CEO Gender and Corporate Risk-Taking

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Abstract

We show that CEO gender helps explain corporate decision making. In particular, we document that firms run by female CEOs have lower leverage, less volatile earnings, and a higher chance of survival than firms run by male CEOs. The results are robust to various tests for endogeneity, including placebo tests, firm fixed effects specifications, additional controls for time-varying CEO characteristics, propensity score matching, a switching regression analysis with endogenous switching, and a treatment effects model. The documented gender-related differences in risk-taking are consistent with gender-related differences in risk-aversion, differences in altruism, and norms related to appropriate behavior for women in a given society.

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I. Introduction

In this paper, we provide evidence that gender diversity plays an important role in corporate choices. We document that female CEOs tend to avoid riskier investment and financing opportunities. We further show that differences in risk-aversion, differences in altruism, and social norms appear to explain (at least part of) these gender-related differences in the propensity to take risks at the corporate level.

Our investigation is motivated by earlier evidence in the experimental economics and psychology literature of gender-related differences in the propensity to take risks. This literature is surveyed by Croson and Gneezy (2009) and Bertrand (2011). To cite a few, Bruce and Johnson (1994) and Johnson and Powell (1994) study how betting behavior varies with gender. They provide evidence that women display a lower propensity for risk-taking than men. Hudgens and Fatkin (1985) document that gender-related differences in risk-taking are also present in a military framework. Sundén and Surette (1998) and Bernasek and Shwiff (2001) document that women are significantly less prone to take risks in their pension allocations.

Evidence that gender diversity affects corporate decisions or outcomes includes Adams and Ferreira (2009), Ahern and Dittmar (2012), and Weber and Zulehner (2010). For example, Weber and Zulehner (2010) document that start-ups with *female first hires* display a higher likelihood of survival. Adams and Ferreira (2009) provide evidence that CEO turnover correlates more strongly with poor performance when the *board of directors* is more gender-diverse. Ahern and Dittmar (2012) document that the introduction of mandatory board member gender quotas lead to an increase in acquisitions and performance deterioration in Norwegian publicly-traded firms.[1] Interestingly, two very recent studies document that banks with more women on their boards do not appear to take

[1] Other work focusing on gender diversity in corporate boards includes Levi, Li, and Zhang (2013) and Matsa and Miller (2013).

less, or even take more, risk than banks with fewer female board members (Adams and Ragunathan, 2013; Berger, Kick, and Shaeck, 2013).

There is even less evidence that gender-related differences in propensity to take risks extend to corporate decision-makers, i.e., *managers*, as women rarely serve as top managers of publicly-traded corporations.[2] While it is well-documented for the general population that women are less prone to take risks than men, given the specific and rare combination of skills needed to ascend to a high management position, there may not necessarily be a difference between males and females among top executives (Adams and Funk, 2012; Adams and Ragunathan, 2013).

Thus, ultimately, whether there are any gender-related differences in the propensity to take risks at the managerial level remains an empirical question. To test this question, we employ *Amadeus Top 250,000* (*Amadeus*), a database covering a large number of European privately-held and publicly-traded companies. Disclosure requirements in Europe require private companies to publish annual information. As a consequence, the database allows us to gather a large sample of firms run by female CEOs. In support of our prediction, we document that firms run by female CEOs have lower leverage, less-volatile earnings, and a higher chance of survival than firms run by male CEOs. These results are robust to controlling for standard determinants of corporate risk-taking.

A caveat in the interpretation of our results, as in any empirical study, is the issue of endogeneity. In particular, gender could be a selection criterion for the CEO. Self-selection is a tricky issue, as identifying the role of gender on risk-taking choices requires an exogenous shock to CEO gender that is independent of other determinants of risk-taking. In this regard, finding a natural experiment is highly unlikely. Additionally, if one could identify a natural experiment, it is unlikely

[2] One exception is Huang and Kisgen (2013), who document that the propensity to make acquisitions is lower in companies with female CFOs. Their sample includes 19 female CEOs and 97 CFOs. A second exception is a study of privately-owned (U.S.) firms by Cole (2013), who reports cross sectional evidence that female-owned firms have lower leverage than male-owned firms.

that the results would generalize to the majority of CEOs. However, as *Amadeus* covers a large and comprehensive set of firms and CEOs, using these data enables us to tackle the issue of endogeneity from multiple angles. At minimum, the comprehensive set of tests discussed below represents a substantial improvement over the existing literature in addressing the issue of endogeneity.

First, we include a number of control variables to reduce the possibility of spurious correlation. In particular, we control for CEO ownership and block ownership to address agency considerations. Further, we control for size and industry to address asymmetric information concerns. Our results are robust to adding these (and other) control variables.

Second, to investigate the possibility that our results might simply be due to luck, we run placebo tests to assess whether our results disappear when we randomly assign gender to CEOs. For none of our dependent variables, across 100,000 simulations run after randomly assigning gender to CEOs, do we ever find the estimated coefficient to be greater (in absolute value) than our point estimate. Thus, unless we are exceptionally lucky, luck cannot explain our results.

Third, to control for time-invariant determinants of risk-taking, we exploit the panel dimension of our dataset and add firm fixed effects to the (panel) regression specifications. Adding firm fixed effects to a panel regression controls for *any* firm-specific time-invariant omitted variables that may affect the firm's decision in terms of attitude toward risk, greatly reducing the risk of spurious correlation. In particular, in those specifications, we compare CEOs of different genders operating the same firm. (In these tests, of course, we focus on firms experiencing a CEO transition). Our conclusions are unaffected by the addition of firm fixed effects.

Fourth, as it is possible that CEO transitions are accompanied by changes in CEO characteristics other than gender, we control for a number of CEO characteristics that might vary around CEO transitions and, at the same time, explain corporate risk-taking. In particular, we control for CEO age and CEO wealth. We show that our conclusions are robust to the addition of these controls.

Fifth, we employ a propensity score matching procedure to compare firms run by female CEOs to a group of similar peers run by male CEOs, selected from the same country, industry, year, and public/private status, and matched on a number of firm- and CEO-level characteristics. As the control firms are restricted to a set of peers that are virtually indistinguishable in terms of observable firm characteristics, the firms run by female CEOs should take as much risk as firms run by male CEOs if CEO gender were indeed irrelevant for risk-taking preferences. However, even after matching using a propensity score approach, we continue to find statistically significant differences in corporate risk-taking depending on CEO gender. This holds true both when we apply the propensity score matching procedure to the “full” sample as well as when we focus on CEO transitions and compare changes in risk-taking among firms experiencing a CEO transition to changes in otherwise identical firms that were always run by a CEO of a given gender.

Sixth, we employ a switching regression analysis with endogenous switching. This allows us to control for endogenous self-selection regarding appointing a male or a female CEO and the possibility that self-selection alone might explain the risk-taking choices. One advantage of this methodology is that it allows us to perform a counterfactual analysis. In other words, *ceteris paribus*, it allows us to infer what the leverage (or volatility of earnings or survival rate) of a company run by a male CEO would have been had it been run by a female CEO. Once again, after controlling for the potential endogenous matching between firms and CEOs, we still find that female CEOs tend to take on less risk than their male counterparts.

Seventh, we employ a treatment effects model. This allows us to test whether CEO gender still plays a role in financial and investment policies after we explicitly control for any kind of self-selection due to unobservables. Our choice of an exogenous determinant of the propensity to select a female CEO builds on the notion of familiarity, in that we use the fraction of firms with a female CEO (and above-average risk-taking) among all other firms in which the firm's male directors also serve as directors. We believe that it is unlikely that familiarity, combined with above-average risk-taking (in other firms), should be correlated with outcomes (in particular, risk-avoidance) except through its effect on CEO gender. Indeed, the results of the treatment effects model reinforce the plausibility of a causal effect of CEO gender on corporate risk-taking choices.

Why does CEO gender help explain corporate risk-taking? Under perfect capital markets, managers should "simply" choose investments so as to maximize the market value of the firm. In this framework, neither the preferences or characteristics of managers nor those of the firm's owners play any role in the investment selection choice (Fama and Miller, 1972). Traditional explanations proposed by finance theory for why decision makers' preferences and characteristics play a role in the investment selection choice include agency (Jensen and Meckling, 1976; Jensen, 1986), asymmetric information (Myers and Majluf, 1984), and behavioral considerations (Roll, 1986; Malmendier and Tate, 2005, 2008; and Malmendier, Tate, and Yan, 2011). Additional explanations include differences in risk-aversion between genders (Schubert et al., 1999; Croson and Gneezy, 2009; Sharifullina, Belianin, and Petrovsky, 2012; Bertrand, 2011), differences in compensation structure, differences in unemployment risk, differences in altruism (Alesina and Giuliano, 2011; Funk and Gathmann, 2009), as well as norms related to the role of women in a given society (Akerlof and Kranton, 2000; Altonji and Blank, 1999; Booth and Nolen, 2012; Guiso et al., 2008). An investigation of the mechanisms behind the documented gender-related difference in the propensity to take risks suggests that differences in risk-aversion, differences in altruism, and social norms appear to explain why women are more prone to avoid risks than men.

This paper complements the literature of how managerial traits affect corporate decision making. Those studies include Bertrand and Schoar (2003); Cain and McKeon (2012); Cronqvist, Makhija, and Yonker (2012); Malmendier and Tate (2005, 2008); and Malmendier, Tate, and Yan (2011). We add to this literature by showing that CEO gender is yet another important trait leading to differences in corporate choices. We also add to the literature by tracing the results back to possible underlying mechanisms. The rest of the paper is organized as follows. Section II describes the data. Sections III and IV present the regression results (including various endogeneity tests) and investigate the possible mechanisms behind the results. Section V concludes.

