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WORKFORCE REDUCTIONS AT WOMEN-OWNED BUSINESSES IN THE UNITED STATES

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Abstract

This paper finds that women-owned private firms were less likely than firms owned by men to downsize their workforces during the Great Recession. Year-to-year employment reductions were as much as 29 percent smaller at women-owned firms, even after controlling for industry, size, and profitability. Using data that allow us to control for additional detailed firm and owner characteristics, we also find that women-owned firms operated with greater labor intensity after the previous recession and were less likely to hire temporary or leased workers. These patterns extend previous findings associating female business leadership with increased labor hoarding.

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> "Women's empathy enables them to look at business issues through a wide angle lens."
>
> –Susan T. Spencer, Entrepreneur (meat processing) and former NFL General Manager
> (*Reuters*, March 8, 2011)

> "It's just a terrible thought having to lay off people, because we like our employees and we need them. And they are well-trained, and they're loyal. And they have been working for us for decades, some of them, or many of them have. And it's just a terrible thought to have to send them away."
>
> –Nicola Leibinger-Kammüller, CEO, TRUMPF Group
> (*PBS Newshour*, February 8, 2012)

There is growing evidence from economics and finance suggesting that individuals bring their own personal styles to managing their firms, yet if and how women manage firms differently than men remains unclear. Although a large management literature documents gender differences in the self-reported attitudes and leadership styles of business executives (including qualitative studies such as Rosener 1990 and meta-analyses such as Eagly and Johnson 1990), the few empirical studies in economics that look at gender in management tend to focus on firms' bottom line—profits or value—without much analysis of *what* within firms women may be doing differently or of *how* female leadership might affect the wellbeing of firms' workers, customers, or other stakeholders (e.g., Carter, Simkins, and Simpson 2003; Erhardt, Werbel, and Shrader 2003; Farrell and Hersch 2005).

The question of how female business leadership affects business outcomes is of increasing interest as women's representation has grown in recent years (Matsa and Miller 2011). This trend will likely continue as more women obtain business training and as countries adopt policies aimed at expanding women's representation among business leaders. Norway adopted mandatory gender quotas for corporate board members in 2006 and was followed by Spain, the Netherlands, France, Iceland, and others. European Union (EU) Justice Commissioner Viviane

Reding has recently called for an EU-wide quota.[1]

This paper examines whether men and women differ in an economically and socially important business decision—whether to reduce their workforce when demand decreases. A business's retention of redundant workers during a downturn—"labor hoarding"—will lead to lower short-term profits because of the increased payroll costs, but it can also preserve employee morale and reduce hiring and training costs after demand recovers (Parsons 1972; Katz 1986). It may also stimulate the economy if rank-and-file workers have a higher marginal propensity to consume than do owners of capital. The question of which firm characteristics contribute to downsizing decisions is increasingly salient for economists and policymakers seeking to understand differential patterns in how recessions affect unemployment rates across countries and economic sectors. Recent research has uncovered sizable international differences in layoff rates during the Great Recession (Burda and Hunt 2011) and cross-firm differences in layoff rates related to family ownership (Sraer and Thesmar 2007).

Building on that literature, this study considers an additional factor that may also affect the relationships between firms and employees—the sex of firms' owners. Our analysis draws on previous evidence of gender differences in business leaders' employment decisions. For example, Rubinstein (2006) found that, in a survey of business newspaper readers, women were less likely than men to lay off workers when presented with a hypothetical decrease in demand. Matsa and Miller (2013) study the impact of Norway's 2006 gender quota for corporate boards by comparing changes in firm outcomes among the affected public Norwegian firms to other Nordic companies, public and private, that were unaffected by the rule. Although most corporate

[1] Arthur, Charles. 2012. EU plans tough quotas to put women in the boardroom. *The Guardian*, March 4.

decisions were unaffected, sizeable differences emerged in affected firms' employment policies. After the gender quota was adopted, affected firms were less likely to reduce their workforces, which led to greater relative labor costs.

This reduction in downsizing following the Norwegian quota may be related to gender differences in the preferences or values of business leaders, such as the differences in leaders' valuing of self-transcendence documented by Adams and Funk (2012). Social psychology studies also find that, more than male leaders, female leaders tend to take into account the interests of others (Eagly and Carli 2007). This paper extends this inquiry to private firms in the United States.

Our results provide the first evidence relating the gender of business owners to their firms' employment strategies. Although the mechanism underlying this gender difference is unknown, our analysis casts doubt on some possibilities by including controls for detailed firm and owner characteristics, including firms' financials and owners' age, experience, education, wealth, and credit worthiness. These findings support the view that business leaders' backgrounds and values affect their organizations' strategic choices (Hambrick and Mason 1984).

The paper also makes a threefold contribution to the analysis of gender differences among business leaders. First, our results complement recent studies of gender and other business outcomes, including corporate innovation (Dezsö and Ross 2012), boards of directors' monitoring of executives (Adams and Ferreira 2009; Schwartz-Ziv 2011), and mergers and acquisitions (Levi, Li, and Zhang 2012). Second, by focusing on owners of private firms rather than executives or board members of large public firms, we have what may be a cleaner setting in which to study the impact of gender differences in leaders' preferences on firm outcomes, as

distinct from the potential agency problems that arise between shareholders and managers in large corporations. Third, the management literature on gender differences in leadership style focuses on communication, delegation of authority, and other aspects of day-to-day interpersonal relations with subordinates (e.g., Rosener 1990; Claes 1999; Eagly et al. 2003; Bass and Avolio 2006). In contrast, we emphasize the issue of whether gender differences in business leaders, possibly related to their values and attitudes, are associated with workers' *economic* outcomes.

Theoretical Background

As illustrated by Bertrand and Schoar (2003), business leaders appear to have their own personal "styles" when making investment, financing, and other strategic decisions. Using a manager-firm matched panel dataset, that study estimates substantial individual manager fixed effects on firm outcomes, even after controlling for firm fixed effects and a wide range of time-varying firm-specific characteristics. The manager-specific effects that they estimate are related to managers' observable characteristics, such as age and education, and are likely related to their unobservable characteristics as well.

The importance of individual leaders—separate from firm, industry, or market factors—for corporate outcomes invites the question of how increasing female representation in business might affect firms' labor and other business strategies. Bertrand and Schoar are careful to point out that their framework cannot estimate definitively causal effects of specific managers or personality characteristics on their firms. Similarly, while our approach enables us to measure gender differences in outcomes, we cannot pinpoint the underlying sources of those differences, which must ultimately be rooted in differences in male and female business leaders' values, skills, abilities, or opportunities. The control variables in our analysis, however, cast doubt on

explanations related to differences in firms' financial strength or owners' age, experience, education, wealth, or credit worthiness. For insight into other sources of gender differences that might explain our results, we turn to the literature on gender differences in the population and in business leadership.

Gender Differences in Business Leadership

A large literature on gender points to fundamental differences between men and women (see Croson and Gneezy 2009). For example, studies suggest that women tend to engage in more communal and relational pro-social behaviors (Eagly 2009), to be more altruistic (Andreoni and Vesterlund 2001), to be more risk averse (Byrnes, Miller, and Schaffer 1999; Eckel and Grossman 2008; Sapienza, Zingales, and Maestripieri 2009), and to shy away from competition (Niederle and Vesterlund 2007). In experiments, women are less inclined than men to lie in order to secure monetary payoffs (Dreber and Johannesson 2008) and more likely to take actions that confer large but delayed rewards (Silverman 2003). In surveys, gender differences in core values are robust across cultures (Schwartz and Rubel 2005).

Most economic studies of gender differences focus on students, workers, or the general population, so it is unclear whether the conclusions extend to the selected group of business leaders. There are many reasons to be skeptical. For starters, certain types of people are more likely to pursue a career in business. As one sign of this, women who choose to enroll in business school have unusually high levels of testosterone (Sapienza, Zingales and Maestripieri 2009), which may affect how managers lead their organizations (Levi, Li and Zhang 2010). Similarly, the population-wide gender differences in tastes for risk and competition may be diminished among people who have chosen to start or acquire a business. Because starting a business often

requires the ability to raise capital from investors and lenders, gender differences in wealth and credit may also be smaller among business owners.

