How does executive gender affect the corporate reaction to competitive shocks?

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Abstract

We investigate executive gender shapes a bank's reaction to competitive pressures. Our empirical identification is based on the staggered adoption of barriers to interstate branching, which varied the exposure to competitive pressures in the US banking sector during the mid 1990s-early 2000s. Results suggest that banks with female executives experience higher performance than all-male banks when competition is low, but underperform when competitive pressures increase. Furthermore, we find that female leadership mitigates the potential exacerbating effect of competition on risk-taking.

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1. Introduction

An established strand of experimental research has analyzed gender differences in competitiveness and risk-taking behavior. Some central findings of this literature are that women tend to be more risk-averse than men (Charness and Gneezy 2012) and that, relative to male performance, competitive pressures are detrimental to female performance (Gneezy et al. 2003; Gneezy and Rustichini 2004), especially in high-pressure and stereotypically male-oriented tasks (Shurchkov 2012; Gunther et al. 2010; Iriberri and Rey-Biel 2012).

Yet, as some studies have recently pointed out (Adams and Funk 2012), gender differences in competitiveness and risk aversion have been established primarily using samples of students or individuals from the general population, and the general validity of these findings in the context of corporate executives is unclear. Because women at the top of companies have self-selected themselves into performance-oriented environments and have successfully gone through highly competitive recruiting processes, they are expected to be dissimilar from women from the general population in their attitudes toward competition and risk, whereas the differences with men could weaken or even disappear. A number of empirical findings are consistent with this notion. For instance, Guiso and Rustichini (2012) show that women entrepreneurs display more masculine traits and are as equal as men in translating their ability into firm outcomes. Analyzing individual traits, Adams and Ragunathan (2013) suggest that women who choose finance careers are less risk averse than other women (and thus more similar to men).

Other works, however, argue that, even at the top of corporate ladders, women may significantly differ from men and these differences translate into different corporate policies. For instance, Huang and Kisgen (2013) show that male and female CFOs differ in their financial decisions; the latter make fewer high-quality acquisitions and are less debt-oriented, possibly due to different risk preferences. In a similar vein, Faccio et al. (2014) argue that

female-led firms have lower leverage, less volatile streams of profits and a higher chance of survival.

In this study, we exploit regulatory changes in the US banking industry to test whether executives' gender affects the response of banks to an exogenous increase in competition.

The US banking sector in the late 20th century represents an ideal laboratory for our study. While historical regulations severely limited the geographic expansion of banks, US states gradually lifted these restrictions starting from the 1970s.[1] Specifically, our identification is based on the legal roadblocks adopted by US states to limit the nationwide deregulation of interstate branching activities, introduced in 1994 by the Interstate Banking and Branching Efficiency Act (IBBEA). The staggered introduction and removal of these roadblocks determined temporal and geographic variations in the intensity of competition from the mid 1990s to the early 2000s, variations that are useful for mitigating endogeneity concerns (Cornaggia et al. 2014; Johnson and Rice 2008; Rice and Strahan 2010).

Using data on listed US banking institutions from 1994 to 2006, we find that the effect of female executives on corporate performance is shaped by competitive pressures: banks with female executives overperform all-male banks in times of low competition, but underperform when competitive pressures increase. This finding holds when adopting both accounting and market-based measures of performance, as well as when controlling for a host of variables to absorb observable differences between banks with female and male executives.

Gill and Prowse (2014) suggest a specific mechanism that can explain our findings. In a real effort experiment, they find that losses are detrimental to subsequent female productivity, whereas for men a loss has negative effect on productivity when the prize at

[1] Several studies have exploited banking deregulation passages to analyze the effect of banking structure characteristics on such state and firm-level outcomes as economic growth (Jayaratne and Strahan 1996), entrepreneurship (Black and Strahan 2002), industry structure (Cetorelli and Strahan 2006), access to finance (Rice and Strahan 2010), and innovation (Amore et al. 2013; Chava et al. 2013; Cornaggia al. 2014).

stake is very large. As increased competition induced a shock in banks' profits, our results are consistent with Gill and Prowse (2014) in that women executives may have engaged less than men in effort-intensive tasks needed to adjust banks' operations to the new competitive scenario.

An alternative explanation for our finding is that, prior to regulatory changes used in our analysis, banks with female executives were enjoying extra-profits reflecting rent, e.g. if they operated in rural areas relatively more protected from existing within-state competition. In this case, the profitability drop experienced by those banks may arise because increased competition eroded existing noncompetitive extra-profits, whereas male-led banks were already gaining normal profits at a competitive level. We rule out this interpretation by checking that the profitability of banks with male and female executives does not differ on years prior to the regulatory changes, and by verifying that our regression results are robust to controlling for location-specific fixed effects. Moreover, we validate our results by the following: (1) control for the interaction of competitive pressures with various bank-specific variables (to allow for deregulation affecting differently banks depending on observable characteristics that are correlated with executives' gender); (2) show that no significant variations emerge in industries unaffected by the regulatory changes; (3) mitigate the concern that stronger competition changes the likelihood of having women at the top; (4) show that results are not driven by overall or gender-specific pre-deregulation trends; (5) estimate a fully-saturated model that includes state-gender specific intercepts as well as gender-specific year dummies.

After having established the profitability effect, we test whether banks with and without female executives experience different risk-taking following the increase in competitive pressures. Although the general effect of competition on banks' risk-taking is ambiguous (see e.g. Boyd and De Nicolo 2005; Martinez-Miera and Repullo 2010), Dick

(2006) provides some indication that interstate branching deregulation led to an increase in banks' portfolio credit risk. We find that banks with female executives were less subject to lower profit volatility and exhibited higher capital ratios when competition intensified. Thus, there is some indication that in spite of lower profitability female leadership can lead to superior bank stability in times of increased competition.

We broadly relate to a recent literature on the impact of women in politics (Chattopadhyay and Duflo 2004; Clots-Figueras 2012; Gagliarducci and Paserman 2012) and firms (Adams and Ferreira 2009; Ahern and Dittmar 2012; Dezso and Ross 2012; Faccio et al. 2014; Huang and Kisgen 2013; Matsa and Miller 2013; Tate and Yang 2014). While these works analyze how possible gender differences in economic behavior translate into institutional outcomes, we focus on how executives' gender may shape a firm's reaction to environmental changes. Estimating the effect of executive gender under different market structures is complicated by the fact that, even within the competitive world of corporate jobs, women managers may self-select into more protected market niches because of a possible intrinsic tendency to shy away from competition (Booth and Nolen 2012; Niederle and Vesterlund 2007), and this selection may bias our estimates. We are able to mitigate this concern by employing *exogenous* variations to competitive pressures for given executive-firm observations *within* a given sector; we also make sure that our results are unaffected by banks that reduced the presence of female executives following the competitive shock.

Our work is also close to recent works that employ real-world data to analyze gender differences in response to changing competition. Delfgaauw et al. (2013) find that the introduction of tournament competition affects firm sales depending on the gender composition of work teams, whereas other works (Morin 2013; Ors et al. 2013) use educational data to show that men respond more effectively than women to a higher level of competition. We extend these works in a number of significant directions. While these works

analyze reactions to competition in a non-corporate context, or in small and young organizations (firms analyzed in Delfgaauw et al. 2013 have, on average, 11 employees that are 25 years old), we focus on the profitability and risk profile of listed US banking institutions. This context is especially interesting as we expect the selection channel to be most pronounced: women that managed to get to the top of large corporations in a stereotypically masculine sector should be most likely to display preferences for competitive and risky environments. By identifying significant gender variations in the reaction of banks to increased competition, our results suggest that existing experimental findings may extend to the corporate arena above and beyond the mitigating role of selection. Our specific focus on banks is also important because of the negative externalities that excessive risk-taking may generate for the whole economy. Regarding this point, our results highlight a trade-off whereby, under increased competitive pressures, female-led companies experience lower profitability but at the same time higher stability.