II. Data

Most of the data used in the paper are taken from *Amadeus Top 250,000 (Amadeus)*. *Amadeus* is maintained by Bureau Van Dijk. From this database we gather information on the name of the CEO, ownership data, and accounting data for every European privately-held and publicly-traded company that satisfies a minimum size threshold.[3] Disclosure requirements in Europe require private companies to publish accounting information with an annual frequency. Consequently, we are able to gather accounting, ownership, and gender information for a very large set of firms. The quality of data in *Amadeus* is discussed in detail in Faccio, Marchica, and Mura (2011). We gather the data from the annual *Amadeus* DVDs.[4] Our sample period starts in 1999 (the first year in which *Amadeus* started reporting shareholder identifiers) and ends in 2009 (the most recent year for which accounting and ownership data are available).

[3] For France, Germany, Italy, Spain, and the United Kingdom, the database includes all companies that meet at least one of the following criteria: (1) revenues of at least €15m, (2) total assets of at least €30m, (3) at least 200 employees. For the other countries, the database includes all companies that meet at least one of the following criteria: (1) revenues of at least €10m, (2) total assets of at least €20m, (3) at least 150 employees.

[4] *Amadeus* removes firms from the database five years after they stop reporting financial data. These drawbacks are also discussed in Klapper, Leaven, and Rajan (2006); and Popov and Roosenboom (2009). In order to avoid potential survivorship bias, we collect data starting with the 2011 DVD and progressively move backward in time. By doing so, we drop no firms from the sample.

II.A. CEO Gender

We identify the gender of a CEO based primarily on his/her first name, as reported in *Amadeus.* Beginning in 2007, the DVDs indicate the gender of the CEO. As a starting point, we use this information to classify CEOs from 2007 forward. We also use this information to classify those same individuals in the prior years. Prior to 2007, *Amadeus* does not indicate the gender of the CEO. However, at least in some instances, *Amadeus* reports a salutation. We use the salutation when it indisputably allows identifying the gender of the CEO.[5] If these methods do not conclusively identify the CEO's gender, we employ country-specific internet-based sources to classify gender based on each individual's first name. [6] Using country-specific sources is important to avoid misclassification. For example, Simone is used for women in France but for men in Italy. Finally, when we cannot identify the gender from the names lists found on the web, we use *OneSource*, *LinkedIn*, *Google*, and *Facebook* to further research the CEO and assess whether a specific name is male or female.

When we are unable to classify the gender of an individual, we drop the observation. Across all countries and all years, this procedure allows us to identify the gender of the CEO in 152,933 firms (or 394,835 firm-year observations). As shown in Table 1, 9.6% of the CEOs in the sample are women. While this figure might appear high at first, it is important to keep in mind that most of the firms in our sample (95.1%) are private companies. [7]

II.B. Risk-Taking

We consider three measures of risk-taking. The first measure, *Leverage*, is a measure of the riskiness of corporate financing choices. The intuition is simple: given a (negative) shock to a firm's

[5] For instance, "Mr." versus "Ms./Mrs./Miss" or "Dr." versus "Dr.ª" (more commonly used in Portugal).
[6] For instance, www.babynology.com, www.nordicnames.de, babynamesworld.parentsconnect.com, www.namepedia.org/en/firstname.
[7] Our data show that the percentage of female CEOs is higher among privately-held firms (9.93%) than among publicly-traded firms (7.03%).

underlying business conditions, the higher the leverage, the greater the (negative) impact of the shock on the firm's net profitability (including a higher probability of default).

Leverage is defined as the ratio of financial debt divided by the sum of financial debt plus equity. Financial debt is the sum of long-term debt (excluding "other non-current liabilities") and short-term loans. Across the firms in our sample, the average *Leverage* ratio is 36.3%. This ratio is 32.2% for firms with a female CEO and 36.8% for firms with a male CEO (the p-value of the difference between the two is less than 0.001).

The other two risk-taking variables are measures of the riskiness of outcomes. The second measure, *σ(ROA*), is the volatility of the firm's operating return on assets, defined as the ratio of earnings before interest and taxes to total assets. Volatility of returns is a standard proxy for risk in the financial economics literature.

This variable captures the riskiness of investment decisions. Further, earlier work by John, Litov, and Yeung (2008) establishes that the volatility of firm-level operating profits has a positive impact on long-term economic growth. We focus on the volatility of accounting returns (as opposed to stock market returns), as the vast majority of firms in our sample are privately-held. We calculate the standard deviation of the returns over five-year overlapping windows (1999-2003, 2000-2004, 2001-2005, 2002-2006, 2003-2007, 2004-2008 and 2005-2009).

Across all firms in the sample, the average volatility of ROA, *σ(ROA*), is 4.9%. As with *Leverage*, there is a significant difference in this variable (p-value < 0.001) between firms run by female CEOs (2.9%) and firms run by male CEOs (5.1%).

The third measure, *Likelihood of survival*, exploits the notion that riskier firms are less likely to survive and focuses on the likelihood of surviving over a five-year period. For a firm to enter this analysis, we require only that CEO gender, ownership, and accounting data be available for at least one year during 1999-2005. Since firms that enter our sample in 2005 or earlier could have up to five years or more of data, we focus on these observations to assess the likelihood of survival. This specification has two main advantages. First, there is no survivorship bias, as both surviving and non-surviving companies are included in the analysis. Second, this measure of risk-taking is unaffected by accounting manipulation.

We find that 50.2% of the firms in the sample survive for at least five years. The likelihood of survival is 60.0% for firms with a female CEO and 49.0% for firms with a male CEO. The difference between female and male CEOs is statistically significant with a p-value of less than 0.001.

II.C. Control Variables

We include a number of control variables in each of the risk-taking regressions. The data used to construct these control variables are taken from *Amadeus*.

CEO Ownership is calculated as the cash flow rights of the CEO on the firm's earnings. Since a high level of ownership aligns the CEO's incentives with those of minority shareholders, we use CEO ownership to control for agency conflicts. *Cash flow rights* is the ownership rights of the largest ultimate shareholder.[8] The higher the ownership of a large shareholder, the greater the incentive to monitor the CEO. This would in turn mitigate agency conflicts. *ROA* is defined as the ratio of earnings before interests and taxes to total assets. We include firm profitability to control for differences in management quality. *Sales Growth* is calculated as the annual rate of growth of sales. We use sales growth (rather than the market-to-book ratio) as our control variable, as most of the firms in the sample are private. *Ln (Size)* is the natural log of total assets (in thousands US$), expressed in 2000 prices. Total assets is the sum of fixed assets (tangible and intangible fixed assets

[8] To identify the largest ultimate shareholder, for each company that has available ownership data in *Amadeus*, we identify its owners, the owners of its owners, and so on.

and other fixed assets) and current assets (inventory, receivables, and other current assets). *Ln (1+Age)* is the natural logarithm of (1 + the number of years since incorporation). This variable controls for differences in the life cycle of a firm. *Tangibility* is calculated as the ratio of fixed to total assets. *Private firm* is an indicator denoting firms that are not publicly traded. We use this variable as a proxy for capital constraints. Summary information for all control variables is reported in Table 1.

III. CEO Gender and Risk-Taking: Regression Results

To assess the relation between gender and corporate risk-taking, we start by regressing our measures of risk-taking on CEO gender and other determinants of risk-taking that, if excluded, could induce spurious correlations. The results are reported in Table 2.

Leverage is the dependent variable in Regression (1). Regression (1) is a panel ordinary least squares (OLS) regression with standard errors clustered at the firm level. The results of Regression (1) indicate that firms run by female CEOs use significantly less leverage and therefore take less financial risk than firms run by male CEOs. The coefficient of *Female CEO* indicates that after controlling for several other determinants of capital structure choices, the leverage of firms run by female CEOs is 0.030 lower on average than the leverage of firms run by male CEOs. This appears to be a sizeable difference, given an average value of *Leverage* of 0.363 for the entire sample. The coefficient on the gender variable has a p-value of less than 0.001. This result provides direct evidence that male CEOs are willing to take greater firm-level risk than female CEOs.

The volatility of firm-level profitability ($\sigma(ROA)$) is the dependent variable in Regression (2). We again employ a panel OLS specification with standard errors clustered at the firm level. In this Model (as well as in Regression (3)), all independent variables are measured at the first year-end of the five-year sample period over which the volatility of earnings (or the likelihood of survival) is measured.

The results show that the volatility of a firm's ROA is significantly lower when the firm is run by a female CEO (p-values ≤ 0.001). As with *Leverage*, the difference in the volatility of firm-level profitability between firms run by female and male CEOs is sizeable (1.845/100=0.018) relative to the sample mean (0.049).

Regression (3) is a cross-sectional probit regression of the *Likelihood of survival*, in which the outcome is 1 if a company survives for at least five years and 0 otherwise. The results in Table 2 indicate significantly higher survival rates for companies run by female CEOs. To the extent that firms that take more risk are less likely to survive through time, this result is consistent with the notion that companies managed by women tend to engage in less risky projects.

Thus, both corporate choices (such as leverage) and corporate outcomes (volatility of profitability and the likelihood of survival) are significantly different depending on the gender of the CEO.