Although the various forces that affect the selection of individuals into entrepreneurship and business leadership could diminish gender differences, there are reasons to expect some population gender differences to persist or even be amplified among business leaders. Because women in leadership positions may experience internal psychic costs or punishment from others for violating expectations about appropriate feminine behavior (Blau and Ferber 1986; Akerlof and Kranton 2000), they may not conform fully to traditional stereotypes associating corporate leadership with masculinity (Koenig et al. 2011) and with masculine traits (Offermann and Beil 1992). Rather than adopting characteristically male behavior, there is evidence in the management literature of successful female leaders adopting a distinctive, "transformational" style (Rosener 1990; Bass and Avolio 2006; Dezsö and Ross 2012). Transformational leaders motivate followers to high levels of performance through idealized influence (or charisma), inspirational motivation, intellectual stimulation, or individual consideration (Bass and Riggio 2006). Based on meta-analysis of 44 studies of leadership style, Eagly, Johannesen-Schmidt, and van Engen (2003) find that women score 0.10 standard deviations higher than men on measures of transformational leadership. Within transformational leadership, they find the largest sex difference in individualized consideration, which pertains to building good relationships with others. For example, while men are more likely to assert themselves in a controlling manner, women tend to take into account the interests of others (Eagly and Carli 2007). To the extent that women build positive relationships with colleagues and workers, they may also be more concerned with their welfare.

In addition to these differences in interpersonal interactions, there is also evidence of gender differences in corporate leaders' values. Adams and Funk (2012) surveyed the universe of resident directors and chief executives of publicly traded companies in Sweden in 2005. They find that, even relative to male directors at the same firm, female directors assign more value to self-transcendence (universalism and benevolence) and less value to self-enhancement (achievement and power). These differences are sizeable in magnitude (about one-third of a standard deviation) and statistically significant and could imply that gender differences in business leadership affect firms' outcomes. Female directors, motivated by self-transcendence, may lead their firms to actions that are more stakeholder-oriented, such as maintaining their payrolls in periods of low demand. After all, Adams, Licht, and Sagiv (2010) show that directors who value benevolence and universalism are more likely to side with stakeholders when presented with vignettes based on actual legal cases in which there was a tension between the interests of shareholders and those of other stakeholders.

Taken together, these studies suggest several ways in which gender differences in leaders' attitudes, preferences, or skills could lead to the gender differences in employment policies that we observe. Although we lack sufficient information to test each of these possible mechanisms, one or more of them might explain our results.

Ownership and Control

Our empirical setting, which is focused on owners of private firms, is a natural environment in which to study the link between the gender of business leaders and workforce reduction decisions. Whereas it may be difficult to pinpoint the impact of any one individual at a

large public firm, a privately held firm's owners' preferences and priorities determine the firm's overall goals and strategic priorities.

Even when ownership is concentrated among a few individuals, the owners of a firm may decide to hire external managers to handle the day-to-day operations of the firm, and these managers can be afforded varying degrees of autonomy. If business decisions are not made by the owners, then we might not expect to find differences in employment policy between firms that are owned by men versus women.

We explore the issue of control in Figure 1 using data from the U.S. Census Bureau's 2007 Survey of Business Owners. Administered as part of the quinquennial economic census, survey data were collected from more than 2.3 million firms about up to four individuals with the largest ownership shares. The survey finds that the vast majority of owners are involved in managing their businesses. Fewer than 20% of female owners and fewer than 10% of male owners report being uninvolved in their companies' operations, management, and financial controls. Indeed, about 50 to 60% of male and female business owners manage their firms' day-to-day operations. These high levels of owner involvement suggest that owner preferences are likely to affect business decisions.

The lower involvement rate for female business owners at first seems to suggest that estimated differences related to female-ownership may be understated because these owners' are potentially less involved in employment decisions. Managers hired by owners may not make the same decisions owners would. Such agency problems that arise when ownership and operational control are separated can limit the degree to which variation in owner preferences affects employment outcomes.[2] However, as owner-level averages, these figures overstate the firm-level

[2] Furthermore, outside managers, facing less of a profit motive than owners, may plausibly avoid

differences between male-owned and female-owned firms. This is because women are more likely to own silent minority stakes. We see this in Figure 2, which is based on the Federal Reserve Board's 2003 Survey of Small Business Finances (SSBF). The survey is described in greater detail below. Each set of bars represents one of the 3 main owners of the firms, ranked in decreasing order of their ownership shares. In cases of equal ownership shares, we rank the more involved owner first. The owner with the largest stake averages 76% ownership of the firm. For nearly 90% of firms, this individual manages day-to-day operations, irrespective of the owner's gender. Among owners with smaller stakes, however, women owners appear to be less involved. We suspect that in some of these cases women are silent minority owners in family businesses run by relatives—a husband, brother, or father. In such situations, majority owners likely take the lead on most personnel issues, but the downsizing decisions we study may be important enough that all owners are consulted.

Downsizing at Men- and Women-Owned Businesses

Data

We analyze data on employment and limited financial information for a panel of privately held U.S. firms from Bureau Van Dyjk's Orbis database to measure workforce reductions between 2006 and 2009. Bureau Van Dyjk is a data aggregator, and much of the underlying information is from Dun and Bradstreet (D&B). D&B compiles data from various

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executing layoffs. In public firms, managers have been found to favor some workers when the potential for agency problems is more severe (Bertrand and Mullainathan 2003). If female owners are more likely than men to delegate employment decisions to outside managers, their firms may be less likely to downsize when demand decreases.

sources, including credit bureaus, about more than 200 million companies worldwide. D&B licenses the data to others, primarily for use in credit decisions, business-to-business marketing, and supply chain management. Although D&B collects some information at the establishment level, the data we obtained from Orbis are aggregated at the firm level.

Panel data on private firms are rare. D&B's data have been used by researchers to study employment outcomes, including changes over time in the number of employees (e.g., Neumark, Zhang, and Wall 2007; Neumark, Wall, and Zhang 2011), but they are not without limitations. The data record firms as female-owned based on the firms' self-identification to D&B as being majority (>50%) female in ownership and control. This definition has the advantage of being consistent with federal government definitions of a women-owned business,[3] but it lacks sufficient detail to identify female ownership separately from female control.[4] Another limitation is that the information on female ownership is for 2011 (based on current information at the time we acquired the data) and does not vary over time.

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[3] For example, the federal definition of a "women-owned small business concern" is defined in the Federal Acquisition Regulations (FAR, Part 19.001) as follows: "Women-owned small business concern means a small business concern—(a) which is at least 51% owned by one or more women; or, in the case of any publicly owned business, at least 51% of the stock of which is owned by one or more women; and (b) whose management and daily business operations are controlled by one or more women."

[4] We are able to explore this distinction in our analysis of data from the Survey of Small Business Finances (SSBF) presented in the next section, where we find similar estimates for alterative definitions of female ownership based on ownership only versus on ownership and control.

Other limitations relate to the employment data. Employment numbers are sometimes missing for firms with workers,[5] and when available, employment counts may be affected by rounding (by firms) or imputation (by D&B), both of which could lead our estimates to underreport the frequency with which firms change their levels of employment over short horizons. The rounding of employment counts makes round numbers more common than would be expected if size were drawn from a smooth distribution, but rounding does not appear to explain our results. Employment at round numbers (whether defined as multiples of 5, 10, or 100) is not consistently related to female ownership in our sample, and the estimates are robust to excluding observations that have round employment counts.[6] We do not observe which, if

[5] For our analysis sample, we impute missing employment data for observations in which the year of missing employment information is preceded and followed by years with identical employment levels. Although these imputed observations are more common at women-owned firms, the gender difference reverses and is insignificant conditional on the main control variables. If we exclude those observations from the analysis, the estimated coefficient on female ownership is larger in magnitude in most specifications. For example, the estimate corresponding to the model in Column 6 of Table 2 increases in magnitude from -0.066 to -0.072 and the estimate corresponding to the model in Column 7 of Table 2 increases in magnitude from -0.016 to -0.020 (all of these coefficients are significantly significant at the 1% level).

[6] For example, the estimate for female ownership from the model in Column 6 of Table 2 is -0.039 when multiples of 5 are excluded, -0.034 when multiples of 10 are excluded, and -0.055 when multiples of 100 are excluded (all statistically significant at the 1% level). The estimate from the model in Column 7 of Table 2 is -0.014, -0.005, and -0.014 (all statistically significant at the 1% level) when multiples of 5, 10, and 100 are excluded, respectively.

any, of our data were imputed by D&B. D&B is more likely to impute employment data for newer firms and particularly for firms that have never before reported employment data (Neumark, Zhang, and Wall 2007). Because women-owned firms tend to be younger in our sample, they might have more imputed employment values. To test the sensitivity of our estimates to possible imputation, we repeated our analysis after limiting the sample to firms in business for at least 5 or 10 years at the start of the sample period and obtained similar results.[7] Finally, because concerns related to either rounding or imputation are most relevant for studying high-frequency changes in employment, we also confirmed that our conclusions hold when examining differences over the entire time period rather than annual changes.[8]

Table 1 reports summary statistics for our estimation sample, both overall and separately by female ownership and control. The data include 2,059 distinct firms that are identified as

[7] The female ownership estimates from models corresponding to Columns 6 and 7 of Table 2 are -0.061 and -0.012 when the sample is restricted to firms in business for at least 5 years in 2006, and are -0.057 and -0.012 when the sample is restricted to those in business at least 10 years in 2006. Each of these estimates is statistically significant at the 1% level.