Finally, our focus on banking institutions is close to Adams and Ragunathan (2013) who show that female representation in the board of directors had an insignificant influence on risk but a positive effect on the performance of banks during the recent financial crisis. We complement this work in two ways. First, rather than conducting the analysis on a period of financial crisis, we explore regulatory changes in the US banking industry. We argue that the corporate implications of these regulatory changes are different from those of a financial crisis. In particular, the opportunity to expand geographically provided banks with greater risk-return combinations (Dick 2006); taking advantage of these expansion opportunities would require banks to undertake aggressive policies to improve service quality and pursue risky investments to expand branch networks. By contrast, the banks that performed better during the financial crisis were those that engaged in more conservative financing choices (e.g. in terms of long-term funding, Beltratti and Stulz 2012). These contextual contrasts

help understanding the differences between our results and Adams and Ragunathan (2013). Second, we focus on female executives and show that the effect differs from that of female directors – thus suggesting that the impact of gender on corporate outcomes may vary depending on the role occupied.

Section 2 illustrates the regulatory changes used to generate exogenous changes in competitive pressures in the US banking industry. Section 3 describes the data used in the empirical analysis and provides summary statistics. Section 4 presents the main profitability results, together with a number of placebo checks and extensions. Section 5 presents our findings on stability and risk. Section 6 concludes.

2. Competitive pressures in the US banking sector

A number of historical regulations such as the McFadden Act of 1927 severely limited the expansion of banks across and within the US states. However, starting in the late 1960s, states started deregulating within state branching activity, allowing the creation of new branches via M&A of existing banks and *de novo* branching. Moreover, starting in the early 1980s, states deregulated the interstate ownership of banks, which was prohibited by the Douglas Amendment to the 1956 Bank Holding Company Act. Interstate deregulation gave bank holding companies the possibility to acquire banks across state borders, although it did not allow consolidation of acquired banks into new branches. Thus, interstate branching was still largely prohibited and there were almost no out-of-state bank branches until the mid 1990s.

Restrictions to interstate branching were finally removed with the Interstate Banking and Branching Efficiency Act (IBBEA), passed by the US Congress in 1994. Among the other provisions, IBBEA allowed *de novo* branching and consolidation of acquired banks or individual branches into branches of the acquiring bank.

The relaxation of interstate branching restrictions led to a significant development of banking activities across state borders. Johnson and Rice (2008) show that, while only 62 out-of-state banks existed in a few states in 1994, by 2005 this number had increased to more than 24,000, and more than 6,000 *de novo* out-of-state branches were opened over the same period. These figures point to a substantial increase in competition among banking institutions, which also had major economic consequences. In particular, Rice and Strahan (2010) show that the deregulation led to an increase in credit supply: small firms in states open to interstate branching could borrow at interest rates that were 80 to 100 basis points lower than those in less open states.

While enacting the deregulation of interstate branching activities, the IBBEA granted US states the right to erect some barriers against the nationwide deregulation provisions by allowing states to pass a law at any time between the passage of IBBEA in September 1994 and its trigger date in July 1997. Similar to existing works (Johnson and Rice 2008; Rice and Strahan 2010; Cornaggia et al. 2014), we exploit the adoption of such state-level roadblocks to the interstate branch expansion in order to establish variations in competitive pressures across US states.

Specifically, US states had the opportunity to: (1) impose a minimum age of 3 or more years on target institutions of interstate acquirers; (2) do not permit *de novo* interstate branching; (3) do not permit the acquisition of individual branches by an out-of-state bank; (4) impose a deposit cap lower than 30%.[2]

Analyzing the separate effect of each regulatory barrier on the growth of out-of-state branches, Johnson and Rice (2008) conclude that the acquisition of individual branches and the statewide gap on the amount of deposits had real effects on the banking system, whereas the other two barriers did not have any significant effect, possibly because "banks were

[2] See Johnson and Rice (2008) for a detailed discussion of each of these provisions.

either (a) able to circumvent the minimum age requirement and prohibition on de novo branching, or (b) the other restrictions were more binding than these two restrictions". Thus, our key variable measuring changes in competitive pressures is a dummy equal to one if a state has passed at least one of the two significant provisions.[3]

Given that different states passed the above-mentioned roadblocks at different points in time, the binary variable displays both within and across-state variation. Furthermore, US states kept revising interstate branching barriers until the mid 2000s, and these changes provide additional variation useful to our identification. Overall, 30 states change status from pre-IBBEA protection to high-competition at various points in time, and these changes account for about 60% of the sample observations. Table A1 lists all changes by state and year (in Columns 3 and 4 we report the key regulatory changes used in the empirical analysis, but for completeness we report the other two provisions in Columns 5 and 6).

An important question is what drove the decision to deregulate. In their investigation of the political economy process that led to *intrastate* branching deregulation, Kroszner and Strahan (1999) study a number of conditions related to state-level politics economic conditions. For instance, they find that deregulation occurs earlier in states with fewer small banks, in states with a smaller insurance industry, in states where small banks are financially weaker, and in states with more small firms. However, focusing on *interstate* branching deregulation, Rice and Strahan (2010) finds that the variations in the openness to nationwide deregulation were less influenced by politics and economic factors. Of all the factors proposed in Kroszner and Strahan (1999), only income growth and small bank share are significantly correlated with the presence of state-level regulatory barriers. This evidence

[3] In unreported tests, we confirmed our main findings using an index which exploits all regulatory barriers (i.e. taking values from one to four). However, we prefer to employ a binary variable as the index would implicitly assume that the four different barriers have a linear effect on banks' outcomes and that they have the same effect and are interchangeable.

suggests that concerns of endogeneity regarding the introduction of regulatory barriers to interstate branching were less severe.

Nevertheless, we address this issue empirically in a number of ways. In the baseline specification, we include state fixed effects to absorb all the state-level heterogeneity that is constant over time. In additional analyses, we test for the presence of pre-deregulation diverging trends, and we show that our results are robust to including the macroeconomic factors identified by Rice and Strahan (2010) to be significantly correlated with the timing of adoption of barriers to deregulation.

3. Data and variables

Information on executive gender comes from the S&P's Execucomp database, which contains information on the top executives on a large set of US public companies. Our time-period spans from 1994 (the first year in which the states were allowed to introduce regulatory barriers to the IBBEA provisions), through 2006 (one year after the last regulatory change was enacted).

As widely documented in existing works, women is executive positions are rare. To avoid the risk of not having enough variation in our key gender variable, we follow Dezso and Ross (2012) and operationalize the presence of women executives using a dummy equal to one if at least one of the firm executives is female, and zero otherwise. However, we check that our findings hold using a continuous measure of female representation in executive positions, i.e. the ratio of female executive to the total number of a bank's executives.

To obtain firm-level accounting information, we match the Execucomp dataset with Compustat Bank, which contains accounting information on US publicly listed banks. We attribute regulatory changes to companies on the basis of their state of headquarter. Given

that headquarter location is typically chosen at the beginning of a firm's operations, for many firms it can be thought to be predetermined to deregulation events.[4]

Our main measure of accounting performance is the return on assets (ROA), computed as the ratio of operating income before taxes to total assets. In robustness checks, we confirm our results using alternative measures of performance, e.g. net interest margin and market to book ratio, as well as using techniques to mitigate the concern of outliers.