III.A. Endogeneity Concerns

As with any empirical study, a caveat in the interpretation of our results is the issue of endogeneity. In the following sub-sections, we take a number of steps to address this concern.

III.A.1 Luck? Falsification Tests

A first concern is that our results might simply be due to luck. If this were the case, we would detect a statistically significant relation between CEO gender and corporate risk-taking, but in fact there would be no true underlying relation between these two variables. To investigate this concern, we run placebo tests to assess whether our results disappear when we randomly assign the CEO gender indicator. As in Table 2, we use the full sample of firms.

First, we randomly reshuffle the CEO gender indicator across all firms. When doing so, we maintain the same number of observations with a female (male) CEO as in the baseline specification, but we disrupt the correct assignment of the CEO gender variable to firms. We then run the placebo tests on the full sample.

For each proxy of risk-taking, we estimate the vector of regression coefficients in the placebo simulation 100,000 times. The distribution of the estimated coefficients obtained from the placebo tests with random reshuffling approximates the distribution under the null hypothesis that there is no difference between female and male CEO-run companies. We use those estimates to compute the likelihood of observing the true point estimate by chance. In the placebo simulations, we never find the coefficient of the CEO gender variable to exceed the true point estimate. This result is inconsistent with luck explaining our earlier findings.

III.A.2 Time-Invariant Omitted Variables: Firm Fixed Effects

Our second endogeneity concern relates to the possibility that our results could be influenced by omitted variables. In particular, the documented correlation between CEO gender and corporate risk-taking may simply reflect unobservable characteristics that affect both CEO gender choice and corporate risk-taking choices. The specific concern is that the omission of these factors might lead us to incorrectly attribute the differences in risk-taking to differences in CEO gender. In the regressions in Table 2, we control for firm-level determinants of risk-taking suggested by theory and/or identified in prior empirical studies.

In this section, we exploit the panel dimension of our dataset to control for *time-invariant* firm-specific characteristics that may be correlated with omitted explanatory variables. More specifically, we add firm fixed effects to the (panel) regression specifications. The inclusion of firm fixed effects removes any purely cross-sectional correlation between gender and risk-taking, greatly reducing the risk of spurious correlation. In particular, in firm fixed effects regressions, we compare

CEOs of different genders operating the same firm. While we recognize that CEOs are not randomly assigned, this approach nevertheless represents a substantial step toward a causal interpretation of the results.

In this estimation, we include only firms that experience a change in the CEO from male to female or vice versa (henceforth, "transition firms"), as only those firms contribute to the identification. (Similar results obtain if we keep in the sample firms that do not experience a change in the CEO. Those results are not tabulated, to save space). In Table 3, regressions (1) and (2), we replicate our earlier analysis (with firm fixed effects now included) for leverage and the volatility of firm-level profitability. The results strongly corroborate the previous evidence. The magnitude of the effect of gender on risk-taking is again both economically and statistically significant, with p-values of less than 0.001.

III. A.3 Time-Varying Omitted Variables: Other CEO Characteristics

Our third concern is that CEO transitions might be accompanied by changes in CEO characteristics other than gender. To the extent that these characteristics affect risk-taking and had been omitted from the previous analyses, we could have still incorrectly attributed the change in risk-taking observed at the time of a transition to a "gender" effect. We note that for the other CEO (or any) characteristics to explain the gender results, changes in these characteristics must (1) occur around the time of the transition (as in the firm fixed-effects specifications identification comes from time series changes); (2) be different for the subsample of firms (initially) run by male CEOs and female CEOs; and (3) credibly affect risk-taking choices.

In the earlier analysis we did control for CEO ownership and block ownership. We reported that the gender-related differences in risk-taking are present above and beyond a pure ownership result. In this section, we add controls for two additional CEO attributes that might affect risk-taking choices. As data on these additional CEO attributes are limited, adding these controls reduces the sample size drastically. For this reason, these controls are not included in the main regressions.

First, we control for CEO wealth, as prior studies suggest that higher wealth is associated with a higher propensity to take risk (Arrow, 1984; Calvet and Sodini, 2013; Paravisini, Rappoport, and Ravina, 2013). To the extent that women are less wealthy than men on average, a transition from a male to a female CEO (or vice versa) could result in a greater propensity to avoid (take) risk because of a wealth effect. So, to the extent that CEO wealth changes at the time of a CEO transition, it is possible that we might have incorrectly attributed our results to gender.

Data in *Amadeus* allow us to construct a proxy for the equity wealth of (some) CEOs. In particular, to determine the equity wealth for each CEO, we first calculate the dollar value of the investment in each firm in which he/she appears as a shareholder. This is computed by multiplying the individual's ownership in the firm by the firm's book value of equity. (We use book values because most of the firms in the sample are privately-held). Next, we sum the value of all equity investments to obtain each CEO's total equity wealth.

The second attribute that we add as control is CEO age. Earlier studies have suggested that younger CEOs are more prone to take risks (Taylor, 1975; Kovalchik et al., 2005; Forbes, 2005). To the extent that men tend to become CEOs at a younger age than women, the change in CEO age could explain our earlier results. CEO age is also determined based on data in *Amadeus*. Importantly, the regression results in the last two columns of Table 3 show that the effect of gender on risk-taking is still present after controlling for these additional CEO characteristics.[9]

[9] Note that the tests in Table 3 are built around a sample of transitions from male to female CEOs (and vice versa), rather than around shocks to CEO wealth or CEO age. As such, those tests are meant only to assess the impact of gender after controlling for these other CEO characteristics that *might* change around CEO transitions, as opposed to establishing the impact of CEO wealth or age *per se*.

Thus, this test further mitigates the possibility that our previous results are due to time-varying, CEO-specific, omitted variables. Admittedly, we recognize that we cannot control for other, possibly relevant CEO characteristics. Therefore, as is often the case, we acknowledge that with this test we cannot rule out the omitted variable issue completely.

III.A.4 Self-Selection: Propensity Score Matching

A fourth concern stems from the idea that gender could be a selection criterion for the CEO. It is evident from Table 1 that firms run by male CEOs and firms run by female CEOs differ across several characteristics. Simply controlling for these attributes (as in the previous analyses) might be insufficient.

To address this concern, we employ a propensity score matching procedure (Rosenbaum and Rubin, 1983) to identify a control sample of firms that are run by male CEOs and that exhibit no observable differences in characteristics relative to the firms run by female CEOs. Thus, each pair of matched firms is virtually indistinguishable from one another except for one key characteristic: the gender of the CEO. We then compare the *Leverage*, σ*(ROA)*, and *Likelihood of survival* between the two groups. As the control firms are restricted to a set of peers that is almost identical in terms of observable characteristics, firms run by female CEOs are expected to make the same risk-taking choices as firms run by male CEOs.

To implement this methodology, we first calculate the probability (i.e., the propensity score) that a firm with given characteristics is run by a female CEO. This probability is calculated based on firm-level characteristics that we included in the previous regression analyses. More specifically, in Panel A, the propensity score is estimated *within* a country-industry-year-public/private status category, as a function of ROA, sales growth, the natural log of total assets, the natural log of firm age, asset tangibility, the ownership of the CEO, and the ownership of the largest ultimate shareholder. To ensure that the firms in the control sample are sufficiently similar to the firms run by a female CEO, we require that the maximum difference between the propensity score of the firm run by a female CEO and that of its matching peer does not exceed 0.1% in absolute value.

The results in Panel A of Table 4 indicate that, even when holding observable firm-level characteristics virtually identical between the two groups, firms run by female CEOs tend to take less risk in comparison to firms run by male CEOs. As the results in Table 4 show, the average leverage of firms run by female CEOs is 34.2%, compared with 37.4% for otherwise similar firms run by male CEOs. The average volatility of ROA is 2.44% for firms run by female CEOs and 3.97% for firms run by male CEOs. The likelihood of survival over a five-year period is 68.7% for firms run by female CEOs and 56.0% for firms run by male CEOs. All differences in risk-taking between the two groups are statistically significant with p-values of less than 0.001. More important, these results indicate that the previously documented gender-related differences in risk-taking are not due to observable differences in firm characteristics.

In Panel B of Table 4 we match firms *within* a country-industry-year-public/private status category, as a function of firm-level *as well as* CEO-level characteristics (CEO wealth and CEO age). Importantly, even with this very restrictive matching, our conclusions remain unchanged.

In Panel C of Table 4 we present a propensity score analysis of the firms experiencing a transition from male to female CEOs. To minimize the possible impact of confounding events, those firms are matched with a control group of firms that are run by male CEOs during the entire sample period. In this analysis, we match firms *within* a country-industry-year-public/private status category as a function of firm (and ownership) attributes. [10]

We find that transition firms on average experience a reduction in *Leverage* from 0.403 (under a male CEO) to 0.380 (under a female CEO). This change is statistically significant with a p-

[10] The small sample size prevents us from undertaking an analogous propensity score analysis of firms experiencing a transition from female to male CEOs. In particular, for the subset of firms experiencing a transition from female to male CEOs we do find a significant increase in risk-taking after the transition, but we do not have enough control firms (i.e., firms always run by female CEOs) to undertake a propensity score analysis using the matching algorithm described above.

value of less than 0.001. By contrast, the leverage of otherwise similar firms that were always run by a male CEO does not change significantly. The difference between the change in leverage of the transition firms and that of the control group is statistically significant with a p-value of less than 0.001. Similar conclusions obtain when we look at the change in the volatility of firm level profitability, *σ(ROA)*. Once again, we recognize that CEO gender cannot be considered as completely randomly assigned. However, this additional evidence provides an important alternative and additional step toward that ideal.