[8] Women-owned firms had significantly lower rates (0.13 versus 0.21) and unconditional depths (0.036 versus 0.047) of long-term employment reductions between 2005 and 2009. When we estimate Tobit models of long-term employment reductions between 2005 and 2009, with controls for industry, state, employment in 2005, and negative profits, profit margin interacted with negative and nonnegative profit indicators, and missing profits in 2005, 2006, 2007, and 2008, we find significant negative coefficients for female ownership: -0.058 (standard error of 0.022) with one-digit industry controls and -0.046 (standard error of 0.022) with two-digit industry controls.

woman-owned and 47,757 other firms between 2005 and 2009 for a total of 4,277 observations at women-owned firms and 117,007 observations at other firms. D&B's classification scheme for female ownership provides a conservative measure if not all women-owned firms self-report as such. Indeed, rates of female business ownership tend to be higher in other sources. For example, although it is not strictly comparable to the female-ownership share among firms (because firms often have multiple owners with unequal shares), the Census Bureau's 2007 Survey of Business Owners indicates that women comprise 15.7% of owners of private businesses with paid employees who also operate their firms. To the extent that our independent variable is measured with error, our results will be biased *against* finding gender differences.

We identify workforce reductions using year-to-year changes in annual employment. Our primary outcome measure is the depth of any downsizing that occurred from one year to the next. This variable is set to zero for observations with no downsizing. Our main analysis measures this depth as a share of the size of the workforce in the prior year. In robustness analysis, we also examine the reduction in the number of workers and compare rates of net declines in total employment of different sizes, defined either as a proportion of the workforce or as the number of workers.

Downsizing was relatively common during the recent recession and comprises 13% of firm-year observations in our sample. The average reduction is 170 employees, or 17.2%. The rate of employment declines of at least 3% is 11%, of at least 5% is 9%, and of at least 10% is 6%. Employment in the previous year has a mean of 378 and a standard deviation of 2,937. Profit information is frequently missing in the data; when reported, profits are negative for 11% of the observations and the average profit margin is 19%. Firms owned by women tend to be smaller and less profitable, but they are also less likely to report negative profits. The sample is

drawn mainly from manufacturing, trade, and service industries (including finance, transportation, health, and education), with relatively few observations from the primary sector.

Estimates of Gender Differences

Sample means, reported in Table 1, reveal gender differences in rates of workforce reductions. Workforce reductions are more than twice as frequent at male-owned firms as at female-owned firms (13.5% versus 5.9%) and more workers are affected. Male-owned firms' unconditional average year-to-year workforce reductions are substantially larger, both in the share of the workforce that is reduced (2.3% versus 1.8%) and in the number of workers (23 workers versus 10 workers). The gender gap is more pronounced for small workforce reductions than for large reductions.

These differences in downsizing are consistent with male and female business owners differing in their employment policies, but they may be confounded by other differences. For example, Table 1 also shows gender differences in firm size and profits. To assess the importance of gender as a predictor of downsizing, we explore the gender differences in a multivariate regression framework. We estimate a Tobit model for workforce reductions, in which we estimate gender differences in both the frequency and depth of these reductions. Because the sample includes repeated observations from the same firms during the period 2006-2009, we adjust standard errors for clustering at the firm level in all models.

Tobit estimates of gender differences in workforce reductions are reported in Table 2. As in the raw data, these estimates find that female-owned firms are significantly less likely to downsize their workforces. When controlling only for year fixed effects, the point estimate is -0.141 (standard error of 0.013; Column 1). As discussed above, it is possible that the estimated

differences in workforce reductions simply reflect the firms operating in different industries or locations. We explore these explanations and report the results in the remaining columns of Table 2. Controlling for one-digit NAICS industry and state fixed effects reduces the size of the estimate to -0.096 (standard error of 0.014; Column 2). Even within an industry or state, it is possible that women own smaller firms, or firms that are more or less profitable, and that these factors may affect firms' propensities to downsize. In fact, Table 1 shows gender differences in both firm size (female-owned firms are smaller) and profitability (female-owned firms are more likely to have missing profits, and when available, their profits are lower). Controlling for the previous year's total employment has little effect on the estimate (Column 3). Adding a control for the prior year's profit margin interacted with indicators for negative and nonnegative profits, as well as indicators for negative profits and for missing profit information, reduces the estimate of the workforce reduction differential to -0.066 (Column 4).[9]

Given the gender differences in firm size and profitability in the sample, and the fact that female-owned firms are relatively rare in the data, one may be concerned that the some of the male-owned firms provide poor comparisons for the female-owned firms and that relying on a linear model to account for controls is too restrictive. To address these concerns, we restrict the comparison sample of male-owned firms to those that are most similar to female-owned firms: for each female-owned firm, we include only the five closest male-owned firm matches based on industry, location, age, and employment in 2007—just before the official start of the recession. The estimate for female ownership in this limited sample is again negative and statistically significant (-0.044, standard error of 0.022; Column 5).

[9] The profit margin variable and the indicators for negative and non-negative profits are set to zero when profit information is missing.

The recession likely affected some industries, such as construction and finance, more than others. To account for the differential timing and impacts of the recession across industries, we interact the year and the industry fixed effects. The resulting point estimate is unchanged but estimated much more precisely (Column 6).

In a final specification, we control for industry at the more detailed two-digit NAICS level and again interact these indicators with the year effects. The estimate in this model is negative and statistically significant at the 1% level, but it is reduced by more than two-thirds (Column 7). This reduction indicates that women are more likely to lead firms in sub-industries where workforce reductions tend to be less common. This could reflect the greater preferences of female owners for avoiding layoffs or it could be driven by other gender differences in skills or preferences that affect industry choice for business owners. Although these additional industry controls can help further isolate the impact of female-ownership, the additional fixed effects can also exacerbate the attenuation bias from the measurement error in female ownership (Griliches and Hausman 1986). Including the additional parameters in the Tobit model can also adversely affect the asymptotic properties of estimates of marginal effects and their standard errors (Greene 2004). To balance these concerns, we report estimates using each level of industry controls in the analysis that follows.[10]

The estimated gender difference in workforce reductions is sizable. Female ownership has about one-fifth to one-half of the association with workforce reductions as does having non-negative profits and a similar association as does having less negative profits by 16 to 34

[10] The interacted industry-year fixed effects (reported in Columns 6 and 7) are too extensive for the smaller matched sample (reported in Column 5). Although estimates for these models do not converge, the optimized values were similar to those from the full sample.

percentage points (Appendix Table A1 reports the coefficient estimates).

We further explore the importance of the estimated gender differences in Table 3. The first column repeats the Tobit coefficients, which can be interpreted as the gender difference in the latent downsizing variable, conditional on the controls. Panel A reports estimates that control for industry at the one-digit NAICS level (as in Column 6 of Table 2) and Panel B reports estimates that control at the two-digit level (as in Column 7 of Table 2). The second column reports estimates that translate these coefficients into the marginal effects of female ownership on the propensity to downsize. We find reductions in downsizing rates of 0.8 and 3.2 percentage points, representing 6% and 24% reductions relative to the frequency for male-owned firms (13.5 percentage points). The third column reports estimates that translate the Tobit coefficients into marginal effects of female ownership on the size of employment reductions, conditional on there being some reduction. The estimates are 0.3% and 1.2% of the workforce, corresponding to 1.8% and 7.1% of the share of the workforce reduced at male-owned firms conditional on a reduction (17%).

We estimate the overall difference in an individual worker's likelihood of downsizing based on the firm's owner's gender by combining the estimated gender differences at the extensive (any downsizing) and intensive (depth of downsizing) margins. When controlling for industry at the one-digit level, shifting from male to female ownership reduces the predicted downsizing frequency to 10.3% (a decline of 3.2 percentage points from the male rate of 13.5%) and the predicted downsizing depth to 15.8% (a decline of 1.2 percentage points from the male rate of 17.0%) for an overall predicted unconditional downsizing rate of 1.6% (i.e., 0.103*0.158). This represents a decline of 0.7 percentage points (or 29%) relative to the average unconditional downsizing rate of 2.3% among male-owned firms. The estimates with two-digit

industry controls imply a total decline in downsizing of 0.2 percentage points (or 7.8%).

