7. The reason for the extensive missing data on socio-demographics is that the database is focused on detailed salary and compensation measures, which is what the SEC requires. On these salary and compensation measures, there is little missing data. Importantly, missing data are not a problem for the sex and title of the executive.

8. We chose FIRE as the reference because the percent female executives within FIRE (6.4 percent) was comparable to the entire sample (6.36 percent). Also, FIRE was the third largest sector in our sample (following only Manufacturing and Transportation *et al.*, which had comparatively fewer female executives). In analyses available upon request, we experimented with other references and the results were robust.

9. Firm data is applied to each unique executive. So, for an executive observed in 2004, we use firm data in 2004.

10. Both assets and logged assets have been used in prior studies because they are relatively insensitive to cyclical corporate downsizing (Arthaud-Day *et al.*, 2006; Blair-Loy, 1999; Lee and James, 2007).

11. We experimented with the one-, three-, and five-year rates of change as operationalizations for net income change and the growth rate of sales (analyses available upon request). We present the version that exhibited the most robust results.

12. For more information on LexisNexis Academic, see http://academic.lexisnexis.com/about.aspx

13. The use of a two-year lag between scandal event and firm outcome has been suggested by Arthaud-Day *et al.* (2006) in their study of financial restatements.

14. Specifically, we used the search terms: scandal, crisis, investigation, suit, settlement, fraud, corruption, penalty, and litigation.

15. We coded an event as a scandal if a firm was one of several parties involved, but responsibility was unclear. Typically, allegations appeared as civil charges brought by a regulatory agency or criminal charges brought by a criminal justice authority. SEC inquiries and requests for restatement also were a substantial portion of the scandals. We did not code allegations brought by competitors or shareholders. Further, routine complaints such as delays in earnings reports, merger/acquisition concerns, and nuisance charges were not coded. Subsidiary activity was coded as a scandal for the parent firm. Additionally, if a firm was involved in one of the eligible acts under a previous name or ownership, but the firm in the database is being held responsible for those acts, such an act is coded as a scandal. Scandals committed in countries other than the USA were coded. Scandals mentioned only incidentally in articles without information on the time frame were not coded.

16. "Financial Other" contained a wide variety of improprieties, but was mainly bribery, price inflation or overfilling, and fraud where the exact nature of the activity could not be

determined – thus these were not book-keeping financial scandals. Miscellaneous includes all other scandals that did not fall into one of the other categories.

17. In analyses available upon request, we experimented with rare event logit models of the 25 female CEOs among the 813 CEOs in the sample. However, none of the variables that are significant in the final models remain significant. This is largely due to a substantial loss of statistical power, and one should be cautious in applying our findings from a sample of all executives towards a strict explanation of CEOs.

18. This coefficient is actually 0.9999. In Table III, we round this coefficient to 1.000 even though it is significantly negative.

19. The exceptions are that the retail trade variable is not robust throughout – becoming insignificant in Table II (Model 2), Table III (Models 1-3) and in Table IV. Thus, the evidence suggests that the stability variables may explain the distinctiveness of the retail trade sector.

20. Again, data are unfortunately not available on the sex composition of the firm or sex composition within management. So, we are unable to test the effects of women in the pipeline directly.

21. In sensitivity analyses available upon request, we experimented with the years of experience an executive had with the firm to assess the patterns for internal promotions and external hires. Like other individual-level variables, this variable was largely missing. When not missing, we re-estimated all models with this experience variable. This variable tends to be significantly negative. However, there is a substantial loss of statistical power and several of the significant effects from the full sample become insignificant.

22. Cox and Harquail (1991) compared the career trajectories of similarly situated male and female MBA students, and found that although female MBAs had similar total promotions and career satisfaction as male MBAs, the women experienced lower salaries, fewer management promotions, and lower hierarchical levels than their male peers. Lower starting salaries, less job mobility, less line experience and seniority were contributory factors to this lack of parity with their male counterparts.

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(The Appendix follows overleaf.)

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Appendix

	Mean	SD	n
Dependent variable			
Sex (Female = 1)	0.064	0.244	3,961
Executive title variables			
CEO	0.205	0.404	3,961
President	0.021	0.143	3,961
Chief administrative officer	0.009	0.096	3,961
CFO	0.133	0.340	3,961
CCO	0.001	0.022	3,961
Chief information officer	0.007	0.081	3,961
General counsel	0.060	0.237	3,961
COO	0.072	0.258	3,961
Executive vice president	0.293	0.455	3,961
Vice chair/executive VC	0.038	0.192	3,961
Vice president	0.034	0.182	3,961
Division/region/group VP	0.080	0.271	3,961
Advisor/consultant	0.002	0.042	3,961
Miscellaneous executive	0.003	0.053	3,961
Sector variables			
Mining sector	0.023	0.149	3,961
Construction sector	0.026	0.160	3,961
Manufacturing sector	0.382	0.486	3,961
Transp., comm., electric, gas, and sanitary services sector	0.178	0.383	3,961
Wholesale trade sector	0.048	0.214	3,961
Retail trade sector	0.133	0.339	3,961
FIRE sector	0.138	0.345	3,961
Services sector	0.066	0.248	3,961
Firm size variables			
Assets (in millions of dollars)	47,641.16	139,516.1	3,961
Logged assets	9.579	1.326	3,961
Net income (in millions of dollars)	858.809	4,779.176	3,961
Number of employees (in thousands)	57.794	105.461	3,934
Firm stability variables			
Net income change (year to year percentage change)	−7.122	325.288	3,409
Three-year growth rate of sales	9.499	15.690	3,961
Black-Scholes volatility	0.397	0.283	3,930
Firm scandal variables			
Number of total scandals	1.502	2.111	3,961
Number of miscellaneous scandals	0.112	0.387	3,961
Number of financial other scandals	0.406	0.970	3,961
Number of anti-trust scandals	0.144	0.425	3,961
Number of book-keeping scandals	0.183	0.526	3,961
Number of marketing scandals	0.071	0.340	3,961
Number of product scandals	0.244	0.734	3,961
Number of personal scandals	0.007	0.085	3,961
Number of discrimination scandals	0.100	0.454	3,961
Number of environmental scandals	0.113	0.512	3,961
Number of labor scandals	0.121	0.420	3,961
Logged number of scandals	0.407	0.639	3,961
Presence or absence of scandals (any scandal = 1)	0.554	0.497	3,961
Year control variables			3,961
Year 2001	0.095	0.294	3,961
Year 2002	0.094	0.292	3,961
Year 2003	0.114	0.318	3,961
Year 2004	0.129	0.335	3,961
Year 2005	0.568	0.495	3,961

Table AI.
Descriptive statistics