III.A.5 Non-Random Self-Selection: Switching Regression Analysis

The fifth concern is that firms may non-randomly self-select into appointing a male or a female CEO and that this self-selection alone might explain the risk-taking choices. We address this concern by employing two variations of the Heckman's (1979) two-step procedure: a switching regression analysis with endogenous switching and a treatment effect model. (The latter is discussed in the next section).

The switching regression analysis with endogenous switching consists of three equations. First, we have a binary outcome equation which, in our case, models the choice of the CEO gender. We then have two regressions for the variable of interest *conditional* on the choice of gender. In our case, we perform this test for all three measures of risk-taking: leverage, volatility of firm-level profitability, and probability of survival.

Following Maddala (1991), the binary choice model is expressed as:

$$I_i^* = \gamma' \cdot Z_i + u_{\mathrm{i}} \tag{1}$$

where Z_i is a vector of exogenous variables that influence the choice of firm i to appoint either a female or a male CEO: $I_i = 1$ if $I_i^* > 0$ and $I_i = 0$ if $I_i^* \leq 0$. Accordingly, the two regressions for the variable of interest are expressed as:

$$y_{1i} = \beta_1' \cdot X_{1i} + u_{1\mathrm{i}} \quad (2)$$

$$y_{2i} = \beta_2' \cdot X_{2i} + u_{2\mathrm{i}} \quad (3)$$

Consequently, $y_i = y_1\ if\ I_i = 1$ and $y_i = y_2\ if\ I_i = 0$. The presence of the selection bias lies in the nonzero correlation between the error term in Equation (1) and the error terms in Equations (2) and (3). Therefore, estimating (2) and (3) via OLS may lead to inconsistent estimates of the regression parameters. Consistent OLS estimators can be instead obtained with a two-stage method following Lee (1978), Heckman (1979), and Maddala (1983).

We first estimate Equation (1) using a probit model. This is instrumental in obtaining consistent estimates of γ. These coefficient estimates are used to compute the inverse Mills ratio for Equations (2) and (3). These terms adjust for the conditional mean of u and allow the equations to be consistently estimated by OLS. Following Maddala (1991) the two inverted Mills ratio parameters are: $\lambda_1(\gamma Z_i) = \frac{-\phi(\gamma Z_i)}{\Phi(\gamma Z_i)}$ and $\lambda_2(\gamma Z_i) = \frac{\phi(\gamma Z_i)}{1-\Phi(\gamma Z_i)}$ where ϕ represents the standard normal density function while Φ represents the standard normal cumulative distribution function.

Equations (2) and (3) are then augmented with the inverse Mills ratios λ_1 and λ_2 as additional regressors. One of the appealing features of this procedure is that it allows us to conduct a counterfactual analysis; put more simply, we can use this procedure to investigate alternative, "what if" scenarios. For instance, it allows us to infer what the leverage of a company run by a male CEO would have been had it instead been run by a female CEO. This counterfactual is calculated by multiplying the estimated coefficients from Equation (2) (the leverage regression for firms run by female CEOs) by the observed values of the right-hand side variables of companies run by male CEOs, excluding the inverse Mills ratio (see Maddala, 1991).

To facilitate identification, in the first stage we use an exogenous determinant of the likelihood that the board might appoint a female CEO. For this purpose, we build on the notion of familiarity.[11] We argue that (male) board members who serve on (other boards) with female CEOs are more familiar with working under the directives of a woman. To the extent that they appreciate and are accustomed to diversity (they would have presumably left the other boards otherwise), they might be more inclined to propose a woman for the position of CEO.

Therefore, we compute the fraction of firms with a female CEO among all other firms in which the firm's male directors also serve as directors. A benefit of this measure, as opposed to counting the number of other firms in which the firm's directors also serve as directors, is that it does not depend on the number of boards on which a director sits. This greatly mitigates the concern that the variable might correlate with connections through networks, which would likely not satisfy the exclusion restriction. As we show below (see Panel B of Table 6), this exogenous determinant of the CEO gender choice is indeed correlated with the endogenous variable of interest. It is, however, more difficult to argue that this variable might affect risk-taking through other channels.

Results reported in Table 5 compare observed values for our three proxies of risk-taking with the counterfactuals for both groups: firms run by male CEOs and firms run by female CEOs. For firms run by female CEOs, leverage would have been 36.6% had the firms been run by a male CEO, compared to the actual average leverage of 32.2%. The mean difference in leverage is 4.4 percentage points, which is significant with a p-value of less than 0.001. Similarly, for firms run by male CEOs,

[11] Grinblatt and Keloharju (2001), Huberman (2001), and Seasholes and Zhu (2010), among others, document that familiarity appears to be important to investors in an investment setting.

leverage would have been 34.4% had the firms been run by a female CEO, compared to the actual average leverage of 36.7%. The difference between the two (2.3 percentage points) is again highly significant statistically and economically.

Similar conclusions are obtained for the other proxies of corporate risk-taking. These tests confirm the previous evidence that, even after controlling for self-selection, women CEOs tend to take on less risk compared to their male counterparts.

III. A.6 Non-Random Self-Selection: Treatment Effects Model

As a sixth attempt to try to address potential endogeneity concerns, we employ a variation of the Heckman two-step approach: the treatment effects model. The first stage of this model is identical to the one outlined in Equation (1), above. However, from Equation (1) we calculate only one inverse Mills ratio: the combination of the λ_1 for firms run by female CEOs and λ_2 for firms run by male CEOs. In the second step, we include this inverse Mills ratio alongside the dummy variable characterizing CEO gender (and other controls). In this manner, we can explicitly test whether CEO gender still plays a role in financial and investment policies after controlling for self-selection due to unobservable private information.

In Table 6 we report the estimates of the probit coefficients and the treatment effects model coefficients. More important, after we add the inverse Mills ratio (which is never significant) to correct for self-selection, the coefficient of the CEO gender indicator maintains the same sign as in the earlier specifications. Thus, after accounting for unobserved private information that makes certain firms select a female CEO, there is still a large effect of CEO gender on risk-taking choices. In particular, appointing female CEOs leads to less corporate risk-taking.

One final concern that we need to address with this analysis relates to the possibility that the exogenous determinant of CEO gender selection used might not satisfy the exclusion restriction. A specific concern is that the same omitted variable could explain the CEO/board member selection *and* the risk-taking choices of firms connected via the board of directors. Notice that it is not sufficient that this omitted variable explains only CEO and board selection choices. It also needs to explain risk-taking.

To mitigate this remaining concern, we use a related but modified determinant of CEO gender selection. In particular, among all other firms in which the firm's male directors also serve as directors, we compute the fraction of firms with (1) a female CEO, (2) above-average leverage, (3) above-average volatility of ROA in the subsequent five years, and (4) lack of survival during the following five years. By construction, we now focus on other firms with female CEOs and *above*-average risk-taking. Thus, for an omitted variable to explain our results, this variable would need to explain (1) CEO gender selection, (2) board selection, (3) *below*-average risk-taking for the firm in question, and (curiously), at the same time, (4) *above*-average risk-taking among the other firms in which the firm's male directors serve. Clearly, this omitted variable needs to explain quite a few (opposing) outcomes, which certainly stands in contrast to a basic "law of simplicity."

As shown in Table 7, our conclusions are unchanged when we use this new determinant of the CEO gender selection choice. This result thus further reinforces the plausibility of a causal effect of CEO gender on corporate risk-taking choices. [12]

IV. Underlying Mechanisms

In the following sections we investigate the role of various possible underlying mechanisms in explaining why CEO gender matters for corporate risk-taking choices. Note that those mechanisms are not mutually exclusive. Also note that data constraints limit our ability to measure some of the

[12] The results of the switching regression analysis in the previous sub-section are robust to alternatively using this exogenous determinant of the CEO selection choice.

underlying frictions in an ideal way. Nevertheless, the analysis below represents an important step toward understanding why CEO gender appears to matter.

IV.A. Agency

In an agency context, when ownership and control do not fully coincide, a potential conflict of interest between the principal and the agent might arise. In particular, CEOs might act to maximize their own utility as opposed to the utility of shareholders. This could mean taking "too much" risk, "too little" risk, or both. In an agency framework, the interests of the CEOs are often believed to become more aligned with those of shareholders as CEO ownership increases (Jensen and Meckling, 1976). Thus, if agency is the mechanism behind the documented gender-related differences in risk-taking, we should find these differences to be less pronounced among firms with relatively low agency conflicts (such as those with a high level of CEO ownership) as compared to firms with relatively high agency conflicts (such as those with a low level of CEO ownership). To test this first alternative explanation, we re-run the Models in Table 2 separately for two sub-samples of firms: the quartile of firms with the highest level of CEO ownership in each country/year and the quartile of firms with the lowest level of CEO ownership in each country/year. The results are reported in Panel A of Table 8. The table reports only the coefficient of *Female CEO* and omits the coefficients of the various control variables (see Table 2) to save space.

Leverage is the dependent variable in Columns (1) and (2) of Table 8. The volatility of firm level profitability is the dependent variable in Columns (4) and (5). The likelihood of firm survival is the dependent variable in columns (7) and (8). Columns (1), (4), and (7) report the regression results for the subsample of firms with low agency conflicts. In Panel A those correspond to the quartile of firms with highest level of CEO ownership. Columns (2), (5), and (8) report the regression results for the subsample of firms with high agency conflicts, for which the gender-related differences in risk-taking are predicted to be more pronounced based on an agency argument. In Panel A those are the firms in the bottom quartile of CEO ownership.