For comparison, we also estimate the gender difference in unconditional downsizing depth using OLS, which combines the extensive and intensive margins. These estimates, which are reported in Column 4 or Table 3, are negative, statistically significant, and comparable in size to the computed total effects from the Tobit models: -0.5 percentage points with one-digit industry controls and -0.3 percentage points with two-digit controls. The OLS estimates and the implied total effects from the Tobit estimates are also quite similar to the raw unconditional differences reported in Table 1: downsizing affected 2.29% of workers at male-owned firms and 1.84% at female-owned firms, for a difference of 0.45 percentage points or 20%. These estimates all amount to sizable differences in downsizing rates between workers at male-owned and female-owned firms.

Robustness

To assess the robustness of our results, we restrict attention to larger companies—firms with at least 100 workers in the previous year. Downsizing is likely to be better measured at these larger firms because their employment counts are likely to be less affected by the timing of random fluctuations in hiring and dismissals.

Lower rates of downsizing at female-owned firms are also present among larger firms. The first three columns of Table 4 present estimates from the same models as reported in Table 3 but for the restricted sample. Panel A reports estimates with one-digit industry controls; Panel B with two-digit. The estimated gender difference is sizable among larger firms: the Tobit coefficient, reported in Column 1, is -0.109 (as compared to -0.066 for firms overall) with one-digit industry controls and -0.048 (as compared to -0.016) with two-digit controls. The marginal

effects on the incidence and depth of employment reductions are also larger on this sample (Columns 2 and 3).

Next, we evaluate downsizing depth measured in terms of the number of workers instead of proportional changes. The results are also reported in Table 4. The female-owned Tobit coefficient is -492 with one-digit industry controls and -210 with two-digit controls (Column 4). As we would expect, the implied effect on any downsizing is similar to estimates obtained using the proportional measure (Column 5). Conditional on downsizing, female-owned firms cut 79 fewer workers with one-digit industry controls and 33 fewer workers with two-digit controls (Column 6).

The summary statistics, reported in Table 1, show larger gender differences for small and moderate downsizings than for larger ones. We examine the gender difference in downsizings of different depths by estimating regression models of year-to-year net declines in employment of varying sizes. This approach relaxes the assumption in the Tobit and OLS models that the incremental gender difference is independent of layoff depth.

Table 5 reports marginal effects from Probit models of the likelihood of downsizing using cutoffs that are measured as a proportion of the prior year's employment—1%, 3%, 5%, and 10% cutoffs—or based on the number of workers reduced—5, 10, 25, or 50. The Probit models control for lagged employment, lagged profits, and state and industry-by-year fixed effects, similar to our main Tobit specifications. As in previous tables, Panel A reports estimates with one-digit industry controls; Panel B with two-digit. The estimate for female-owned is negative for all of the measures and tends to decrease in magnitude as the size of the employment reduction grows. With one-digit industry controls, the estimated gender gap decreases from 3.3 percentage points when modeling workforce reductions above 1% (Column

1) to 1.2 percentage points when modeling workforce reductions of more than 10% of employment (Column 4). However, the mean values of the dependent variable are also smaller for higher cutoffs, and the estimated gender gaps are more stable relative to those values (ranging from 32% of the sample mean for workforce reductions above 1% to 20% of the mean for reductions above 10%).

When we measure reductions in levels rather than in proportions, the estimate for female ownership is also lower for larger reductions, but not relative to the sample means. With one-digit industry controls, the estimated gender gap decreases from 2.7 percentage points (Column 5) for reductions of more than 5 workers to 1.5 percentage points for reductions of more than 50 workers (Column 8). As a proportion of the sample average rates of workforce reductions, these estimates reflect an increase from 29% (Column 5) to 33% (Column 8). With two-digit industry controls, the estimated gender gap is 1.4 percentage points (15% of the sample mean) for reductions of more than 5 workers (Column 5) and 1.2 percentage points (26% of the sample mean) for reductions of more than 50 workers (Column 8).

We also consider the role of survivorship bias in our data. When the downsizing measure is limited to surviving firms, it does not capture the employment risk to workers whose jobs are eliminated when their firm ceases operations. Conditional on reporting employment in one year, we find that women-owned firms are about 1% *less* likely to be missing employment information in all future years. Female-owned firms also have a greater survival rate after controlling for industry, firm size, and profitability. Unsurprisingly then, when we re-estimate the Tobit models reported in Table 2 while counting all missing employment observations as reductions to zero employment, women-owned firms continue to have significantly fewer (and less severe) workforce reductions. The model with one-digit industry controls yields a similar coefficient

estimate for female ownership (-0.066, standard error of 0.020), and the model with two-digit controls yields a larger estimate (-0.055, standard error of 0.020).

In a final test, we examine the timing of the reductions. The estimates reported thus far are based on workforce reductions in 2006 through 2009. Table 6 reports results from analysis based on shorter time periods: Columns 1–3 include 2007–2009, Columns 4–6 include 2008–2009, and Columns 7–9 are limited to 2009. Panel A again reports estimates with one-digit industry controls; Panel B with two-digit. The female-owned coefficient and marginal effects are consistently negative and statistically significant across these samples.

Public Companies

Given our findings for private companies, it is natural to ask if female leaders of large corporations use similar labor management strategies. The aftermath of the Norwegian gender quota suggests that they do in Norway (Matsa and Miller, 2013), but what about in the United States? Unfortunately, the relatively small number of female directors and executives at large public companies in the U.S. limits what analysis is possible (Matsa and Miller 2011). As an exploratory exercise, we compare female-directed public companies (those with majority-female boards of directors) to other companies. We analyze a firm-year panel from 1997 through 2010 using information on directors from the Investor Responsibility Research Center and RiskMetrics and data on corporate employment and financials from Compustat. Female-directed public companies are significantly less likely to lay off workers, even after controlling for industry (or firm) and year fixed effects, lagged employment, and lagged profits. Although this indicates that female leadership may lead to fewer workforce reductions in the corporate sector as well, one should be cautious about drawing inference because of the very small number of

female-directed public companies in the United States.

Limitations of the Analysis

Although our results for private companies are robust in many ways, there are a number of hypotheses that we cannot test. We observe only *net* reductions in employment at the firm level, so we cannot distinguish layoffs from voluntary attrition. Without observing gross flows, we also cannot observe reductions at one of a firm's establishments or divisions that are offset by employment growth in another part of the business. For these reasons, we focus on the decision to reduce the size of the overall workforce and cannot examine the explicit decision to lay off specific workers.

There are several potential biases in the estimates due to data limitations described above. Although we have panel data on employment outcomes, ownership is measured at end of the period. Ownership changes during the sample period could introduce measurement error in our gender variable, which would tend to attenuate the estimates. This is not likely to have a major impact, however, because it is rare for small businesses to change ownership. Among the Kauffman Firm Survey of 4,928 firms that began operations in 2004, for example, fewer than 5% were sold to another business by 2008 (Robb et al. 2010). Thus, the results in the paper should be understood as deriving from cross-firm differences in ownership, conditional on controls, rather than from within-firm differences related to changes in ownership.

The most important data limitation is the lack of information about firm characteristics or owner characteristics other than gender. In general, studies examining the relative performance of women-owned firms in survival (Robb 2002; Fairlie and Robb 2009), size (Loscocco et al. 1991), growth (Brush et al. 2001; Cliff 1998), and profitability (Kepler and Shane 2007) suggest

that women-owned firms are smaller and less growth-oriented than firms owned by men. Women are more heavily represented in industries such as retail and health care, and less in others such as construction and finance. Our above analysis of the data from D&B accounts for these differences by controlling for firms' industry, size, and profitability. But woman-owned firms also tend to have lower credit quality (Coleman and Robb 2009b), have less capital, and rely more heavily on owners' personal funds rather than external sources of debt and equity (Coleman and Robb 2009a)—all of which we cannot observe using the data from D&B. Because these factors may themselves influence firm employment outcomes, there is some concern that one of these omitted factors may explain the lower frequency of employment reductions at women-owned companies.

Even when the companies are comparable, owners differ in their age, education, work experience, and net worth. Perhaps such differences explain the gender differences in downsizing? For more complete data on firm and owner characteristics that enable us to evaluate these hypotheses, we turn to a different data set.

Controlling for Additional Firm and Owner Characteristics

Data

This section presents an analysis of gender differences in labor outcomes using data from the Survey of Small Business Finances (SSBF). Conducted by the Federal Reserve Board of Governors, the SSBF collected information on businesses with fewer than 500 employees in the United States. These data include much more detail on firms' and owners' finances and other characteristics than those from D&B, enabling us to employ a richer set of controls. In addition

to information on employment and profits, these data include detailed information on firms' age and credit worthiness and on owners' age, education, business experience, and net worth.

