Bank Stress Testing, Human Capital Investment and Risk Management

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ABSTRACT

This paper studies banks' investment in risk management practices following the Global Financial Crisis and the advent of stress testing. Banks that experienced greater losses during the Crisis exhibit stronger demand for risk management talents. Banks increase their demand for highly skilled stress test labor in anticipation of a test and following poor performance on a test. Following this higher demand, banks exhibit lower systematic risk and lower profitability. While stress testing has modernized banks' risk management by spurring the acquisition of highly skilled risk management talent, our results suggest that recent changes to the tests could erode its efficacy.

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1. INTRODUCTION

The 2007-2009 Global Financial Crisis (GFC) represents a massive risk management failure on the part of both private-sector financial firms and their regulators. The financial system itself became over-leveraged due to the growth of products like credit default swaps in the early 2000s, and lending practices became lax due to the growth of securitization in areas such as subprime mortgage lending (Mian and Sufi, 2009). Many of these changes occurred, or were accelerated, by gaps in regulation.[1] In the aftermath of the GFC, regulators have attempted to fill these gaps with new programs designed to foster resiliency, and bank stress testing is among the most important of these regulatory innovations. Although a burgeoning literature studies the efficacy of stress testing, little is known about how stress testing has changed the way banks approach risk management.

This paper analyzes banks' investment in human capital aimed at managing risk following the GFC and the advent of bank stress testing.[2] We first document a rising demand for risk management expertise over the subsequent decade, and we show that this demand is greater among banks that suffered heavier losses during the GFC.[3] Next, we examine how stress testing has shaped banks' demand for risk managers and find that banks seek to hire highly skilled stress test labor in anticipation of a test and following poor performance on a test. Finally, we find that this higher demand translates to lower systematic risk and lower profitability. Overall, our results

[1] OTC derivatives markets were loosely regulated and offered a means to increase economic leverage for firms like AIG. Novel securitization techniques enabled banks to maintain ostensibly low levels of risk and hold artificially low levels of regulatory capital. In one form of such regulatory arbitrage, Acharya et al. (2013) show that asset-backed commercial paper vehicles used to support loan securitization were designed specifically to avoid bank capital regulations. These structures collapsed spectacularly starting in the summer of 2007 and were the harbinger of the full-on crisis in late 2008.

[2] Our analysis is done at the level of the bank holding company ("BHC"). To avoid these clumsy terms, we instead generally refer to 'banks' throughout the text.

[3] Kho et al. (2000) focuses on loss exposure to emerging market crises of the 1990s, but they do not analyze subsequent risk management hiring, as we do.

suggest that stress testing has catalyzed advancement in risk management through the acquisition of highly skilled talent.

Recent changes in the stress testing regime have both reduced the severity of these tests as well as the level of public disclosure. The 2018 reforms to the Dodd-Frank Act, for example, gave the Federal Reserve discretion as to which banks with assets between $50 and $250 billion would be required to undergo annual supervisory stress tests (called the Comprehensive Capital Analysis and Review, or CCAR).[4] As a result, banks such as Silicon Valley Bank (SVB) were not put through these tests even though they had grown above the $50 billion threshold by 2018. Whether or not this change led to SVB's failure is unknowable, but absent the legislative change SVB would have faced additional regulatory oversight and hence pressure to improve their risk management procedures. Also, starting in 2020 the Federal Reserve removed the qualitative assessment from stress testing, which had formerly been a core component of the regime. The results from these qualitative assessments – which depend on supervisory oversight of internal risk management policies, practices, and governance – had been publicly disclosed (and are the source of our key measure), along with the quantitative results. Importantly, our analysis suggests that this component of the stress testing regime had the greatest impact on skill acquisition. Hence, the recent changes likely have reduced bank investment in risk management talent.

Our data come from Lightcast, which reports comprehensive information for online advertisements by firms looking to hire at all levels across the organization. These data, we argue, capture labor demand, as they reflect the kinds of skills banks are seeking to employ. As such, they

[4] In most of the paper, the term 'stress test' refers to the Fed's Supervisory Stress Tests. Most banks have been subjected to some level of these tests, as dictated in the Dodd-Frank Act. However, in 2019 and earlier banks with assets over $50 billion faced the full effect of these tests via the Supervisory Stress Tests (called the Comprehensive Capital Analysis and Review, or CCAR). After 2019, banks with $50-$100 billion in assets were not required to take the tests, and those with assets between $100 and $250 billion took them every other year. These tests were used to tie stress test results to bank capital and were, until 2019, used to limit bank dividend payouts in some cases. Hence, CCAR had much more 'bite' as a regulatory tool than the stress testing applied to smaller banks.

help us understand what banks are trying to achieve in their human resources policies, as opposed to whom they succeed in hiring (which would capture both labor supply and demand effects).[5]

Using Lightcast, we document that total demand for risk management jobs climbed nearly six-fold from 12,000 job posts by banks in 2010 to over 70,000 posts by 2019, before falling during the coronavirus pandemic (Figure 1A). The data clearly show that risk management has been a persistent and increasingly important factor at banks in the years following the GFC.