We construct a number of bank-specific variables. In particular, we take the logarithm of the book value of the total assets to measure bank size; the number of years a bank has been in Compustat as proxy of a bank's age; the ratio of the deposits to total assets and the ratio of loans net of total allowance for loan losses to total assets, to capture differences in the composition of liabilities and bank's activities; the ratio of bank's equity to the book value of total assets, to measure a bank's stability. We also compute the state-level concentration of banks' activities by taking the Herfindahl-Hirschman index (HHI) of deposits by state and year.[5] Finally, we construct variables related to a bank's executives, such as the number of executives, the annual compensation level (computed as the average of executives' salary plus bonus for a given bank and year) and the dispersion of compensation across all executives (computed as the standard deviation of compensation by bank and year).

Summary statistics are reported in Table 1, while Appendix A2 presents a detailed description of how each variable was constructed. After dropping missing values in the key variables, our sample consists of 208 unique banks (of which, 75 have at least one female

[4] One concern is that because Compustat only reports the last state of headquarter we cannot control for headquarter relocations potentially driven by the passage of restrictions to IBBEA restrictions. This concern is mitigated by the infrequent nature of headquarter relocations. For instance, Pirinsky and Wang (2006) find that, of more than 4000 firms over the period 1992-1997, only 118 relocated for reasons other than M&As and major restructuring events.

[5] The empirical distribution of the HHI shows a small spike in the extreme left tail, which points to misclassifications or extreme cases (e.g. one bank only in a given state). In the baseline analyses, we drop the few observations with HHI equal to one. However, our main results are unaffected by this exclusion.

executive) and 1289 bank-year observations. On average, banks have 6 executives and 28% have at least one woman among the top executives. Conditioning on having at least one female executive, 77% of observations are associated with one female executive, 20% with two executives and the remaining 3% with three or more female executives. Focusing on banks' performance, we find an average ROA of 1.8.

To get an understanding of the matching between bank's characteristics and executive gender, we estimate a probit with the main gender dummy as dependent variable and banks' characteristics as explanatory variables. We use 1994, i.e. the first sample year, to estimate the model in a pre-treatment window (given that only Alaska introduced a regulatory barrier in 1994).

Results are reported in Table 2, which reports marginal effects. As shown, performance has no significant effect on the likelihood of having a female executive. Bank size has a reverse U-shaped association with the likelihood of having at least one female executive. Moreover, companies are more likely to have a female executive if they are large in loans to assets. We also find some significant effect in the dispersion of executive compensation. Taken together, these findings suggest that there are some observable differences in the activities of banks with male and female executives, which we need to take into account in our regression analysis.

4. Profitability

4.1. Identification and main results

Our identification strategy relies on the combination of (1) across and within-state variations in competitive pressures, as generated by the adoption and removal of significant roadblocks to the IBBEA deregulation, and (2) within-state differences in executive gender across companies.

To exemplify, we can consider two *treated* banks in a given state: they are exposed to the same competitive pressures but differ in the presence of women among the top executives. Taking the difference in performance between these two banks around the competitive shock allows us to establish the differential performance effect of competitive pressures by gender. At the same time, exploiting the staggered change in competitive pressures, we can employ in the analysis two additional banks in a different state, which again differ in their top executive gender but for which the competitive pressures have not changed. These *control* banks are useful to absorb the effect of general macroeconomic changes as well as differences that are specific to banks with female executives. Generalizing this example to the full sample, we estimate the following model:

$$\mathrm{ROA}_{itk} = \alpha + \beta_1 \text{Female Executive}_{it} + \beta_2 \text{High protection}_{tk} + \beta_3 \text{Female Executive}_{it} \times \text{High protection}_{tk} + X_{it-1}\delta + \theta_k + \tau_t + \varepsilon_{itk}$$

in which the dependent variable is the time-*t* ROA of a bank *i* headquartered in state *k*. Female executive is a dummy equal to one if at least one of the top executives of bank *i* at time *t* is female, and zero otherwise. High protection is a dummy capturing variations in competitive pressures from interstate branching: the variable is equal to one if a state has passed (at least one of) the two provisions that significantly restricted interstate branching, and zero otherwise.

The interaction between high protection and female executive dummies measures how the profitability effect of banks with female executives differs under the two competitive regimes. A positive and significant interaction coefficient β_3 would indicate that high banking competition has a more negative effect on banks with female executives.

The specification controls sequentially a host of bank-level variables, which are included in the X vector. These variables are important to control for the fact that banks with and without female executives may differ along a number of observable characteristics, as

suggested in Table 2. Our specification also includes year dummies, τ_t, to absorb shocks common to all banks, and state fixed effects, θ_k, to control for geographic time-invariant heterogeneity.

Residuals are clustered by a bank's state of headquarter, which is the appropriate level of clustering given that regulatory changes affected companies at the state level. However, in additional checks we confirm the robustness of the main results computing standard errors in alternative ways.

Results are reported in Table 3, in which we first estimate the model controlling for asset size and bank's age (Column 1); second, we add additional variables related to the nature of banks' activities (Column 2); and third, we control for the number of banks' executives and compensation characteristics (Column 3).

Focusing on the result obtained using the full set of controls (Column 3), we find that the coefficient of female executive is negative and significant at the 10% level. In other words, female-led banks experience lower profitability than their male counterpart when banking competition is high. The interaction between female executive and high protection is positive and significant at the 1% level. In other words, as the competitive level switches to low protection, the profitability of banks with female executives is significantly lower than the one of all-male banks (or, conversely, significantly higher as the competitive level switches to high protection). The high protection coefficient is insignificant in itself, possibly owing to the fact that, pushed by the increased competition, banks improved existing service quality and introduced new (more sophisticated) services that enabled them to maintain existing revenues (Dick 2006) but that this activity was conducted primarily by all-male banks.

One concern with our result is that of trends. While our main specification controls for overall trends by means of year dummies, it does not control for gender-specific trends. To

overcome this limitation, in Column (4) we show that our results are robust to the inclusion of the interactions between gender and year dummies.

In Column (5), we propose a fully saturated model that further includes the interactions between female executive and year dummies, as well as the interactions between female executive and state dummies. This model is helpful to overcome the concern that the previous specifications pool cross-sectional and time variations. As shown, the interaction term becomes statistically significant at the 10% level but remain in line with our previous estimates.

In Column (6), we allow for heterogeneous effects of regulatory changes on bank performance by including the interaction between the high protection dummy and all the time-varying controls of Column (3). This procedure is important to control for confounding effects of competitive shock affecting such banks' operation likely to influence bank performance (and potentially correlated with executive gender). For instance, Cunat and Guadalupe (2009) show that following the IBBEA banks experienced a significant increase in performance-related pay as well as performance-pay sensitivities. As shown, including these additional controls does not alter the main finding of Column (3). To interpret the economic magnitude of having any female executive under high and low competitive pressures, we can consider the coefficients in Column (3): the interaction term is about 0.25 percentage points, which corresponds to an increase of about 14% over the sample mean.

As discussed above, throughout the empirical analysis our key gender variable is a dummy equal to one if a bank has at least one female executive. In Column (7), we replicate the results of Column (6) to show that our key findings are robust to replacing the gender dummy with a continuous variable measuring the share of female executives to the total number of executives.