Although the Survey of Small Business Finances is rich in detail, it is cross-sectional and therefore lacks information on year-to-year employment changes. This means that it cannot be used directly to replicate the workforce reduction results from the previous section. Instead, we conduct an indirect test by examining labor intensity after an economic downturn. The idea is that if women-owned firms are indeed less likely to lay off workers during recessions, an implication is that women-owned firms would tend to have greater labor intensity afterwards. Unfortunately, the SSBF was not collected following the recent recession. We instead investigate the prediction using data from 2003, which lies in the aftermath of a different recession (the dotcom bust). The 2003 sample is the most recent wave of the SSBF and the only wave to include questions on temporary and leased labor contracting, which we exploit in our analysis. The Federal Reserve Board has since discontinued the SSBF.

We restrict the sample to employer firms with nonmissing observations for the variables listed in Table 7, except owner net worth, leading to a sample size of 4,030 observations. (Owner net worth is available for only 3,676 observations.) Summary statistics for the outcome variables and controls are presented in Table 7. At 31 employees, the average firm in this sample is smaller than in the analysis of workforce reductions reported above. The average profit margin is similar (18.6% versus 18.7%), although more firms in this sample have negative profits (19.1% versus 10.6%). Our outcome in this section is labor intensity, which is defined as the number of employees per $10,000 of total assets. In the next section, we also analyze firms' contractual relationships with workers using indicators for the usage of temporary or leased employees.

Our baseline specification controls for firms' two-digit SIC industry, census region, an indicator for negative profits, and profit margin (winsorized at 5% tails) interacted with indicators for negative and nonnegative profits. We also explore the effects of additional firm-level controls for the firms' age, sales growth over the past year and over the past three years, credit score, and credit events (including denials, delinquencies, judgments, and bankruptcies). These variables are especially important for ruling out explanations for gender differences in outcomes based on access to credit or firm financing (Coleman and Robb 2009a).

Finally, we can also control for owner characteristics: age, education, business experience, net worth, whether they use their personal credit card to pay business expenses, and their personal credit events (including delinquencies, judgments, and bankruptcies). About 44% of business owners report having used their personal credit cards to pay for business expenses, highlighting the interconnected nature of businesses' and their owners' finances in this sample and suggesting that there is a high degree of owner involvement in the day-to-day management of these businesses.

Estimates of Gender Differences

The sample means, reported in Table 7, display a substantial gender difference in firms' labor intensity in the aftermath of a recession, as female-owned firms employ, on average, more than twice as many employees per dollar of assets as male-owned firms. This difference in labor intensity may be related to gender differences in owners' values and preferences, but could also reflect gender differences in owners' education, experience, or net worth. The richness of the SSBF allows us to consider these and many other potential explanations. Table 7 reports gender differences along various dimensions. Only 41% of female owners have at least a college degree,

as compared to 53% of male owners. Female owners also average 20% less experience managing or owning a business and 0.5-log-points (or 60%) lower net worth. These women's firms tend to be younger, have moderately worse credit scores, and be more likely to have been denied credit. Perhaps as a consequence, female owners are 16% more likely to report using their personal credit cards to pay for business expenses.

We control for these and other potential confounders using an OLS multivariate regression framework. The results from regressing labor intensity on a female ownership indicator and controls are presented in Table 8. Across the specifications in Columns 1 to 4, we find that woman-owned firms operate with greater labor intensity than firms owned by men. The baseline specification, reported in Column 1, finds that firms owned by women average 2.4 more employees per $10,000 of assets. Including detailed additional controls for firms' credit worthiness, age, and other characteristics has little effect on the results (Column 2).

The results are somewhat smaller when we control for owner characteristics, reported in Column 3. The estimates for age, education, and experience are not statistically significant. The strongest relationship among owner characteristics is that higher net worth owners use lower labor intensity. Adding this control reduces the sample size by about 10% and lowers the estimated gender difference in labor intensity to 1.5, which remains statistically significant. The estimate's moderation suggests that some, but not all, of the gender difference in labor intensity could reflect gender differences in owners' access to capital. We find a similar gender difference, 1.6 workers per $10,000 of assets, when we control for both owner and firm characteristics (Column 4).

These results indicate that relative to the baseline specification, which is most similar to the analysis of workforce reductions reported above, about two-thirds (or 1.6/2.4) of the

estimated gender difference in labor intensity remains unexplained by firm financial characteristics or owner characteristics, other than gender. The remaining gender difference represents a large proportion (54%) of the sample mean of labor intensity, but less than a tenth of the variable's standard deviation. Relative to profits, female ownership has a larger association with workforce reductions as does having non-negative profits and has a similar association as does having less negative profits by 17 percentage points (Appendix Table A2 reports the coefficient estimates).

As described above, although ownership and control are tightly linked in small businesses, they do not always coincide. The results in Table 8 are robust to using an alternative definition of a women-owned business that is closer to the definition used in the previous section. In particular, we use additional information in the SSBF that identifies which owners are also involved in the day-to-day management of the firm. When we limit the measure of women-owned businesses to ones in which the combined ownership shares of women amounts to at least 50% *and* in which one of the female owners is also a manager, we find significantly larger associations between female ownership and labor intensity. As we add controls in specifications that mirror those in Table 8, the estimated gender difference is always statistically significant and ranges from 2.7 (standard error of 1.3) to 3.2 (standard error of 1.3) workers per $10,000 of assets.[11]

[11] Unlike the D&B data used in the previous section, the SSBF provides a continuous measure of female ownership. Using this information, we find similar estimates for female ownership when we examine a linear relation with female ownership share instead of the binary indicator for majority female ownership. We also estimate separate coefficients for majority female ownership and complete (100%) female ownership and find the two are very similar and not statistically

In contrast to these significant differences in labor intensity in a post-recession period, we find no significant differences before the recession. We repeat our analysis of labor intensity in the 1998 wave of the SSBF, which was collected before the recession. The SSBF was not conducted in any years between 1998 and 2003. Consistent with the 2003 estimates reflecting gender differences in labor hoarding during the recession, we find no significant relationship between female ownership and labor intensity in 1998 before the recession began.

To further explore the mechanism behind the post-recession labor intensity differential, we further compare gender differences between firms that were more or less negatively affected by the recession. Instead of looking at all firms in the post-recession period, we separate out firms that report experiencing a decline in sales over the previous three years and compare them to firms that report sales growth over the same period. The depth of sales decline was not asked in the survey. Newly established firms and those with no change over the period are excluded from this analysis. The results are in Columns 5 and 6 of Table 8. We find that firms with recent sales drops (Column 5) have large gender differences in labor intensity in 2003. The difference is much smaller and not significant for those with positive recent sales growth (Column 6). This pattern is what we would expect if the differences in labor intensity resulted from woman-owned firms employing different labor policies in response to adverse sales shocks.

Other Aspects of Labor Contracting at Men- and Women-Owned Businesses

The lower rates of workforce reductions at women-owned businesses suggest that those companies may form a different kind of relationship with their workers. The approach to labor

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distinguishable. This pattern indicates that our primary definition, based on majority ownership, provides a relevant cutoff for the analysis.

relations at women-owned companies may be analogous to the one uncovered in Sraer and Thesmar (2007) for family-owned firms in France. Sraer and Thesmar find that family-owned companies lay off fewer workers during recessions, which they argue is related to family-owned companies' greater ability to maintain long-term implicit contracts with workers. If the reduced workforce reductions among women-owned firms that we document in this paper are also related to implicit commitments to workers, then we might expect to see differences in formal commitments as well. In particular, we use the 2003 SSBF to investigate if female business owners tend to use more stable employment relationships in their formal contracts with workers.

Mean rates of firms' usage of less stable employment contracts are reported separately by the owners' gender in Table 7. Female-owned firms are about half as likely to hire workers on a temporary (possibly contingent) basis (8.1% versus 16.2%) or on a leased basis (2.4% versus 4.5%). Under employment leasing, a firm contracts with a leasing company to manage its human resources. The workers are officially employees of the leasing company, which has the right to fire or reassign them to another client.

Estimates that control for other gender differences are reported Table 9. Based on the same specifications as our analysis of labor intensity (augmented to also control for the total number of employees), we find that female-owned firms are less likely to hire workers on a temporary basis (Panel A) or a leased basis (Panel B). In the baseline specifications (Column 1), female-owned firms are 3.1 percentage points (23% relative to the mean) less likely to use temporary workers and 1.5 percentage points (39% relative to the mean) less likely to use leased workers. Including the full set of owner and firm controls has a modest impact on the estimates (Columns 2–4). In all specifications, the results are statistically significant and suggest a consistent pattern of more stable, in-house employment at women-owned firms in 2003.