To formally test for an agency story, we compare the coefficient of *Female CEO* for the quartile of firms with the highest CEO ownership to that for the quartile of firms with the lowest CEO ownership. Columns (3), (6), and (9) report the p-values of the difference for the *Leverage*, σ*(ROA),* and the *Likelihood of survival* models, respectively

Using *Leverage* as the dependent variable, we find that the coefficient of *Female CEO* is -0.032 for the sub-sample of firms with low agency conflicts (i.e., high CEO ownership) and -0.045 for the sub-sample of firms with high agency conflicts (i.e., low CEO ownership). The difference between the two is significant with a p-value of less than 0.001. The greater difference in risk-taking between genders documented for the subsample of firms with higher agency conflicts is consistent with an agency explanation of our results. The difference in the volatility of firm-level profitability across genders is also greater among the subsample of firms with low CEO ownership. Further, the gender-related difference in the likelihood of firm survival is more pronounced for the subset of firms with low CEO ownership. Thus, using *CEO ownership* as a proxy for agency conflicts, the evidence supports the notion that agency considerations are a possible mechanism behind our results.

To investigate the validity of the agency story further, in Panel B we alternatively exploit the notion that agency conflicts should be mitigated by the presence of a large shareholder (Shleifer and Vishny, 1986, 1997). Interestingly, large shareholders are the norm in our sample of predominantly private firms. Therefore, the ability of a CEO to imprint his/her own preferences on corporate choices (to the detriment of shareholders) should diminish when a large blockholder is present. To investigate whether this is the case, in Panel B of Table 8 we split the sample based on *Cash flow rights*, the ownership rights of the largest ultimate shareholder. As before, for each dependent variable, the regression in the ”predicted “low” difference“ columns (Columns (1), (4), and (7)) reports the results for the subsample of firms with the lowest agency conflicts – the quartile of firms with the most concentrated ownership by the largest shareholder in each country/year. The regression in the ”predicted “high” difference“ columns (Columns (2), (5), and (8)) reports the results for the subsample of firms with more pronounced agency conflicts – the bottom quartile of ownership by the largest shareholder in each country/year.

In the *Leverage* regressions, we find the coefficient of *Female CEO* to be -0.060 for the sub-sample of firms with low agency conflicts (i.e., high CEO cash flow rights) and -0.039 for the sub-sample of firms with high agency conflicts (i.e., low CEO cash flow rights). The difference between the two is significant with a p-value of less than 0.001. The results in Columns (4) and (5) further show that the gender-related differences in the volatility of firm-level profitability are also significantly more pronounced for the subsample of firms with low agency conflicts. These results are in sharp contrast to an agency explanation of our story, as the differences in risk-taking are greatest when agency conflicts are smallest.

Thus, while agency considerations likely affect corporate decisions and outcomes, our results are, at least in part, inconsistent with an agency-based explanation of the differences in corporate risk-taking between male and female CEOs. To state it differently, the evidence with respect to an agency explanation of our results is, at best, mixed.

IV. B. Asymmetric Information

A second alternative explanation states that if information asymmetries are correlated with gender, then the cost of accessing external financing could be different for firms run by male vs. female CEOs. A specific concern is that women face a greater difficulty than men in raising external capital. As a consequence, the leverage of the firms they manage is lower, and the riskiness of investment policies might be affected as well. Three pieces of evidence go against an asymmetric information-based explanation of our results.

First, using data from the *Loan Pricing Corporation*'s *DealScan* database, we fail to find evidence of any major supply-side discrimination against women in the debt market. More specifically, for the firms in our sample that appear in *DealScan*, we find that the average value of the loans obtained by (69) firms run by female CEOs is statistically similar to the value of loans obtained by (934) firms run by male CEOs in our sample (p-value of diff. = 0.751). Thus, conditional on a firm obtaining at least one loan, there appears to be no gender-related difference in the amount of capital obtained. We instead document a significant difference in the cost of borrowing. However, contrary to a story in which informational asymmetries are more pronounced among firms run by female CEOs (which would explain their lower leverage), we find that the cost of borrowing is lower for firms run by female CEOs. In particular, the average spread (over LIBOR) is 1.62% for firms with a female CEO and 1.98% for firms with a male CEO (p-value of diff. = 0.084). These results cast doubt on the possibility that firms run by female CEOs have lower leverage because of greater difficulty or cost in raising funds.

Second, following the spirit of the tests in the previous section, we partition the sample based on two proxies for informational asymmetries and investigate whether gender-related differences in risk-taking are more pronounced among firms potentially more sensitive to this issue. Our first proxy for informational asymmetries is based on the premise that, presumably, information is relatively more asymmetric for privately-held firms as compared to publicly-traded firms. For example, private firms publish their accounting information annually (as opposed to semi-annually or even quarterly for public firms). Second, stock price data are not available to guide choices in private firms. Thus, to the extent that informational asymmetries are more pronounced among private firms, we should expect differences in risk-taking between genders to be more pronounced for this subset of firms.

Panel C of Table 8 compares the results between publicly-traded firms (Columns (1), (4), and (7)) and privately-held firms (Columns (2), (5), and (8)). Contrary to the notion that informational asymmetries are the mechanism behind our results, we find that gender-related differences in risk-taking are significantly more pronounced among public firms when the volatility of firm-level profitability is the dependent variable.[13]

To investigate the issue further, in Panel D we alternatively split firms based on firm size, as Vermaelen (1981) suggests that informational asymmetries decline with size. Columns (1), (4), and (7) report the results for firms in the top size quartile (low informational asymmetries group), while Columns (2), (5), and (8) report the results for firms in the small size quartile (high informational asymmetries). With this proxy, we find that gender-related differences in corporate risk-taking are significantly more pronounced for firms with low informational asymmetries as compared to those with high informational asymmetries for two of the risk-taking proxies. Based on the results in this section, we conclude that informational asymmetries do not appear to explain the documented gender-related differences in corporate risk-taking choices.

IV.C. Behavioral Considerations

A third alternative explanation is that women are less overconfident than men. This presumption is well-documented in the social psychology literature and in experimental economics studies, as surveyed by Croson and Gneezy (2009). For example, Lundeberg, Fox, and Punćochaŕ (1994) show that young boys are more overconfident (when wrong) than young girls. Barber and Odean (2001) document that men trade much more than women and perform worse. Importantly, Malmendier and Tate (2005, 2008) document that differences in CEO overconfidence have implications for corporate decision making.

[13] The results are nearly identical when we compare publicly-traded firms to privately-held firms with widespread ownership as in Michaely and Roberts (2012).

Prior management and psychology studies suggest that overconfidence declines with age (Taylor, 1975; Kovalchik et al., 2005; Forbes, 2005). We rely on this intuition to test whether overconfidence can explain our results. In particular, in Panel E of Table 8 we compare the results between the quartile of firms with relatively fewer overconfident (older) CEOs to those for the quartile of firms with relatively more overconfident (younger) CEOs. Overconfidence predicts a greater difference in risk-taking for the sub-sample of younger CEOs (Bengtsson, Persson, and Willenhag, 2004). As the results in Panel E show, we fail to find any evidence in support of this claim.

IV.D. Risk-Aversion

A fourth alternative explanation is that the gender-related differences in corporate risk-taking reflect systematic differences in risk-aversion. We use *CEO age* to investigate the extent to which risk-aversion is the possible mechanism behind our results. Earlier studies document that differences in risk-aversion between genders are most pronounced at a middle age. In fact, at a young age, girls appear to be as risk-averse (or tolerant) as boys. Differences in risk-aversion reach a peak around the age of 30-40 and subsequently decrease with age (Brinig, 1995; Pålsson, 1996; Dohmen et al., 2005; Sharifullina, Belianin, and Petrovsky, 2012). Therefore, we investigate whether, consistent with a risk-aversion-based interpretation of our results, differences in risk-taking between genders are more pronounced at intermediate ages. To do so, we select the 25% of firms whose CEO age is in the middle of the distribution and compare those with the quartiles of older and younger CEOs (identified earlier on in Panel E). These comparisons are presented in Panels F (older vs. middle-age CEOs) and G (younger vs. middle-age CEOs). For risk-aversion to explain our results, differences in risk-taking should be more pronounced among middle-age CEOs. The results provide some support to this idea. Differences in risk-taking are in fact more pronounced among middle-age CEOs in the leverage and volatility of ROA regressions.

IV.E. Differences in Pay Structure

A fifth alternative explanation is that the results might be due to underlying differences in pay structure across genders. *Amadeus* provides no data on CEO compensation. However, using data in *Amadeus* we are able to identify a sub-sample of firms less subject to the concern that differences in pay structure could explain the results. In particular, differences in pay structure are unlikely to be important among firms in which the CEO is the largest and dominant shareholder. In many cases, in those firms CEOs receive no explicit pay. Even when they do, most of their compensation still comes from their equity ownership. Thus, the concern that our results might be due to differences in pay structure should be less important among firms in which the CEO owns 50% or more of the shares. We therefore check whether there is any gender-related difference in risk-taking among this sub-sample of firms. As shown in Table 8, Panel H, we continue to find significant gender-related differences in corporate risk-taking among this subsample of CEO-owned firms. This result is inconsistent with the explanation that differences in incentives lead to documented gender-related differences in corporate risk-taking.