Finally, we provide evidence estimating the effect of executive gender on the two subsamples of banks subject to high and low competition. Consistent with the results of the interaction model, we find that the female executive coefficient is negative and statistically significant when competitive pressures are high, but becomes positive and significant when competitive pressures are low (Panel B of Table 3). An interpretation for the latter result is that women executives extract lower private benefits under weak competitive pressures and manage better a given asset base.

4.2. Placebo checks and robustness

We support the validity of our findings with a number of placebo tests. First, we check whether our findings are specific to banks (and to the increase in banking competition they were subject to) by estimating our main specification on a sample of non-banking financial firms (SIC codes between 6200 and 7000). Given that these firms were not directly affected by changes in competitive pressures, one should not find any differential effect in performance by executive's gender. Column (1) of Panel A, Table 4, indeed shows that the interaction term is statistically and economically insignificant. In unreported analyses, we found the same insignificant result using the sample of manufacturing firms in SIC codes between 2000 and 4000.

Second, we check that our findings are specific to having a female executive. To this end, we randomly assign to banks the value of the executive gender dummy, respecting the average state prevalence of female executives. As shown in Column (2) of Panel A, Table 4, the interaction of interest is not statistically significant.

Third, we mitigate concerns of pre-existing diverging trends following a procedure similar to Bertrand and Mullainathan (2003). Specifically, we decompose the high protection dummy into dummies associated with three periods: one year before, the year of the

regulatory change, and one year or more after (the reference period is formed by two years or more before regulatory change). A significant interaction between gender dummy and high protection$_{t=-1}$ would indicate whether there is any gender-specific relationship between performance and deregulation before the regulatory change was enacted. As reported in Panel B of Table 4, the interaction term is statistically and economically insignificant before deregulation, whereas it becomes significant in the post-deregulation period. This evidence helps ruling out concerns of pre-deregulation diverging trends.

Previous section indicates that banks with female executives perform worse than all-male banks when competitive pressures increase. One possible interpretation of this finding is that the profits of those banks do not significantly change, but ROA decreases because of differences in investment that inflates the asset base (i.e., the ROA denominator). We rule out this interpretation by checking that the interaction term does not have any significant effect on total assets (results unreported).

In Table 5, we present a number of robustness checks to further assess the validity of our findings. First, we show robustness to the use of alternative performance measures. In Column (1), we replace ROA with the net interest income (scaled by total assets), whereas in Column (2) we use a market-based measure of performance, i.e. the market value of equity to the book value of common equity. As shown, the interaction term remains statistically significant at the 5-10% level.

Second, we employ different estimation strategies. In Column (3), we replace state dummies with city-specific intercepts, which provide a more fine-grained way to control for geographic characteristics. In Column (4), we adopt an even more restrictive specification that controls for bank fixed effects. Shrinking all the unobserved time-invariant heterogeneity reduces the coefficient of the interaction term, but the main effect is broadly in line with our results so far.

Our findings may be consistent with the notion that, prior to the increase in competitive pressures, banks led by women were enjoying extra profits reflecting non-competitive rent. In this case, the larger profitability drop we estimate for banks with female executives may be due to increased competition eroding these noncompetitive extra-profits, whereas all-male banks were already gaining normal profits at a competitive level. In Column (5), we rule out this interpretation by showing that our results are robust to controlling for early profitability differences (i.e. ROA at the beginning of the sample period).

Increases in competitive pressures may have affected bank entry and exit, which in turn can influence our estimates. In Column (6), we mitigate this concern by restricting the analysis to banks that enter the sample prior to the trigger year of 1997 and that stay for at least one year after 1997.

Next, we address the computation of the standard errors. In the baseline regressions, we cluster standard errors by the state of headquarter, which is the level at which regulatory changes affected banks. However, we confirm that our findings are robust to clustering standard errors by bank (Column 7) or computing heteroskedasticity-robust (un-clustered) standard errors (Column 8). We also check that outliers do not affect our results by dropping 1% from the tails of the ROA distribution (Column 9), or 2% (unreported), or by taking a transformation of the dependent variable – the logarithm of one plus ROA (Column 10), which is less sensitive to extreme observations.

We then address the concern of confounding policies. Over the same time period considered, a few US states changed the tax rate on banks' income, which in turn reduced banks' financial constraints (Farrè-Mensa and Ljungqvist 2013). By exploiting within-state variations provided by differences in executives' gender, our specification already takes into account these confounding policies and other shocks over the time period considered.

However, we control for this concern in a more complete way by adding the tax rate changes as an explanatory variable (Column 11).

Next, we control for governance characteristics. To this end, we gather board characteristics from the Investor Responsibility Research (IRRC) and RiskMetrics dataset. Unfortunately, the time coverage of this dataset starts in 1997, and thus we are forced to restrict the analysis to the period 1997-2006. In Column (12), we confirm that our results remain significant once we control for the ratio of independent board members (and its interaction with the high protection dummy) as proxy for the quality of corporate governance.

In Table 3, we verified that our results are robust to the inclusion of gender-year dummies to control for female-specific trends. In Column (13) of Table 5, we further rule out this concern by including as control the annual average of the dependent variable computed using female observations.

Another challenge to our identification is that the regulatory protection from competition in itself may change likelihood of having female executives. This effect may be negative (i.e. lower likelihood of appointing female executives), if e.g. the supply of female candidates shrinks due to women shying away from competition (Niederle and Vesterlund 2007) or women exit competitive contests (Hogarth et al. 2012). Or it could be positive if banks subject to stronger competition find it more costly to discriminate women (as suggested by Black and Strahan 2001 focusing on an earlier wave of deregulation). To test for the importance of these concerns, we estimate a linear probability model in which the dependent variable is the female executive dummy and the main explanatory variables are high competition dummy together with state fixed effects and controls similar to the main regressions. Unreported results show that the high competition dummy does not have any significant effect on the likelihood of having a female executive. Moreover, in Column (14)

we show that our main findings are robust to excluding firms that reduced the number of female executives over the period considered.

As discussed in Section 2, from the late 1960s to the mid 1990s US states adopted a number of deregulation acts concerning intrastate branching and interstate banking activities. Thus, one may be concerned that these prior deregulation episodes confound our main finding. We mitigate this concern in three ways. First, we check that at the beginning of our sample almost all states had passed interstate banking and intrastate branching deregulation (only Montana and Hawaii had passed the interstate banking and intrastate branching deregulation after 1992), thus confirming that these deregulation events do not overlap with the adoption of roadblocks to the IBBEA provision. Second, in Column (15) we control for the number of years since a state has passed intrastate branching and interstate banking deregulation. Third, in order to mitigate the concern that gender-specific responses to deregulation events may confound our finding, we interact gender-specific variable with the years since the two prior deregulation events (Column 16).

We have discussed in Section 2 the political economy process behind the process of interstate branching deregulation. According to Rice and Strahan (2010), income growth and the share of small banks were significantly correlated with the adoption of barriers to interstate branching deregulation. We check that the inclusion of these factors does not meaningfully affect our results. In Column (17), we present results after controlling for annual GDP growth at state level (obtained from the Bureau of Economic Analysis BEA), and the share of small banks (computed as the fraction of total assets in the state held by banks with assets below the state median; Rice and Strahan 2010), factors that had a significant influence on the timing of adoption of barriers to interstate branching deregulation.

We lastly check the robustness to excluding Delaware and South Dakota (Column 18), which exhibit skewed measures of banking structure due to the presence of credit card banks (Black and Strahan 2002).

5. Corporate risk

Previous sections indicate that banks with female executives experience lower profitability as competitive pressures increased. In this section, we test for the presence of gender differences in banks' risk-taking behavior following the increase in competition.