Conclusion

This paper is the first to relate female business ownership to company policies affecting workers. We find that female-owned private companies may have softened the blow to workers of the Great Recession by undertaking fewer workforce reductions. The gender difference is robust to including various fixed effects and other controls and to alternative outcome measures and sample definitions. We also find that women-owned companies had greater labor intensity and were less likely to use temporary or leased workers in the aftermath of the previous economic downturn. The gender differences are robust to controlling for firms' characteristics, including location, size, and profitability. They also persist after controlling for detailed measures of firms' financial strength and detailed characteristics of the owner, including age, experience, education, debt, and net worth.

The findings of this study are broadly consistent with a recent examination of the impact of Norway's quota, implemented in 2006, requiring that the boards of directors of public limited companies be composed of at least 40% female members (Matsa and Miller 2013). After that quota was adopted, affected firms retained rank-and-file workers when other firms were laying them off. The Norway analysis has the advantage of exploiting a natural experiment, which provides strong internal validity, but it was unclear if the results generalize beyond the quota setting—either because the quota led to an unusual group of women being placed in corporate leadership positions or because so many directors changed at once. The analysis in this paper finds that similar relations between female business leadership and workforce reductions hold at private firms in the United States.[12] The focus on private firms in this paper may provide even

[12] These results are also consistent with findings that female leadership tends to lower the gender

more direct evidence on gender differences in the values and preferences of business leaders because there is no agency problem between directors and owners at these firms.

If women do indeed lead their firms to undertake fewer workforce reductions, what is the underlying cause? The results on labor intensity and contract type show that the gender differences are not explained by differences in age, education, or net worth, which suggests that gender differences in preferences or values may be important. It is possible that the pattern reflects a greater concern on the part of female leaders for the well-being of their workers, even at the expense of short-term profits. Women may also rightly or wrongly question the long-run profitability of workforce reductions, which can lower morale and lead to greater hiring and training costs when the economy recovers. Experiments find that women are generally more altruistic (Andreoni and Vesterlund 2001) and long-term oriented (Silverman 2003) than are men, and survey evidence documents sex differences in corporate directors' preferences and values (Adams and Funk 2012). Further research is needed to pinpoint the mechanism underlying the gender difference in labor hoarding documented in this paper.

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pay gap among top executives (Matsa and Miller 2011; Bell 2005) and across all workers (Cardoso and Winter-Ebmer 2010; Tate and Yang 2012).

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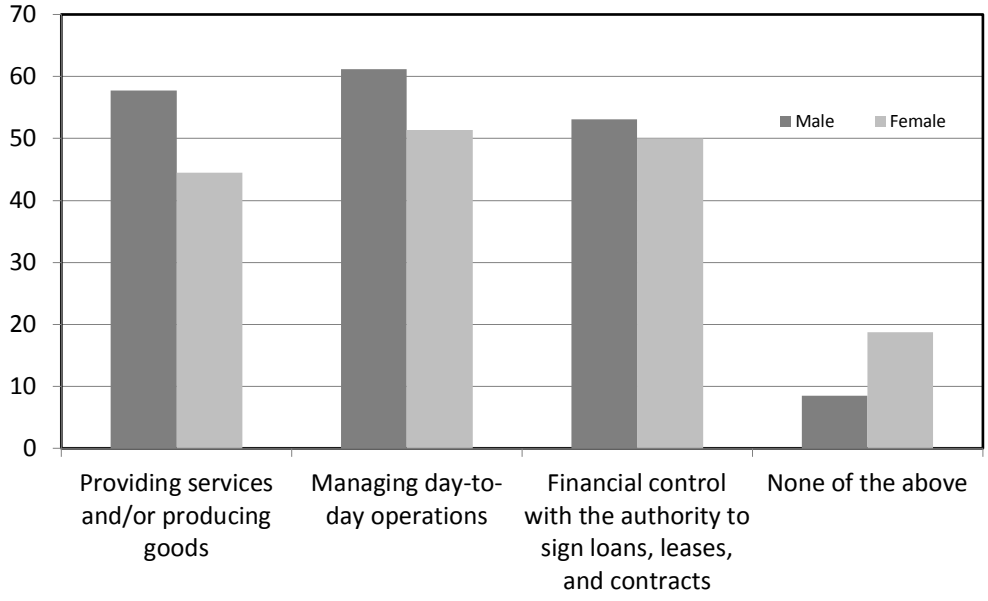
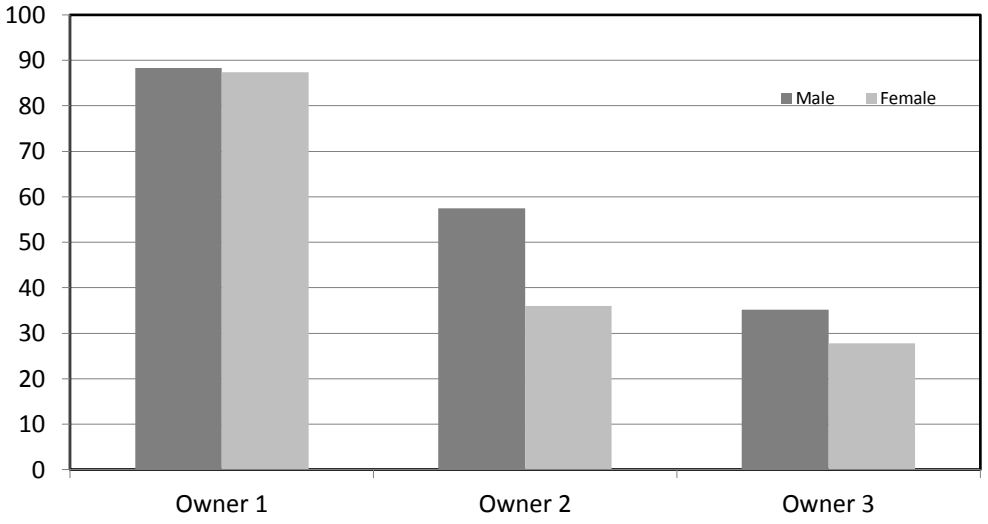
Figure 1. Owners' Involvement in the Business by Gender



Source: Survey of Business Owners, 2007

Figure 2. Percent of Owners Responsible for Day-to-Day Management of Business by Gender



Ownership	76.0	12.5	2.7
share	(27.1)	(19.9)	(7.5)

Note: Firms' owners are ranked in decreasing order of their ownership share. In cases of equal ownership shares, the more involved owner is ranked first. Owners' mean ownership shares are reported, followed by their standard deviation in parentheses.
Source: Survey of Small Business Finance, 2003

Table 1. Summary Statistics

	All	Female-owned	Male-owned
Workforce reductions:			
Any reduction (%)	13.2	5.9	13.5
Share reduced (%)	2.3	1.8	2.3
Number reduced	22.4	10.5	22.8
>1% of workforce (%)	12.8	5.8	13.1
>3% of workforce (%)	11.0	5.7	11.2
>5% of workforce (%)	9.1	5.4	9.3
>10% of workforce (%)	5.8	4.8	5.8
Control variables:			
Lag Number of Employees	378	190	385
(Std Dev)	2,937	584	2,988
Lag Profit Margin (%, conditional on reporting)	18.7	6.2	18.8
(Std Dev)	22.3	12.9	22.3
Lag Negative Profits (%, conditional on reporting)	10.6	7.5	10.7
Lag Profit Missing (%)	58.9	82.9	58.0
Industry:			
Agriculture, Forestry, Fishing and Hunting (%)	0.5	0.5	0.4
Mining, Utilities, and Construction (%)	7.9	12.2	7.7
Manufacturing (%)	13.3	16.5	13.1
Trade and Transportation (%)	19.5	29.8	19.1
Finance and Professional Services (%)	41.5	31.0	41.9
Education and Health (%)	12.4	6.0	12.6
Food, Accommodation, and Recreation (%)	3.2	3.1	3.2
Other Services (%)	1.8	0.9	1.8
Observations	121,284	4,277	117,007

Source: Orbis, 2006–2009

Table 2. Differential Employment Reductions at Women-Owned Businesses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female-owned	-0.141***	-0.096***	-0.094***	-0.066***	-0.044**	-0.066***	-0.016***
	[0.013]	[0.014]	[0.014]	[0.014]	[0.022]	[0.001]	[0.001]
Observations	121,284	121,284	121,284	121,284	20,599	121,284	121,284
Year fixed effects	X	X	X	X	X	X	X
One-digit industry fixed effects		X	X	X	X	X	X
State fixed effects		X	X	X	X	X	X
Control for lagged employment			X	X	X	X	X
Controls for lagged profits				X	X	X	X
Matched sample					X		
One-digit industry*Year fixed effects						X	X
Two-digit industry*Year fixed effects							X

Notes: This table reports coeffient estimates from Tobit regressions of a firm's year-to-year proportional decrease in employment (censored at zero) on an indicator for the firm being female-owned and the controls indicated in each column. The controls for lagged profits include an indicator for negative lagged profits, lagged profit margin interacted with indicators for negative and nonnegative lagged profits, and an indicator for when these data are missing. Column 5 is estimated on a matched sample of the five closest male-owned firms, based on industry, state, employment, and age in 2007. Standard errors, reported in brackets, are adjusted for within-firm correlation.