As an additional test, we use data from *CapitalIQ* to proxy for systematic gender-related differences in pay structure across countries. In particular, *CapitalIQ* provides some data on CEO compensation. The vast majority of the compensation data in *CapitalIQ* are for CEOs of publicly-traded firms, although some data are available for a limited number of privately-held firms. Thus, our test is based on the presumption that incentives are, at least, correlated (across countries) between public and private firms. Incentives (or the lack thereof) presumably influence a CEO's propensity to take risks.

Thus, as a measure of typical (dis)incentives, separately for each country and CEO gender type,[14] we compute the ratio of fixed cash salary to total compensation. Total compensation includes bonuses, stock options, and other incentives. Within each country, we then compute the ratio of cash salary to total compensation for female CEOs, over the ratio of cash salary to total compensation for male CEOs. If differences in compensation structure (in particular, insufficient incentives given to female CEOs) are giving rise to our results, we expect differences in risk-taking to increase as our measure of relative disincentives increases.

Thus, we expect the gender-related difference in risk-taking to be greater in Columns (2), (5), and (8) of Panel I, as compared to columns (1), (4), and (7). While we find this to be the case when the likelihood of firm survival is used as a proxy for risk-taking, we find the opposite to be true when the volatility of firm-level profitability is used to proxy for risk-taking. Thus, the results are at best mixed with respect to an incentives-based interpretation of our evidence.

IV.F. Differences in Unemployment Risk

A sixth alternative explanation is that female CEOs seek to avoid risk because of job market frictions. In particular, if risk-taking increases the chances of losing a job, and if finding a new job is more difficult for women, it is possible that our results could be driven by a job loss-related friction. To test the importance of this consideration, we gather country-year level unemployment data for individuals with a prior managerial position from the *Eurostat Labour Force Survey*. We use these data to compute the ratio of unemployed women with a prior managerial position over the total unemployment among individuals with a prior managerial position.

[14] As in Section II.A., we employ country-specific internet sources to classify gender based on each individual's first name.

Differences in risk-taking behavior between genders should increase the higher this ratio, and thus should be greater in Columns (2), (5), and (8) of Panel J as compared to columns (1), (4), and (7). Contrary to an unemployment-based interpretation of our results when using the volatility of ROA as measure of risk-taking, we find that differences in risk-taking between genders become more pronounced when female unemployment becomes similar to male unemployment. It is therefore difficult to reconcile our results with a job market friction story.

IV.G. Differences in Altruism

A seventh alternative explanation is that the greater risk-avoidance exhibited by female CEOs might reflect a higher level of altruism among women (Alesina and Giuliano, 2011; Funk and Gathmann, 2009). In particular, female CEOs might care more about their employees and creditors. If that were the case, keeping corporate risk low might be a way to reduce instances in which firing employees may be necessary, or in which defaults might occur.

To test the bearing of such considerations, we build a proxy for altruism using data from the integrated *World Value Survey/European Value Survey*. We focus on two questions. In the first question, respondents are asked whether they personally think that "a useful job for society" is an important aspect of a job. In the second question, respondents are asked whether it is important to them to help the people nearby. In building our altruism score, we assign a value of 1 (to reflect more altruism) if a given respondent gave a "yes" answer to question 1. Similarly, we assign a score of 1 if the respondent answered "Agree" or "Strongly Agree" to question 2. For each question, separately for male and female respondents, we compute the fraction of respondents giving an answer coded as 1 in each geographic subdivision.[15] Then, for each region and by gender type, we compute the

[15] Examples of the smallest geographic subdivisions are "North West," "East Midlands," "London," and "Wales" in the U.K. The median population across our geographic subdivisions is 1,743,791 inhabitants.

average of the two scores to derive a measure of altruism, where higher values of the measure indicate a more favorable attitude toward others. The "Altruism" score used is the ratio of the attitude toward others by female respondents in a given region, over the attitude toward others index for male respondents in that same region. We use the postcode or the name of the city in which a firm is headquartered to match the *WVS/EVS* survey data with *Amadeus*.

To test whether altruism explains the gender-related differences in corporate risk-taking, we compare the results between firms based in regions with small differences in altruism between men and women (bottom quartile) to the results for firms based in regions where women are relatively more altruistic than men (top quartile). We expect differences to be greater among the second group.

In line with an explanation of our results based on an altruism-related story, for the first two proxies of risk-taking we find that the gender-related differences in risk-taking are significantly more pronounced in regions where women appear to be more altruistic. Thus, altruism appears to explain some of the documented differences in risk-taking across genders.

IV.H. Social Norms

A further possibility that we are able to test is that female CEOs act differently from male CEOs because of societal expectations about what behavior is appropriate (Akerlof and Kranton, 2000; Altonji and Blank, 1999; Booth and Nolen, 2012; Guiso et al., 2008). For example, it is possible that in more sexist societies women are expected to avoid risky choices. We build a proxy for attitude toward women using data from the integrated *World Value Survey/European Value Survey*. We focus on three questions to capture social norms related to the role of women in society. These questions are specifically related to the attitude toward the participation of women in the workforce.

In Ireland, Luxembourg, and Switzerland, data are available only at country-level. These countries are not included in these regressions.

Respondents are asked whether they (strongly) agree, (strongly) disagree, or neither agree nor disagree with the following statements: (1) "When jobs are scarce, men should have more right to a job than women;" 2) "Being a housewife is just as fulfilling as working for pay;" and 3) "Both the husband and wife should contribute to household income." We assign the value of 1 to reflect a more favorable attitude toward women if the answer is "Disagree" or "Strongly Disagree" in questions 1 and 2 and if the answer is "Agree" or "Strongly Agree" in question 3. We compute the proportion of respondents giving an answer coded as 1 for each question in each given region. Finally, for each region, we compute the average of the three scores to derive a measure of the *attitude toward women*, where higher values of the measure indicate more favorable attitudes toward women.

To test whether social norms, in particular the attitude toward women in society, explain the gender-related differences in corporate risk-taking, we compare the results between firms based in regions with a more favorable attitude toward women (top quartile) to firms based in regions with a less favorable attitude toward women (bottom quartile). For social norms to explain our results, gender-related differences in corporate risk-taking choices should become greater as the attitude toward women deteriorates. The results reported in Panel L of Table 8 provide some support to this notion, at least when leverage is used as a proxy for risk-taking.

V. Conclusions

We provide evidence that CEO gender significantly affects corporate risk-taking choices. More precisely, firms run by female CEOs tend to make financing and investment choices that are less risky when compared with firms run by male CEOs. The effect of CEO gender on corporate risk-taking is significant both statistically and economically. Further, it is present across a variety of corporate choices and outcomes, and it is robust to controlling for traditional firm-level determinants of risk-taking as well as for CEO characteristics, country, industry, and time trends. The results are robust to various tests for endogeneity, including placebo tests, firm fixed effects, the use of (different variations of) a propensity score matching procedure, a switching regression analysis with endogenous switching, and a treatment effects model.

Thus, using a large and comprehensive sample of European privately-held and publicly-traded firms from *Amadeus*, we show that the earlier evidence of gender-related differences in the propensity to take risks extends to corporate CEOs. We further provide suggestive evidence that the risk-avoidance of female CEOs appears to be traceable back to differences in risk-aversion between genders, differences in altruism, and social norms. In particular, gender-related differences in risk-taking are more pronounced among middle-age CEOs, in regions where women are relatively more altruistic than men, and in regions with a less favorable attitude toward the participation of women in the workforce. It is instead more difficult to reconcile our results with explanations based on agency considerations, informational asymmetries, behavioral considerations, job market frictions, and differences in incentives.

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Table 1. Univariate statistics

Leverage is defined as the ratio of financial debt divided by the sum of financial debt plus equity. Financial debt is the sum of long-term debt (excluding "other non-current liabilities") plus short-term loans. *σ(ROA)* is the volatility of the firm's operating return on assets (ROA), defined as the ratio of earnings before interests and taxes to total assets. *Likelihood of survival* is an indicator variable that takes the value of 1 if the firm survives at least five years and 0 otherwise. *Female CEO* is an indicator variable that takes the value of 1 if the CEO is a woman and 0 otherwise. *CEO ownership* is the cash flow rights of the CEO on the firm's earnings. *Cash flow rights* is the ownership rights of the largest ultimate shareholder. *Sales Growth* is calculated as the annual rate of growth of sales. *Ln (Size)* is the natural log of total assets (in thousands US$), expressed in 2000 prices. Total assets is the sum of total fixed assets (tangible and intangible fixed assets and other fixed assets) and current assets (inventory, receivables, and other current assets). *Ln (1+Age)* is the natural logarithm of (1 + the number of years since incorporation). *Tangibility* is calculated as the ratio of fixed to total assets. *Private firm* is an indicator denoting firms that are not publicly traded. With the exception of *Likelihood of survival*, all statistics are computed for the panel of observations. *Likelihood of survival* can be computed only cross-sectionally.