The general effect of competition on bank risk is highly debated (Boyd and De Nicolo 2005; Martinez-Miera and Repullo 2010). On the one hand, there are arguments suggesting that competition should increase survival rates by enhancing banks' efficiency. Focusing on the early stage of US deregulation, there is evidence that intrastate branching deregulation improved the quality of banks' loan portfolios (Jayaratne and Strahan 1996). On one other hand, some works have highlighted that a decrease in banks' market power increases asset risk (Keeley 1990; Matutes and Vives 2000). Focusing on interstate branching deregulation, similar to our empirical analysis, Dick (2006) provides evidence that the competition induced by the IBBEA passage increased portfolio credit risk.

Experimental economics works have identified strong gender differences in risk-taking whereby women take on less financial risk (see Charness and Gneezy 2012 and references therein). These differences, however, turn out to be weaker considering samples of executives. For instance, Adams and Funk (2012) use survey data to show that female directors are not more risk averse than male directors. Croson and Gneezy (2009) suggest that, due to selection or learning reasons, women managers may behave more similar to men in terms of risk-taking. Thus, the risk implications of having female executives remain

unclear. In Table 6, we address this question empirically using as dependent variables a number of variables measuring banks' stability and risk.

Following Beltratti and Stulz (2012), we use as dependent variables two proxies for a bank's capital: Tier 1 (Column 1), computed as the ratio of Tier 1 capital to total risk-weighted assets, and tangible equity (Column 2), computed as the ratio of tangible equity to total assets (when intangible assets are not available, we use total equity). Main explanatory variables and controls are the same of those used in Table 3, Column (3), with the only difference that capital ratio is omitted from the controls given the focus on capital ratios as dependent variables. As shown, the interaction between female executive and high protection dummies is negative and significant at the 10% level–suggesting that banks with female executives exhibit higher capital stability under tough competition.

Next, we employ as dependent variable two measures of profit volatility. In particular, we use as dependent variable the (logarithm of) volatilities of net interest income and market value of equity. Volatilities are measured as the standard deviation over three-year periods (from 1995-1997 through 2004-2006). Volatility regressions include the same time-varying controls of the profitability regressions as in Table 3, Column (3), computed at the first year of each time period.

The positive and significant interaction terms reported in Columns (3)-(4), suggest that banks with female executives displayed a less volatile stream of profits as competitive pressures increased. In unreported tests, we check that this result holds controlling for ROA, i.e. that it is not just mirroring by the previously reported drop in profitability.

Higher capitalization and more stable streams of profits during periods of increased competition may result in a lower likelihood of exit. Looking at the fraction of banks that exited the sample before 2006 (the last year covered in our dataset), we find that this is

indeed the case: despite a lower profitability rate, banks with female executives are slightly less likely than all-male banks to exit.[6]

6. Discussion

We analyze whether banks with men and women executives respond differently to variations in competitive pressures. Drawing on the staggered introduction and the removal of barriers to interstate branching activities in the US, our empirical approach exploits increases in competition within a given state, and then establishes the differential banks' response by executive gender while controlling for state-level unobserved heterogeneity, common shocks and bank-level characteristics.

Using data on US listed banks for the period 1994-2006, we find that when competitive pressures are low, banks with female executives outperform all-male banks; however, when competitive pressures increase, banks with female executives experience lower performance. Focusing on risk-taking behavior, there is some indication that, relative to all-male banks, banks with women executives experience a lower increase in corporate risk. This result highlights that, despite lower profitability, female leadership may mitigate the potential exacerbating effect of competition on risk-taking, thus improving stability and survival rates.

Recent works suggest that the performance effect of women varies with the scope of female representation inside the firm. For instance, Amore et al. (2014) show that family firms benefit from having women in both CEO and board positions, Gagliarducci and Paserman (2014) document a positive output effect of women in different management levels, and Schwartz-Ziv (2013) finds that firms with a critical mass of three or more female directors experience higher performance. Exploring the heterogeneity in the share of women

[6] Firms typically exit the Compustat sample due to mergers and acquisitions, bankruptcies, liquidations and delistings.

in executive positions, we find some indication that banks that underperform the most are those with a small number of female executives interacting with a dominant group of male executives, whereas the negative performance effect is smaller when the share of female executives is high.[7]

We conclude by remarking a challenge in the interpretation of our findings. Interstate branching deregulation had effects on the banking structure (Dick 2006; Johnson and Rice 2008) that parallel effects on various economic outcomes of deregulating states. For instance, Rice and Strahan (2010) document that nonfinancial firms borrow at lower interest rates in states most exposed to interstate branching, and Cornaggia et al. (2014) show significant effects on innovation activities. While our results provide highlight the importance of executive gender as factor that shaped the reaction of banks to interstate branching deregulation, the presence of multiple effects of deregulation on the economic outcomes make it hard to isolate specific channels through which competition affected banks with female executives.

[7] To this end, we replace the female executive dummy with two dummies equal to one, respectively, if the bank has a low (below the median value of banks with any female executive) or high (above the median value) fraction of female executives (the reference group is formed by banks with no female executives). We then interact these two variables with the high protection dummy.

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Table 1. Summary statistics

The table reports summary statistics for the main bank characteristics, computed on the full sample of firms in Compustat bank for the period 1994-2006. Asset size is the logarithm of the book value of total assets. Age is the number of years a bank has been in Compustat. Capital to assets is the ratio of book value of equity to total assets. Deposits are the ratio of deposits to total assets. Net loans are the ratio of loans net of total allowance for loan losses to total assets. Return on assets (ROA) is the ratio of operating income before tax to total assets. Market to book is the ratio of market value of equity to the book value of equity. Executives number is the number of executives as reported in Execucomp. Female executive is a dummy equal to one if at least one of the bank executives is female, zero otherwise. Details on the construction of each variable are reported in Appendix A2.

	Observations	Mean	s.d.	Median
Asset size	1289	9.471	1.333	9.262
Age	1289	20.530	12.121	18
Capital to assets	1289	8.729	3.262	8.162
Deposits	1289	69.170	11.182	69.734
Net loans	1289	60.723	14.598	63.366
ROA	1289	1.830	0.777	1.791
Market to book	1289	2.017	1.553	1.585
Executives number	1289	5.765	1.191	6
Female executive	1289	0.282	0.450	0

Table 2. Bank characteristics and executive gender

This table reports results from a Probit regression reporting marginal effects and estimated as of 1994. The dependent variable, Female executive, is a dummy equal to one if at least one of the executives is female, zero otherwise. Return on assets (ROA) is the ratio of operating income before tax to total assets. Asset size is the logarithm of the book value of total assets. Age is the number of years a bank has been in Compustat. Capital to assets is the ratio of book value of equity to total assets. Deposits are the ratio of deposits to total assets. Net loans are the ratio of loans net of total allowance for loan losses to total assets. HHI is an index measuring the concentration of deposits at the state level. Executives number is the number of executives as reported in Execucomp. Executives compensation is the average of executives' total compensation for a bank in a given year, s.d. executive compensation is the standard deviation of executives' total compensation for a bank in a given year. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

Dependent variable: Female executive	
ROA	-0.0259
	(0.0268)
Asset size	0.6509**
	(0.2995)
Asset size^2	-0.0328**
	(0.0155)
Age	-0.0015
	(0.0020)
Capital to assets	-0.0073
	(0.0085)
Deposits	-0.0019
	(0.0018)
Net loans	0.0037**
	(0.0015)
HHI	0.0046
	(0.0723)
Executives number	0.0113
	(0.0136)
Executive compensation	-0.0649
	(0.0643)
s.d. executive compensation	0.4765*
	(0.3023)
Number of observations	100