Source: Orbis, 2006–2009

** $p < 0.05$, *** $p < 0.01$

Table 3. Marginal Effects

	Coefficient: Employment Drop (1)	Probability: Employment Drop (2)	Conditional Expectation: Employment Drop (3)	OLS: Depth of Downsizing (4)
Panel A: One-digit industry * Year fixed effects				
Female-owned	-0.066***	-0.032***	-0.012***	-0.005***
	[0.001]	[0.000]	[0.000]	[0.002]
Observations	121,284	121,284	121,284	121,284
Panel B: Two-digit industry * Year fixed effects				
Female-owned	-0.016***	-0.008***	-0.003***	-0.003*
	[0.001]	[0.001]	[0.000]	[0.002]
Observations	121,284	121,284	121,284	121,284

Notes: Columns 1–3 of this table report marginal effects of being female-owned implied by two of the Tobit models reported in Table 2. Column 1 reports the coefficient estimate (i.e., the effect on the latent downsizing variable); Column 2 reports the effect on the probability of any downsizing; Column 3 reports the effect on the expected size of the employment reduction conditional on a reduction. Column 4 reports estimates from OLS models of the same dependent variable. All regressions include controls for state and industry-by-year fixed effects, lagged employment, an indicator for negative lagged profits, lagged profit margin interacted with indicators for negative and nonnegative lagged profits, and an indicator for missing lagged profits. The specification reported in Panel A controls for industry*year effects defined at the 1-digit level (as in Table 2, Column 6), and the specification reported in Panel B controls at the 2-digit level (as in Table 2, Column 7). Standard errors, reported in brackets, are adjusted for within-firm correlation.

Source: Orbis, 2006–2009

* $p < 0.10$, *** $p < 0.01$

Table 4. Employment Reductions at Larger Firms

	Reductions as Share of Workforce			Reductions as Number of Workers		
	Coefficient: Employment Drop	Probability: Employment Drop	Conditional Expectation: Employment Drop	Coefficient: Employment Drop	Probability: Employment Drop	Conditional Expectation: Employment Drop
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: One-digit industry controls						
Female-owned	-0.109***	-0.039***	-0.019***	-492.001***	-0.034***	-78.975***
	[0.021]	[0.008]	[0.004]	[116.274]	[0.006]	[18.518]
Observations	77,914	77,914	77,914	77,917	77,917	77,917
Panel B: Two-digit industry controls						
Female-owned	-0.048**	-0.017**	-0.008**	-210.436**	-0.014**	-33.451**
	[0.021]	[0.007]	[0.004]	[95.317]	[0.006]	[15.122]
Observations	77,914	77,914	77,914	77,917	77,917	77,917

Notes: This table reports coeffient estimates and marginal effects from Tobit models of a firm's year-to-year percentage (in Columns 1–3) or level (in Columns 4–6) decrease in employment (censored at zero), estimated from the sample of firm-year observations with at least 100 employees in the prior year. For each of the two outcome variables, the first column reports the Tobit coefficent, second column reports the effect on probability of downsizing, and the third column reports the effect on the size of the employment reduction conditional on a reduction. All regressions include controls for state and industry-by-year fixed effects, lagged employment, an indicator for negative lagged profits, lagged profit margin interacted with indicators for negative and nonnegative lagged profits, and an indicator for missing lagged profits. The specification reported in Panel A controls for industry*year effects defined at the 1-digit level (as in Table 2, Column 6), and the specification reported in Panel B controls at the 2-digit level (as in Table 2, Column 7). Standard errors, reported in parentheses, are adjusted for within-firm correlation.

Source: Orbis, 2006–2009

** $p < 0.5$, *** $p < 0.01$

Table 5. Employment Reductions of Various Sizes

	Magnitude of employment reduction							
	>1%	>3%	>5%	>10%	>5 workers	>10 workers	>25 workers	>50 workers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mean of dependent variable	0.103	0.089	0.079	0.060	0.092	0.080	0.062	0.046
Panel A: One-digit industry controls								
Female-owned	-0.033***	-0.027***	-0.022***	-0.012***	-0.027***	-0.022***	-0.019***	-0.015***
	[0.005]	[0.005]	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]	[0.003]
Observations	77,881	77,881	77,881	77,881	77,884	77,884	77,884	77,673
Panel B: Two-digit industry controls								
Female-owned	-0.013**	-0.011**	-0.010*	-0.006	-0.014***	-0.013***	-0.014***	-0.012***
	[0.006]	[0.006]	[0.005]	[0.004]	[0.005]	[0.004]	[0.003]	[0.003]
Observations	77,881	77,881	77,881	77,881	77,884	77,884	77,884	77,673

Notes: This table reports the marginal effects from Probit models estimated from the sample of firm-year observations with at least 100 workers in the prior year. The top row contains mean values of the dependent variables in this sample. The analysis models the incidence of workforce reductions of various magnitudes, as indicated in each column's heading. All regressions include controls for state and industry-by-year fixed effects, lagged employment, an indicator for negative lagged profits, lagged profit margin interacted with indicators for negative and nonnegative lagged profits, and an indicator for missing lagged profits. The industry*year controls are defined at the 1-digit level in Panel A and at the 2-digit level in Panel B. Standard errors, reported in brackets, are adjusted for within-firm correlation.

Source: Orbis, 2006–2009

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6. Alternate Time Periods

	2007–2009			2008–2009			2009		
	Coefficient: Employment Drop (1)	Probability: Employment Drop (2)	Conditional Expectation: Employment Drop (3)	Coefficient: Employment Drop (4)	Probability: Employment Drop (5)	Conditional Expectation: Employment Drop (6)	Coefficient: Employment Drop (7)	Probability: Employment Drop (8)	Conditional Expectation: Employment Drop (9)
Panel A: One-digit industry controls									
Female-owned	-0.118***	-0.038***	-0.019***	-0.101***	-0.033***	-0.016***	-0.132***	-0.048***	-0.022***
	[0.027]	[0.009]	[0.004]	[0.027]	[0.009]	[0.004]	[0.033]	[0.012]	[0.006]
Observations	52,287	52,287	52,287	41,674	41,674	41,674	23,553	23,553	23,553
Panel B: Two-digit industry controls									
Female-owned	-0.064**	-0.020**	-0.010**	-0.055**	-0.017**	-0.009**	-0.079**	-0.028**	-0.013**
	[0.026]	[0.008]	[0.004]	[0.027]	[0.009]	[0.004]	[0.033]	[0.012]	[0.006]
Observations	52,287	52,287	52,287	41,674	41,674	41,674	23,553	23,553	23,553

Notes: This table reports coeffient estimates and marginal effects from Tobit models of a firm's year-to-year proportional decrease in employment (censored at zero), estimated over different time periods from the sample of firm-year observations with at least 100 employees in the prior year. For each time period, the first column reports the Tobit coefficent, second column reports the effect on probability of downsizing, and the third column reports the effect on the size of the employment reduction conditional on a reduction. All regressions include controls for state and industry-by-year fixed effects, lagged employment, an indicator for negative lagged profits, lagged profit margin interacted with indicators for negative and nonnegative lagged profits, and an indicator for missing lagged profits. The specification reported in Panel A controls for industry*year effects defined at the 1-digit level (as in Table 2, Column 6), and the specification reported in Panel B controls at the 2-digit level (as in Table 2, Column 7). Standard errors, reported in parentheses, are adjusted for within-firm correlation.