	Full sample			Female CEOs	Male CEOs	p-value of diff.
Full sample	Mean	Median	Stnd. dev.			
Leverage	0.363	0.310	0.326	0.322	0.368	0.000
σ(ROA)	0.049	0.031	0.057	0.029	0.051	0.000
Likelihood of survival	0.502	1	0.500	0.600	0.490	0.000
Female CEO	0.096	0	0.295			
CEO ownership	0.083	0	0.221	0.092	0.082	0.000
Cash flow rights	0.638	0.680	0.357	0.586	0.644	0.000
ROA	0.061	0.051	0.110	0.067	0.061	0.000
Sales growth	0.233	0.055	0.862	0.200	0.236	0.000
Ln (Size)	10.225	10.072	1.445	10.072	10.241	0.000
Ln (1+Age)	2.876	2.890	0.806	2.901	2.873	0.000
Tangibility	0.227	0.146	0.238	0.225	0.227	0.383
Private firm	0.951	1	0.215	0.965	0.950	0.000

Table 2. Female CEOs and corporate risk-taking

In regression (1) the dependent variable is *Leverage*, defined as the ratio of financial debt divided by the sum of financial debt plus equity; in regression (2) the dependent variable is the volatility of the firm's operating return on assets *σ(ROA)* x100, where ROA is defined as the ratio of earnings before interest and taxes to total assets; in regression (3) the dependent variable is an indicator denoting whether the firm survived over a five-year period. Regressions (1) and (2) are run for the panel of observations. Regression (3) can be run only cross-sectionally. *Female CEO* is an indicator variable that takes the value of 1 if the CEO is a woman and 0 otherwise. Control variables are defined in Table 1. P-values, adjusted for heteroskedasticity and clustering at the firm level (in the panel regressions), are reported in brackets below the coefficients.

	(1) Leverage	(2) σ(ROA) x100	(3) Likelihood of survival
Female CEO	-0.030***	-1.845***	0.232***
	[0.000]	[0.000]	[0.000]
CEO ownership	0.089***	-0.978***	-0.043*
	[0.000]	[0.000]	[0.072]
Cash flow rights	0.004*	0.593***	0.019
	[0.098]	[0.000]	[0.298]
ROA	-0.607***	-3.418***	0.904***
	[0.000]	[0.000]	[0.000]
Sales growth	0.009***	-0.054***	-0.012***
	[0.000]	[0.003]	[0.002]
Ln (Size)	0.016***	-0.173***	0.163***
	[0.000]	[0.000]	[0.000]
Ln (1+Age)	-0.042***	-0.381***	0.086***
	[0.000]	[0.000]	[0.000]
Tangibility	0.150***	-1.055***	0.158***
	[0.000]	[0.000]	[0.000]
Private firm	0.088***	-0.911***	-0.386***
	[0.000]	[0.000]	[0.000]
Intercept	0.313***	10.083***	-2.652***
	[0.000]	[0.000]	[0.000]
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R-squared	0.190	0.100	0.156
No. of observations	394,835	124,350	72,012
No. of firms	152,933	53,064	72,012

Table 3. Female CEOs and corporate risk-taking: Firm fixed effects specifications

Panel A of this table reports panel regression results with firm fixed effects. In regression (1) the dependent variable is *Leverage*, defined as the ratio of financial debt divided by the sum of financial debt plus equity. In regression (2) the dependent variable is the volatility of the firm's operating return on assets *σ(ROA)* x100, where ROA is defined as the ratio of earnings before interest and taxes to total assets. *Female CEO* is an indicator variable that takes the value of 1 if the CEO is a woman and 0 otherwise. Control variables are defined in Table 1. Panel B reports change specifications. In the change specifications, all variables are the year-on-year changes of their corresponding level variables. P-values, adjusted for heteroskedasticity and clustering at the firm level, are reported in brackets below the coefficients.

	(1) Leverage	(2) σ(ROA) x100	(3) Leverage	(4) σ(ROA) x100
Female CEO	-0.024***	-1.587***	-0.020*	-0.918***
	[0.000]	[0.000]	[0.082]	[0.008]
Ln (CEO wealth)			-0.048***	-0.040
			[0.000]	[0.837]
Ln (CEO age)			0.066	0.110
			[0.172]	[0.933]
CEO ownership	-0.006	0.331	0.134**	-0.944
	[0.542]	[0.412]	[0.028]	[0.548]
Cash flow rights	0.009	-0.297	0.022	0.648
	[0.132]	[0.459]	[0.721]	[0.662]
ROA	-0.378***	-3.828***	-0.518***	-5.784
	[0.000]	[0.008]	[0.000]	[0.274]
Sales growth	0.005***	0.061	0.011*	-0.175
	[0.001]	[0.268]	[0.061]	[0.616]
Ln (Size)	0.033***	-0.354	0.112***	-0.905
	[0.000]	[0.168]	[0.000]	[0.534]
Ln (1+Age)	-0.049***	1.279	0.067	3.534
	[0.001]	[0.134]	[0.284]	[0.395]
Tangibility	0.113***	-2.609**	0.142**	-1.753
	[0.000]	[0.015]	[0.032]	[0.425]
Private firm	0.01	0.629	0.054	4.052
	[0.360]	[0.569]	[0.428]	[0.307]
Intercept	0.121**	5.587	-0.955***	-0.331
	[0.035]	[0.136]	[0.007]	[0.988]
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
R-squared	0.718	0.423	0.831	0.554
No. of observations	52,918	23,822	2,983	1,480
No. of firms	11,749	8,568	1,145	627

Table 4. Propensity score matching estimators

In this table, we identify control samples of firms that are run by male CEOs by employing a propensity score matching procedure. In Panels A and C, the propensity score is estimated within a country-industry-year-public/private status category, using all firm-level controls included in our regression analyses in Table 2. In Panel B, the propensity score is estimated within a country-industry-year-public/private status category, using all firm- and CEO-level controls included in our regression analyses in Table 3. We require that the difference between the propensity score of the firm run by a female CEO and its matching peer does not exceed 0.1% in absolute value. We then compare the levels of *Leverage*, *σ(ROA)* x100 and the likelihood of survival between the two groups. *Leverage* is defined as the ratio of financial debt divided by the sum of financial debt plus equity. Financial debt is the sum of long-term debt (excluding "other non-current liabilities") plus short-term loans; the volatility of the firm's operating return on assets is *σ(ROA)* x100, where ROA is defined as the ratio of earnings before interest and taxes to total assets; the *Likelihood of survival* is an indicator denoting whether the firm survived over a five-year period.

Panel A: The propensity score is estimated within a country-industry-year-public/private status category using all available firm-level controls (see Table 2).

	No. of observations	Mean	Difference (Female CEOs – Male CEOs)	P-value of diff.
Leverage (Female CEOs)	14,710	0.342	-0.032	0.000
Leverage (Male CEOs)		0.374		
σ(ROA) x 100 (Female CEOs)	4,375	2.439	-1.529	0.000
σ(ROA) x 100 (Male CEOs)		3.969		
Likelihood of survival (Female CEOs)	967	0.687	0.127	0.000
Likelihood of survival (Male CEOs)		0.560		

Panel B: The propensity score is estimated within a country-industry-year-public/private status category using all available firm- *and* CEO-level characteristics (CEO wealth and age).

	No. of observations	Mean	Difference (Female CEOs – Male CEOs)	P-value of diff.
Leverage (Female CEOs)	1,758	0.433	-0.037	0.000
Leverage (Male CEOs)		0.470		
σ(ROA) x 100 (Female CEOs)	554	2.134	-0.883	0.000
σ(ROA) x 100 (Male CEOs)		3.017		

Likelihood of survival (Female CEOs) Likelihood of survival (Male CEOs)	133	0.601 0.496	0.105	0.075

Panel C: The propensity score is estimated within a country-industry-year-public/private status category using all available firm-characteristics (see Table 2). The treatment group in this Panel includes only firms experiencing a transition from male to female CEOs.

	No. of observations	Mean	Difference (Post CEOs – Pre CEOs)	P-value of diff.
Treated Group				
Pre-transition Leverage (Male CEOs) Post-transition Leverage (Female CEOs)	5,375	0.403 0.380	-0.023***	0.000
Control Group				
Pre-transition Leverage (Male CEOs) Post-transition Leverage (Male CEOs)	5,375	0.405 0.398	-0.007	0.331
		Diff.-in-Diff.	-0.016***	0.000

	No. of observations	Mean	Difference (Post CEOs – Pre CEOs)	P-value of diff.
Treated Group				
Pre-transition σ(ROA) x 100 (Male CEOs) Post-transition σ(ROA) x 100 (Female CEOs)	869	3.648 2.473	-1.175***	0.000
Control Group				
Pre-transition σ(ROA) x 100 (Male CEOs) Post-transition σ(ROA) x 100 (Male CEOs)	869	3.588 3.686	0.098	0.541
		Diff.-in-Diff.	-1.273***	0.000

Table 5. Counterfactual analysis

This table compares the means of the observed values for our proxies for risk-taking with their counterfactuals calculated via a two-step Heckman (1979) selection model. *Leverage* is defined as the ratio of financial debt divided by the sum of financial debt plus equity. The volatility of the firm's operating return on assets is *σ(ROA*) x100, where ROA is defined as the ratio of earnings before interest and taxes to total assets. The *Likelihood of survival* is an indicator denoting whether the firm survived over a five-year period.