Table 3. Competitive pressures, executive gender and performance

This table reports results from OLS regressions. The dependent variable is the return on assets (ROA). In Columns (1)-(4), Female executive is a dummy equal to one if at least one of the executives is female, zero otherwise. High protection is a dummy equal to one if a given state at time t has erected barriers to single branch acquisition and/or statewide deposit cap on branch acquisition (see Table A1 for details). Asset size is the logarithm of the book value of total assets. Age is the number of years a bank has been in Compustat. Capital to assets is the ratio of book value of equity to total assets. Deposits are the ratio of deposits to total assets. Net loans are the ratio of loans net of total allowance for loan losses to total assets. HHI is an index measuring the annual concentration of deposits at the state level. Executives number is the number of executives as reported in Execucomp. Executive compensation is the average of executives' total compensation for a bank in a given year. s.d. executive compensation is the standard deviation of executives' total compensation for a bank in a given year. Each regression includes state and year fixed effects. Column (4) of Panel A includes the interaction between year and gender-specific dummies. Column (5) of Panel A presents a fully-saturated model in which the specification of Column (3) is further augmented with the interactions between state-female executive and year-female executive dummies. Column (6) of Panel A augments the specification of Column (3) with the interactions between the high protection dummy and each of the bank-level controls. Column (7) replicates the model in Column (6) after replacing the female executive dummy with a variable equal to the percentage of female executives relative to the total number of a bank's executives. Standard errors are clustered by states of headquarter. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

Panel A. Interaction model

Dependent variable: ROA							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female executive	-0.1201*	-0.0940	-0.1065*	-0.5128**	-0.5358	-0.1305**	-0.0052*
	(0.0616)	(0.0630)	(0.0598)	(0.2047)	(0.3322)	(0.0611)	(0.0027)
Female executive×High protection	0.2701**	0.2497**	0.2550**	0.3447***	0.2651*	0.2993***	0.0101**
	(0.1138)	(0.1178)	(0.1049)	(0.1170)	(0.1474)	(0.1024)	(0.0038)
High protection	-0.0463	-0.0097	0.0283	0.0048	0.0283	-2.0341	0.0442
	(0.0885)	(0.0795)	(0.0766)	(0.0745)	(0.0808)	(2.1207)	(0.0854)
Asset size	0.2970	0.3541	0.2992	0.3205	0.3000	0.2121	0.3185
	(0.2789)	(0.2790)	(0.2968)	(0.2898)	(0.2751)	(0.3315)	(0.2886)
Asset size^2	-0.0172	-0.0160	-0.0229	-0.0239	-0.0227	-0.0214	-0.0239
	(0.0143)	(0.0145)	(0.0149)	(0.0147)	(0.0139)	(0.0190)	(0.0146)
Age	0.0121**	0.0074	0.0053	0.0054	0.0061	0.0141**	0.0053
	(0.0050)	(0.0049)	(0.0041)	(0.0042)	(0.0045)	(0.0069)	(0.0041)
Capital to assets	0.0698***	0.0704***	0.0655***	0.0661***	0.0695***	0.0375***	0.0657***
	(0.0238)	(0.0210)	(0.0184)	(0.0188)	(0.0205)	(0.0131)	(0.0183)
Deposits		0.0154***	0.0143***	0.0144***	0.0148***	0.0107**	0.0145***
		(0.0024)	(0.0022)	(0.0023)	(0.0026)	(0.0052)	(0.0022)
Net loans		-0.0017	0.0012	0.0011	0.0008	0.0018	0.0013
		(0.0029)	(0.0018)	(0.0018)	(0.0019)	(0.0024)	(0.0017)
HHI		-0.2578	-0.1496	-0.1530	-0.1944	-0.3606*	-0.1471
		(0.1917)	(0.1811)	(0.1768)	(0.1711)	(0.2110)	(0.1839)
Executives number			0.0235**	0.0234**	0.0196	0.0235	0.0260**
			(0.0111)	(0.0108)	(0.0119)	(0.0259)	(0.0125)
Executive compensation			0.4767***	0.4674***	0.4767***	0.4218***	0.4810***
			(0.1330)	(0.1336)	(0.1372)	(0.1034)	(0.1328)
s.d. executive compensation			-0.6308	-0.5936	-0.6584	-0.5615	-0.6245
			(0.5087)	(0.5036)	(0.5236)	(0.3946)	(0.5131)
Year fixed effects	✓	✓	✓	✓	✓	✓	✓
State fixed effects	✓	✓	✓	✓	✓	✓	✓
Year fixed effects×Female executive				✓	✓		
State fixed effects×Female executive					✓		
Controls×High protection						✓	✓
Number of observations	1289	1289	1289	1289	1289	1289	1289

Panel B. Subsample analysis

Dependent variable: ROA

	Low protection	High protection
	(1)	(2)
Female executive	-0.1318**	0.1762**
	(0.0610)	(0.0791)
Asset size	0.1996	0.2992
	(0.3849)	(0.4353)
Asset size^2	-0.0201	-0.0214
	(0.0219)	(0.0203)
Age	0.0146*	-0.0000
	(0.0077)	(0.0049)
Capital to assets	0.0386**	0.1281***
	(0.0143)	(0.0275)
Deposits	0.0117**	0.0103***
	(0.0054)	(0.0038)
Net loans	0.0012	0.0038**
	(0.0025)	(0.0017)
HHI	-0.3726	0.0207
	(0.2412)	(0.2746)
Executives number	0.0282	0.0109
	(0.0249)	(0.0160)
Executive compensation	0.4063***	0.5113***
	(0.1108)	(0.1863)
s.d. executive compensation	-0.5376	-0.7978
	(0.4203)	(0.7363)
Year fixed effects	✓	✓
State fixed effects	✓	✓
Number of observations	492	797

Table 4. Placebo tests

This table reports results from OLS regressions. The dependent variable is the return on assets (ROA). In Panel A, Column (1), Female executive is a dummy equal to one if at least one of the executives is female, zero otherwise. In Panel A, Column (2), Female executive is a dummy variable that takes randomly zero or one values, but such that the average reflects the state-level average of the true Female executive dummy. In Columns (1)-(2) of Panel A, High protection is a dummy equal to one if a given state at time t has erected barriers to single branch acquisition and/or statewide deposit cap on branch acquisition (see Table A1 for details). In Panel B, we first replace high protection dummy with a set of dummies around the year in which the state erected the regulatory barriers (the reference period is formed by two years or more before the relevant regulatory year). Each regression includes the following controls (coefficients unreported): asset size, measured is the logarithm of the book value of total assets, and its squared term; age, measured as the number of years a bank has been in Compustat; capital to assets, measured as the ratio of book value of equity to total assets; deposits, measured as the ratio of deposits to total assets; net loans, measured as the ratio of loans net of total allowance for loan losses to total assets; HHI, i.e. is an index measuring the annual concentration of deposits at the state level; executives number, i.e. is the number of executives as reported in Execucomp; executive compensation, computed as the average of executives' total compensation for a bank in a given year; and s.d. executive compensation, i.e. the standard deviation of executives' total compensation for a bank in a given year. Each regression also includes state and year fixed effects. Standard errors are clustered by states of headquarter. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