Source: Orbis, 2007–2009

** $p < 0.05$, *** $p < 0.01$

Table 7. Summary Statistics

	All	Female-owned	Male-owned
Dependent variables:			
Labor intensity	2.9	5.3	2.0
(Std Dev)	25.0	40.7	13.9
Usage of temporary employees (%)	13.8	8.1	16.2
Usage of leased employees (%)	3.9	2.4	4.5
Baseline control:			
Number of employees	31.1	18.4	36.4
(Std Dev)	56.8	38.8	62.0
Profit margin (%)	18.6	19.6	18.1
(Std Dev)	27.1	28.8	26.4
Negative profits (%)	19.1	21.2	18.1
Firm controls:			
Firm age in years	16.5	14.5	17.3
(Std Dev)	12.1	10.7	12.5
Dunn and Bradstreet credit score (%):			
0–10 (highest risk)	8.0	7.3	8.2
11–25	10.7	11.7	10.3
26–50	18.3	22.0	16.7
51–75	27.4	24.4	28.7
76–90	21.2	21.2	21.1
91–100 (lowest risk)	14.4	13.3	14.9
1-year sales growth (%):			
Positive	43.5	41.6	44.3
Negative	24.1	24.4	24.0
No growth	29.3	29.9	29.1
Not in business last year	3.1	4.0	2.6
3-year sales growth (%):			
Positive	47.5	45.5	48.3
Negative	24.1	24.4	24.0
No growth	16.6	15.9	16.9
Not in business 3 years ago	11.8	14.3	10.8
Recently denied credit (%)	3.2	3.8	2.9
Declared bankruptcy within past 7 years (%)	0.9	1.0	0.8
Judgments rendered against within past 3 years (%)	2.6	2.6	2.6
Obligations 60+ days delinquent within past 3 years (%):			
None	83.7	83.1	83.9
One	2.8	3.4	2.6
Two	2.5	2.3	2.5
Three or more	11.0	11.2	11.0
Owner controls:			
Average owner age	53.0	52.5	53.3
(Std Dev)	10.8	10.8	10.8
Average owner years experience managing or owning a busine	21.5	18.2	22.8
(Std Dev)	11.4	10.5	11.6
Average owner education (%):			
Less than high school degree (grade 11 or less)	1.4	1.6	1.4
High school graduate or equivalent (GED)	16.9	17.5	16.6
Some college but no degree granted	15.6	18.2	14.5
Associate degree occupational/academic program	9.1	11.3	8.1
Trade school/vocational program	7.9	10.4	6.8
College degree	29.4	23.7	31.7
Post graduate degree	19.8	17.2	20.9
Log of principal owner net worth	13.4	13.0	13.5
(Std Dev)	1.4	1.4	1.5
Use personal credit card to pay business expenses (%)	43.6	48.3	41.6
Declared bankruptcy witin past 7 years (%)	1.8	2.4	1.5
Judgments rendered against within past 3 years (%)	1.9	1.8	1.9
Obligations 60+ days delinquent within past 3 years (%):			
None	90.9	88.3	92.0
One	2.5	3.4	2.1
Two	2.0	2.7	1.7
Three or more	4.6	5.5	4.3
Observations	4,030	1,192	2,838

Notes: Labor intensity is defined as number of total employees per $10,000 of total assets. Profit margin is winsorized at the 5% tails. Owner net worth is only available for 3,676 observations (1,078 female-owned, 2,598 male-owned).

Table 8. Labor Intensity at Women-Owned Businesses

	Full sample				3-year sales growth: Negative	3-year sales growth: Positive
	(1)	(2)	(3)	(4)	(5)	(6)
Female-owned	2.391**	2.263**	1.505**	1.597*	1.731**	0.135
	(0.942)	(0.943)	(0.760)	(0.829)	(0.847)	(0.503)
Observations	4,030	4,030	3,676	3,676	884	1,771
R-squared	0.016	0.022	0.022	0.027	0.205	0.039
Two-digit industry fixed effects	X	X	X	X	X	X
Census region fixed effects	X	X	X	X	X	X
Controls						
Profits	X	X	X	X	X	X
Firm		X		X	X	X
Owner			X	X	X	X

Notes: This table reports coefficient estimates from OLS regressions of a firm's labor intensity on an indicator for the firm being female owned and the controls indicated in each column. The profits controls include an indicator for negative profits and profit margin interacted with indicators for negative and nonnegative profits. The complete sets of firm and owner controls are listed in Table 7. The regressions in Columns 5 and 6 are estimated on samples defined based on 3-year sales growth and exclude controls for sales growth. Robust standard errors are reported in parentheses.

Source: Survey of Small Business Finance, 2003

* $p < 0.10$, ** $p < 0.05$

Table 9. Labor Contracting at Women-Owned Businesses

	(1)	(2)	(3)	(4)
Panel A: Usage of temporary employees (%)				
Female-owned	-3.132***	-2.989***	-2.719**	-2.632**
	(1.07)	(1.07)	(1.16)	(1.16)
Observations	4,030	4,030	3,676	3,676
R-squared	0.142	0.148	0.152	0.159
Panel B: Usage of leased employees (%)				
Female-owned	-1.523**	-1.448**	-1.452**	-1.387**
	(0.65)	(0.65)	(0.70)	(0.70)
Observations	4,030	4,030	3,676	3,676
R-squared	0.031	0.041	0.039	0.052
Two-digit industry fixed effects	X	X	X	X
Census region fixed effects	X	X	X	X
Controls				
Baseline	X	X	X	X
Firm		X		X
Owner			X	X

Notes: This table reports coefficient estimates from OLS regressions of a firm's usage temporary or leased employees on an indicator for the firm being female owned and the controls indicated in each column. The baseline controls include the number of employees, an indicator for negative profits, and profit margin interacted with indicators for negative and nonnegative profits. The complete sets of firm and owner controls are listed in Table 7. Robust standard errors are reported in parentheses.
Source: Survey of Small Business Finance, 2003
** $p < 0.05$, *** $p < 0.01$

Table A1. Differential Employment Reductions at Women-Owned Businesses

	(1)	(2)
Female-owned	-0.066***	-0.016***
	[0.001]	[0.001]
Lagged employment (1000s of workers)	0.006***	0.006***
	[0.000]	[0.000]
Lagged profit margin * Negative lagged profits	-0.192***	-0.097***
	[0.004]	[0.004]
Lagged profit margin * Nonnegative lagged profits	0.122***	-0.0002
	[0.003]	[0.003]
Negative lagged profits	0.336***	0.029***
	[0.001]	[0.002]
Missing lagged profits	-0.090***	-0.010***
	[0.002]	[0.002]
Observations	121,284	121,284
State fixed effects	X	X
One-digit industry*Year fixed effects	X	X
Two-digit industry*Year fixed effects		X

Notes: This table reports coeffient estimates from Tobit regressions of a firm's year-to-year proportional decrease in employment (censored at zero) on an indicator for a firm being female-owned and the controls indicated in each column. These are the specifications reported in Columns 6 and 7 of Table 2. Standard errors, reported in brackets, are adjusted for within-firm correlation.

Source: Orbis, 2006–2009

*** $p < 0.01$

Table A2. Labor Intensity at Women-Owned Businesses

	Coefficient	Std. Err.
Variable of interest:		
Female-owned	1.60 *	0.83
Baseline control:		
Profit margin * Negative profits	-9.47	8.95
Profit margin * Nonnegative profits	-1.32	0.93
Negative profits	-0.97	0.62
Firm controls:		
Firm age in years	-0.03	0.03
Dunn and Bradstreet credit score:		
0–10 (highest risk)	-0.18	0.68
11–25	0.14	1.84
26–50	-0.03	0.88
51–75	1.03	0.95
76–90	-0.42	0.85
91–100 (lowest risk) [omitted category]		
1-year sales growth:		
Positive	0.90	0.93
Negative†	-0.09	0.44
No growth [omitted category]		
Not in business last year	1.07	4.59
3-year sales growth:		
Positive	-0.81	0.61
Negative†		
No growth [omitted category]		
Not in business 3 years ago	4.04	3.73
Recently denied credit	-0.45	1.32
Declared bankruptcy within past 7 years	-1.43	1.16
Judgments rendered against within past 3 years	-1.15	0.91
Obligations 60+ days delinquent within past 3 years:		
None [omitted category]		
One	-1.57 **	0.72
Two	-1.20 *	0.74
Three or more	-1.08 **	0.46
Owner controls:		
Average owner age	0.04	0.04
Average owner years experience managing or owning a business	0.01	0.05
Average owner education:		
Less than high school degree (grade 11 or less) [omitted category]]		
High school graduate or equivalent (GED)	-0.65	0.79
Some college but no degree granted	-0.66	0.86
Associate degree occupational/academic program	-0.48	1.04
Trade school/vocational program	4.40	4.30
College degree	-0.36	0.71
Post graduate degree	0.71	1.35
Log of principal owner net worth	-1.01 ***	0.37
Use personal credit card to pay business expenses	0.27	0.94
Declared bankruptcy witin past 7 years	-3.20 *	1.80
Judgments rendered against within past 3 years	2.27	2.52
Obligations 60+ days delinquent within past 3 years:		
None [omitted category]		
One	-1.01	1.06
Two	-1.85 **	0.79
Three or more	-0.46	1.38
Observations	3,676	
R-squared	0.03	
Two-digit industry fixed effects	X	
Census region fixed effects	X	

Notes: This table reports coefficient estimates from OLS regressions of a firm's labor intensity on an indicator for the firm being female owned and the indicated controls. This is the specifications reported in Column 4 of Table 8. Robust standard errors are reported.

Source: Survey of Small Business Finance, 2003

†Indicators for negative 1-year sales growth and negative 3-year sales growth are perfectly correlated.