	Firms with Female CEOs			
	Actual	Counterfactual	Difference	P-value of diff.
Leverage	0.322	0.366	-0.044	0.000
σ(ROA) x 100	2.929	5.608	-2.679	0.000
Likelihood of survival	0.601	0.534	0.067	0.000

	Firms with Male CEOs			
	Actual	Counterfactual	Difference	P-value of diff.
Leverage	0.367	0.344	0.023	0.000
σ(ROA) x 100	5.079	2.438	2.641	0.000
Likelihood of survival	0.489	0.610	-0.121	0.000

Table 6. Treatment effects (I)

In the *second stage regressions*, in regression (1) the dependent variable is *Leverage*, defined as the ratio of financial debt divided by the sum of financial debt plus equity; in regression (2) the dependent variable is the volatility of the firm's operating return on assets *σ(ROA)* x100, where ROA is defined as the ratio of earnings before interests and taxes to total assets; in regression (3) the dependent variable is an indicator denoting whether the firm survived over a five-year period. Across all regressions, we use the fraction of firms with a female CEO among all other firms in which the firm's male directors also serve as directors as an exogenous determinant of the CEO gender selection choice. Control variables are defined in Table 1. The *Inverse Mills ratio* is calculated from the predicted values of the first stage probit regressions. P-values, adjusted for heteroskedasticity and clustering at the firm level, are reported in brackets below the coefficients.

Panel A: Second stage regressions

	(1)	(2)	(3)
Dependent variable:	Leverage	σ(ROA) x100	Likelihood of survival
Female CEO	-0.028**	-1.557***	0.183**
	[0.029]	[0.007]	[0.038]
CEO ownership	-0.013**	0.251	-0.058*
	[0.037]	[0.411]	[0.085]
Cash flow rights	0.014***	-0.149	0.056**
	[0.000]	[0.562]	[0.012]
ROA	-0.433***	-4.010***	0.899***
	[0.000]	[0.000]	[0.000]
Sales growth	0.006***	0.036	-0.015***
	[0.000]	[0.316]	[0.002]
Ln (Size)	0.035***	-0.275*	0.153***
	[0.000]	[0.099]	[0.000]
Ln (1+Age)	-0.046***	1.161**	0.105***
	[0.000]	[0.036]	[0.000]
Tangibility	0.134***	-1.758**	0.148***
	[0.000]	[0.011]	[0.000]
Private firm	0.009*	1.531**	-0.413***
	[0.072]	[0.017]	[0.000]
Inverse Mills ratio	0.002	-0.15	0.046
	[0.773]	[0.595]	[0.329]
Intercept	0.109***	4.755*	-2.093***
	[0.001]	[0.058]	[0.000]
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	257,357	81,568	47,114
No. of firms	107,124	37,555	47,114

Panel B: First stage probit model

	(1)	(2)	(3)
Dependent variable:		Female CEO	
Fraction of firms with a female CEO among other firms in which male directors serve	1.468***	1.296***	1.286***
	[0.000]	[0.000]	[0.000]
Control variables	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	257,357	81,568	47,114
No. of firms	107,124	37,555	47,114

Table 7. Treatment effects (II)

In the *second stage regressions*, in regression (1) the dependent variable is *Leverage*, defined as the ratio of financial debt divided by the sum of financial debt plus equity; in regression (2) the dependent variable is the volatility of the firm's operating return on assets *σ(ROA)* x100, where ROA is defined as the ratio of earnings before interests and taxes to total assets; in regression (3) the dependent variable is an indicator denoting whether the firm survived over a five-year period. Across all regressions, we use the fraction, among all other firms in which the firm's male directors also serve as directors, of firms with (1) a female CEO, (2) above-average leverage, (3) above-average volatility of ROA in the subsequent five years and (4) lack of survival during the following five years as an exogenous determinant of the CEO gender selection choice. Control variables are defined in Table 1. The *Inverse Mills ratio* is calculated from the predicted values of the first stage probit regressions. P-values, adjusted for heteroskedasticity and clustering at the firm level, are reported in brackets below the coefficients.

Panel A: Second stage regressions

	(1)	(2)	(3)
Dependent variable:	Leverage	σ(ROA) x100	Likelihood of survival
Female CEO	-0.065***	-2.476***	0.448***
	[0.001]	[0.001]	[0.001]
CEO ownership	-0.015**	0.258	-0.012
	[0.017]	[0.391]	[0.740]
Cash flow rights	0.013***	-0.17	0.051**
	[0.000]	[0.504]	[0.028]
ROA	-0.420***	-4.072***	0.817***
	[0.000]	[0.000]	[0.000]
Sales growth	0.006***	0.03	-0.013***
	[0.000]	[0.403]	[0.009]
Ln (Size)	0.035***	-0.27	0.143***
	[0.000]	[0.104]	[0.000]
Ln (1+Age)	-0.046***	1.186**	0.102***
	[0.000]	[0.032]	[0.000]
Tangibility	0.137***	-1.781***	0.164***
	[0.000]	[0.010]	[0.000]
Private firm	0.009	1.516**	-0.404***
	[0.107]	[0.018]	[0.000]
Inverse Mills ratio	0.018*	0.317	-0.06
	[0.054]	[0.358]	[0.384]
Intercept	0.091***	4.717*	-1.977***
	[0.007]	[0.060]	[0.000]
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	242,204	80,521	44,289
No. of firms	101,751	36,603	44,289

Panel B: First stage probit model

	(1)	(2)	(3)
Dependent variable:	Female CEO		
Fraction of firms with a female CEO and high risk-taking among other firms in which male directors serve	1.516***	1.458***	1.322***
	[0.000]	[0.000]	[0.000]
Control variables	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	242,204	80,521	44,289
No. of firms	101,751	36,603	44,289

Table 8. Mechanisms behind the gender-related differences in corporate risk-taking

In Columns (1) and (2) the dependent variable is *Leverage*, defined as the ratio of financial debt divided by the sum of financial debt plus equity; in Columns (4) and (5) the dependent variable is the volatility of the firm's operating return on assets *σ(ROA)* x100, where ROA is defined as the ratio of earnings before interest and taxes to total assets; in Columns (7) and (8) the dependent variable is an indicator denoting whether the firm survived over a five-year period. Regressions in Columns (1), (2), (4) and (5) are run for the panel of observations. Regressions in Columns (7) and (8) can be run only cross-sectionally. The regressions include the control variables used in Table 2, along with country, industry, and year fixed effects. Variables used to split the sample in a given panel are not included as controls in that particular panel. Thus, for example, regressions in Panel A do not control for CEO ownership. The table reports the coefficient of *Female CEO*, an indicator variable that takes the value of 1 if the CEO is a woman and 0 otherwise. The p-value of this coefficient, adjusted for heteroskedasticity and clustering at the firm level (in the panel regressions), is reported in brackets below the coefficient estimate.

Dependent variable: Leverage			Dependent variable: σ(ROA) x100			Dependent variable: Likelihood of survival		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Predicted "low" difference	Predicted "high" difference	P-value difference	Predicted "low" difference	Predicted "high" difference	P-value difference	Predicted "low" difference	Predicted "high" difference	P-value difference
Panel A: High vs. low CEO ownership								
-0.032***	-0.045***	0.000	-1.191***	-2.155***	0.000	0.166***	0.248***	0.086
[0.000]	[0.000]		[0.000]	[0.000]		[0.000]	[0.000]	
Panel B: High vs. low cash flow rights								
-0.060***	-0.039***	0.000	-2.390***	-2.174***	0.067	0.222***	0.194***	0.319
[0.000]	[0.000]		[0.000]	[0.000]		[0.000]	[0.000]	
Panel C: Publicly-traded vs. privately-held firms								
-0.032***	-0.040***	0.254	-2.531***	-1.888***	0.008	0.373***	0.233***	0.179
[0.000]	[0.000]		[0.000]	[0.000]		[0.001]	[0.000]	
Panel D: Large vs. small firms								
-0.047***	-0.041***	0.225	-2.251***	-1.286***	0.000	0.281***	0.175***	0.031
[0.000]	[0.000]		[0.000]	[0.000]		[0.000]	[0.000]	
Panel E: Older CEOs vs. younger CEOs								
-0.009	0.000	0.289	-1.151***	-1.545***	0.124	0.333***	0.204**	0.222
[0.266]	[0.985]		[0.000]	[0.000]		[0.000]	[0.011]	
Panel F: Younger CEOs vs. middle-age CEOs								
0.000	-0.020***	0.065	-1.545***	-1.631***	0.373	0.204**	0.236***	0.383

[0.985]	[0.009]		[0.000]	[0.000]		[0.011]	[0.004]	
Panel G: Older CEOs vs. middle-age CEOs								
-0.009	-0.020***	0.226	-1.151***	-1.631***	0.070	0.333***	0.236***	0.287
[0.266]	[0.009]		[0.000]	[0.000]		[0.000]	[0.004]	
Panel H: CEO ownership > 50%								
-0.042***			-1.004***			0.140**		
[0.000]			[0.000]			[0.017]		
Panel I: Low vs. high difference in pay structure								
-0.045***	-0.042***	0.348	-2.689***	-1.304***	0.000	0.244***	0.308***	0.072
[0.000]	[0.000]		[0.000]	[0.000]		[0.000]	[0.000]	
Panel J: Low vs. high difference in unemployment								
-0.037***	-0.029***	0.162	-3.076***	-1.016***	0.000	0.249***	0.293***	0.258
[0.000]	[0.000]		[0.000]	[0.000]		[0.000]	[0.000]	
Panel K: Low vs. high difference in altruism								
-0.033***	-0.062***	0.000	-1.519***	-2.675***	0.000	0.239***	0.243***	0.396
[0.000]	[0.000]		[0.000]	[0.000]		[0.000]	[0.000]	
Panel L: High vs. low attitude toward women								
-0.036***	-0.068***	0.000	-2.028***	-1.968***	0.331	0.269***	0.262***	0.393
[0.000]	[0.000]		[0.000]	[0.000]		[0.000]	[0.000]	