Panel A. Placebo checks

Dependent variable: ROA

	Nonbanking financial institutions	Placebo executive gender
Female executive	-0.3791	-0.0559
	(0.3951)	(0.0691)
Female executive×High protection	-0.2703	0.1105
	(0.5273)	(0.0820)
High protection	-0.2122	0.0783
	(0.4637)	(0.0897)
Controls	✓	✓
Year fixed effects	✓	✓
State fixed effects	✓	✓
Number of observations	1785	1289

Panel B. Dynamics

Dependent variable: ROA

Female executive	0.1495*
	(0.0836)
Female executive×High protection $_{t=-1}$	-0.0237
	(0.1344)
Female executive×High protection $_{t=0}$	-0.4072***
	(0.1345)
Female executive×High protection $_{t=1+}$	-0.2303*
	(0.1178)
High protection $_{t=-1}$	0.0788
	(0.0706)
High protection $_{t=0+}$	0.0620
	(0.0864)
High protection $_{t=1+}$	-0.0099
	(0.1102)
Controls	✓
Year fixed effects	✓
State fixed effects	✓
Number of observations	1289

Table 5. Robustness

This table reports results from OLS regressions. Unless differently specified, the dependent variable is the return on assets (ROA) computed as the ratio of operating income before tax to total assets, and the specification is the same as the one used in Table 3, Column (3). In Column (1), the dependent variable is net interest margin (scaled by total assets), whereas in Column (2) is the market to book ratio. Columns (3) and (4) add, respectively, city fixed effects and bank fixed effects to the main specification. Column (5) controls for the ROA of the first year a bank enters the sample. Column (6) restricts the analysis to banks that enter the sample prior to the trigger year of 1997 and that stay for at least one year after 1997. Column (7) clusters standard errors by bank, whereas Column (8) reports heteroskedasticity-adjusted (unclustered) standard errors. Column (9) drops % of observations on the right and left tails of the ROA distribution. Column (10) uses the logarithm of 1 plus ROA as a dependent variable. Column (11) controls for a number of state-year changes in the income tax that affected banks and other financial institutions over the period considered (data from Farre-Mensa and Ljungqvist 2013). Column (12) controls for the share of independent directors (and the interaction with the high protection dummy). Column (13) includes linear female-specific trends, computed as the annual average of the dependent variable computed using observations for which female executive dummy takes value one. Column (14) excludes firms that have decreased the number of female executives during the sample period. Column (15) includes the years since a given state deregulated interstate banking and intrastate branching activities; Column (16) includes the interaction between gender dummy and the inter-intrastate deregulation variables. Column (17) includes the state-level growth in GDP per capita (from the Bureau of Economic Analysis) and the share of small banks, computed as the fraction of total assets in the state held by banks with assets below the state median. Column (19) excludes banks headquartered in Delaware and South Dakota. Unless specified otherwise, standard errors are clustered by states of headquarter. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

	Net interest margin	Market to book	City fixed effects	Bank fixed effects	Early ROA differences	Entry/exit effects
	(1)	(2)	(3)	(4)	(5)	(6)
Female executive	-1.904**	-0.0857	-0.1459*	-0.0262	-0.0221	-0.1179*
	(0.9245)	(0.1034)	(0.0784)	(0.0857)	(0.0664)	(0.0627)
Female executive×High protection	2.1735**	0.5847*	0.2536**	0.2315**	0.1889**	0.2195**
	(0.9043)	(0.3350)	(0.0984)	(0.1100)	(0.0856)	(0.0961)
High protection	-1.411**	-0.0813	0.0540	-3.8342**	-0.0201	0.0355
	(0.5729)	(0.1536)	(0.0836)	(1.5067)	(0.0637)	(0.0782)
Controls	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
State fixed effects	✓	✓			✓	✓
Number of observations	1276	1289	1289	1289	1289	1180

	Bank-clustered s.e.	Heteroske-dasticity robust s.e.	Outliers I	Outliers II	Tax changes	Independent directors
	(7)	(8)	(9)	(10)	(11)	(12)
Female executive	-0.1065	-0.1065*	-0.1334**	-0.0010*	-0.1043*	-0.0100
	(0.0861)	(0.0641)	(0.0554)	(0.0006)	(0.0583)	(0.1072)
Female executive×High protection	0.2550**	0.2550***	0.1805**	0.0025**	0.2535**	0.2436*
	(0.1128)	(0.0830)	(0.0796)	(0.0010)	(0.1048)	(0.1367)
High protection	0.0283	0.0283	0.0185	0.0003	0.0266	0.0000
	(0.0800)	(0.0716)	(0.0690)	(0.0008)	(0.0753)	(0.0000)
Controls	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
State fixed effects	✓	✓	✓	✓	✓	✓
Number of observations	1289	1289	1265	1289	1289	750

(*continued in the next page*)

(*continued from the previous page*)

	Female-specific trends	No female executive leaves	Interstate/ intrastate reforms I	Interstate/ intrastate reforms II	State-level controls	Excluding DE/SD
	(13)	(14)	(15)	(16)	(17)	(18)
Female executive	-0.1065*	-0.1774	-0.1065*	0.0000	-0.1043*	-0.1065*
	(0.0598)	(0.1355)	(0.0598)	(0.0000)	(0.0603)	(0.0598)
Female executive×High protection	0.2550**	0.4274**	0.2550**	0.3020***	0.2507**	0.2550**
	(0.1049)	(0.1962)	(0.1049)	(0.1006)	(0.1024)	(0.1049)
High protection	0.0283	0.0223	0.0283	0.0118	0.0315	0.0283
	(0.0766)	(0.0647)	(0.0766)	(0.0783)	(0.0729)	(0.0766)
Controls	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
State fixed effects	✓	✓	✓	✓	✓	✓
Number of observations	1289	1008	1289	1289	1289	1289

Table 6. Bank stability

This table reports results from OLS regressions. The dependent variable in Column (1) the Tier 1 capital ratio, whereas in Column (2) is tangible equity, defined as equity minus intangible assets whenever available or equity when intangible assets are not available divided by total assets. The dependent variable in Columns (3)-(4) is the volatility of, respectively, net interest income and market value of equity. Volatilities are computed taking the standard deviation over 3-year periods from 1995 to 2006. In all columns, Female executive is a dummy equal to one if at least one of the executives is female, zero otherwise. High protection is a dummy equal to one if a given state at time t has erected barriers to single branch acquisition and/or statewide deposit cap on branch acquisition (see Table A1 for details). Each regression includes the following controls (coefficients unreported): asset size, measured is the logarithm of the book value of total assets, and its squared term; age, measured as the number of years a bank has been in Compustat; capital to assets, measured as the ratio of book value of equity to total assets; deposits, measured as the ratio of deposits to total assets; net loans, measured as the ratio of loans net of total allowance for loan losses to total assets; HHI, i.e. is an index measuring the annual concentration of deposits at the state level; executives number, i.e. is the number of executives as reported in Execucomp; executive compensation, computed as the average of executives' total compensation for a bank in a given year; and s.d. executive compensation, i.e. the standard deviation of executives' total compensation for a bank in a given year. In Columns (3)-(4), explanatory variables are valued at the first year of each time period. Each regression also includes state and year fixed effects. Standard errors are clustered by states of headquarter. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

Dependent variable:	Tier 1	Tangible equity	σ (net interest income)	σ (market value of equity)
	(1)	(2)	(3)	(4)
Female executive	1.0104	1.2154	-0.6193**	-0.3378
	(0.8514)	(0.7715)	(0.2876)	(0.2150)
Female executive×High protection	-1.6846*	-1.4496*	0.8213**	0.7739**
	(0.9514)	(0.7994)	(0.3099)	(0.3677)
High protection	0.4099	0.2428	-0.3224	-0.4605
	(0.3608)	(0.3771)	(0.3090)	(0.2909)
Controls	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓
State fixed effects	✓	✓	✓	✓
Number of observations	1286	1229	389	389

Table A1. Barriers to interstate branching deregulation

This table illustrates the regulatory changes in the banking industry. Each column reports the roadblocks erected by a state in a given year against the IBBEA provisions. Data source: Rice and Strahan (2010).

State	Effective date	Single branch acquisition restriction	Statewide deposit cap on branch acquisition	Age restriction (years)	De novo interstate branching restriction
Alabama	5/31/1997	Yes	30%	5	Yes
Alaska	01/01/1994	No	50%	3	Yes
Arizona	8/31/2001	No	30%	5	Yes
Arizona	09/01/1996	Yes	30%	5	Yes
Arkansas	06/01/1997	Yes	25%	5	Yes
California	9/28/1995	Yes	30%	5	Yes
Colorado	06/01/1997	Yes	25%	5	Yes
Connecticut	6/27/1995	No	30%	5	No
Delaware	9/29/1995	Yes	30%	5	Yes
DC	6/13/1996	No	30%	No	No
Florida	06/01/1997	Yes	30%	3	Yes
Georgia	05/10/2002	Yes	30%	3	Yes
Georgia	06/01/1997	Yes	30%	5	Yes
Hawaii	01/01/2001	No	30%	No	No
Hawaii	06/01/1997	Yes	30%	5	Yes
Idaho	9/29/1995	Yes	No	5	Yes
Illinois	8/20/2004	No	30%	No	No
Illinois	06/01/1997	Yes	30%	5	Yes
Indiana	07/01/1998	No	30%	5	No
Indiana	06/01/1997	No	30%	No	No
Iowa	04/04/1996	Yes	15%	5	Yes
Kansas	9/29/1995	Yes	15%	5	Yes
Kentucky	3/22/2004	Yes	15%	No	Yes
Kentucky	3/17/2000	Yes	15%	No	Yes
Kentucky	06/01/1997	Yes	15%	5	Yes
Louisiana	06/01/1997	Yes	30%	5	Yes
Maine	01/01/1997	No	30%	No	No
Maryland	9/29/1995	No	30%	No	No
Massachusetts	08/02/1996	No	30%	3	No
Michigan	11/29/1995	No	No	No	No
Minnesota	06/01/1997	Yes	30%	5	Yes
Mississippi	06/01/1997	Yes	25%	5	Yes
Missouri	9/29/1995	Yes	13%	5	Yes
Montana	10/01/2001	Yes	22%	5	Yes
Montana	9/29/1995	N/A	+1% per year from 18% to 22%	4	N/A
Nebraska	5/31/1997	Yes	14%	5	Yes
Nevada	9/29/1995	Limited	30%	5	Limited
New Hampshire	01/01/2002	No	30%	No	No
New Hampshire	08/01/2000	No	30%	5	No
New Hampshire	06/01/1997	Yes	20%	5	Yes

New Jersey	4/17/1996	No	30%	No	Yes
New Mexico	06/01/1996	Yes	40%	5	Yes
New York	06/01/1997	No	30%	5	Yes
North Carolina	07/01/1995	No	30%	No	No
North Dakota	08/01/2003	No	25%	No	No
North Dakota	5/31/1997	Yes	25%	No	Yes
Ohio	5/21/1997	No	30%	No	No
Oklahoma	5/17/2000	No	20%	No	No
Oklahoma	5/31/1997	Yes	15%	5	Yes
Oregon	07/01/1997	Yes	30%	3	Yes
Pennsylvania	07/06/1995	No	30%	No	No
Rhode Island	6/20/1995	No	30%	No	No
South Carolina	07/01/1996	Yes	30%	5	Yes
South Dakota	03/09/1996	Yes	30%	5	Yes
Tennessee	3/17/2003	No	30%	3	No
Tennessee	07/01/2001	No	30%	5	No
Tennessee	05/01/1998	No	30%	5	Yes
Tennessee	06/01/1997	Yes	30%	5	Yes
Texas	09/01/1999	No	20%	No	No
Texas	8/28/1995	N/A	20%	N/A	N/A
Utah	4/30/2001	No	30%	5	No
Utah	06/01/1995	No	30%	5	Yes
Vermont	01/01/2001	No	30%	No	No
Vermont	5/30/1996	No	30%	5	Yes
Virginia	9/29/1995	No	30%	No	No
Washington	05/09/2005	No	30%	5	No
Washington	06/06/1996	Yes	30%	5	Yes
West Virginia	5/31/1997	No	25%	No	No
Wisconsin	05/01/1996	Yes	30%	5	Yes
Wyoming	5/31/1997	Yes	30%	3	Yes

Table A2. Variable description

Name	Description	Source
ROA	(*coeit*/*at*)×100, where *coeit* are operating earnings before taxes and *at* measures total assets.	Compustat bank
Net interest margin	(*nim*/*at*)×100, where *nim* is the net interest margin and *a*t measures total assets.	Compustat bank
Market to book	(*prcc_f*×*cshtr_f*)/*ceq*, where *prcc_f* is the market price of common shares at the end of the fiscal year, *cshtr_f* is the number of common shares outstanding and *ceq* is the book value of equity. The variable is winsorized at 0 and 10 following Baker and Wurgler (2010).	Compustat bank
Asset size	ln(*at*), where *at* measures the book value of total assets.	Compustat bank
Asset size^2	Square of ln(*at*), where *at* measures the book value of total assets.	Compustat bank
Age	Bank age, proxied by the number of years a bank has been in Compustat.	Compustat bank
Capital to assets	(*ceq*/*at*)×100, where *ceq* is the book value of equity and *at* are total assets. Values outside the [0, 1] range are excluded.	Compustat bank
Deposits	(*dptc*/*at)*×100, where *dptc* are deposits and *at* is the size of assets. Values outside the [0, 1] range are excluded.	Compustat bank
Net loans	(*lntal*/*at)*×100, where *lntal* are net loans computed as loans net of total allowance for loan losses and *at* is the size of assets. Values outside the [0, 1] range are excluded.	Compustat bank
HHI	Herfindahl–Hirschman index measuring the state-level geographic concentration of deposits, computed as the sum of squared shares of deposits in a given state and year. Values equal to one are excluded.	Compustat bank
σ (net interest income)	Logarithm of the standard deviation of the net interest income, i.e. interest and related income minus interest and related expenses. Standard deviations are computed over three-year periods (from 1995-1997 through 2004-2006).	Compustat bank
σ (market value of equity)	Logarithm of the standard deviation of the market value of equity (as defined above). Standard deviations are computed over three-year periods (from 1995-1997 through 2004-2006).	Compustat bank
Female executive	Dummy equal to one if the bank has at least one female executive.	Execucomp

Share of female executive	Ratio of female executives to the total number of executives.	Execucomp
Executives number	Total number of executives as reported in Execucomp.	Execucomp
Executives age	Average age of all bank executives in Execucomp in a given year.	Execucomp
s.d. executives age	Standard deviation of the age of all bank executives in Execucomp in a given year.	Execucomp
Share independent directors	Ratio of independent directors to the total number of board members.	IRRC/RiskMetrics
High protection	Dummy variable that takes value one if a state has adopted restriction to single branch acquisition and/or has established a deposit cap on branch acquisition lower than the 30% threshold	Rice and Strahan (2010)