To understand this pattern, we consider two effects of the GFC on banks' labor demand. First, we look for, and find, evidence that banks *learned* about their risk exposure from the trial by fire during the Crisis and responded by demanding more risk management skills. Specifically, we focus on banks' exposure to losses during the 2008-2009 period, and we find that banks with higher losses during the GFC subsequently increase their hiring of people with risk management skills relative to less-affected banks in the cross-section. This effect is large economically, and it is not subsumed by bank characteristics such as size, real estate exposure, and whether the bank is subject to stress testing.

Next, we shift our focus to stress testing given its importance in the post-crisis regulatory regime. Stress tested banks dominate the demand for risk management jobs, accounting for over 80% of these job posts in any given year (Figure 1A). Their demand for risk managers is higher not only because they are bigger, but also as a fraction of their hiring. Risk management represented about 4% of total job posts across all banks in 2010, but this share tripled to over 12% of job posts at stress-tested banks by the end of the decade, outpacing the increase to 8% at other banks (Figure 1B).

[5] We do not have access to data on actual bank hiring by skill domain. As far as we know, no such systematic data exists for U.S. banks.

Empirically, the setting of stress testing allows us to exploit within-bank variation in panel models since the set of banks subject to stress tests changes over time, and the effect of the test on banks also varies temporally. We show that stress testing spurred bank investment in highly skilled workers, and that this led to lower risk. Specifically, banks that expect to be stress tested in the next cycle increase their demand for stress-test specific labor. This effect is greatest at banks who perform worse in or fail the stress tests. Following higher demand for stress-test specific labor, banks exhibit lower systematic risk and lower profitability. This is strongest when banks demand jobs requiring higher education or advanced quantitative skills. Overall, stress testing has helped advance internal risk management practices at banks. By extension, the general tightening of regulation itself helps explain the marked upward trend in banks' demand for risk-management skills.

The effects we document surrounding stress testing likely understate the overall impact of regulatory tightening after the crisis on demand for risk management. Many dimensions of regulatory change happened to all U.S. banks, making it hard to pin down their causal effects empirically. We remove both time-invariant bank characteristics as well as time trends in our analysis of stress tests to address identification concerns, but this approach may also remove important common effects of regulatory change on skill acquisition. Even within the panel setting, we argue that the measured effect of stress test outcomes on skill demand is likely to understate the true effect because banks with a greater level of risk management expertise ought to perform *better* on their stress tests; in other words, any reverse causation from a bank's hiring of risk management talent to stress test outcomes ought to attenuate our core finding.

In addition to strengthening internal risk management by talent acquisition, banks also invest heavily in hiring external consultants. Globally, banks' expenditure on consultants has

increased from $16 billion in 2007 to $29 billion in 2015, much of that for stress tests.[6] Since individual banks' expenditures on consulting services is not easily observable, the labor demand response that we estimate is likely a lower bound on the aggregate investments that banks make in their risk management practices. That is, our results likely understate the overall resources that banks dedicate towards risk management and its subsequent effect on risk outcomes.

In studying post-GFC regulatory changes like stress tests, many researchers have focused on the impact of stress testing on credit supply (e.g., Acharya, Berger and Roman (2018); Bassett and Berrospide (2018); Cortes et al. (2020); and Doerr (2021)). There is also debate about the efficacy of stress tests as a means of regulating capital and how results should be disclosed. Hirtle et al. (2009) argue that stress tests have become a key tool in banking supervision, although Frame et al. (2015) report that pre-GFC stress testing was ineffective for the GSEs. Goldstein and Leitner (2018) model the tradeoffs faced by regulators regarding disclosure of stress test results. They focus on how disclosure of individual bank risks can affect inter-bank markets and risk sharing. But little is known about how (and whether) stress testing reshapes banks' internal risk management practices, and whether such changes have affected actual risk outcomes for banks. Our paper fills this gap by showing that banks respond to stress testing by changing their investment in human capital, especially in highly skilled expertise, to improve their risk management.

Because we are the first to analyze hiring patterns, our paper provides a fuller understanding of how banks reacted to the 2008 Crisis. Many existing papers have emphasized the risk-management failures of both banks and their regulators. The only research on the role of bankers themselves that we know of focus on bank senior managers (e.g., Stulz and Fahlenbrach,

[6] https://www.wsj.com/articles/stress-test-inc-billions-of-dollars-consultants-to-manage-other-consultants-1467139620

2011) or board members and structures (e.g., Ellul and Yerramilli, 2013; Minton et al., 2014). While management and governance are clearly important – top executives and board members set the priorities and incentives within an organization – these few individuals cannot singlehandedly govern bank risk without the support of low- and mid-level employees.

2. STRESS TESTING

We focus on the supervisory stress testing, which began in the wake of the GFC in 2009 with the Supervisory Capital Assessment Program (SCAP). This program succeeded in allaying concern about bank health and led to rapid bank recapitalization. Following the success of SCAP, the Fed decided to implement annual supervisory stress tests for large banks, and rebranded the program as the Comprehensive Capital Analysis and Review (CCAR). The CCAR process, until 2020, explicitly tied bank dividend and capital distributions to the stress test results. CCAR captures each bank's quantitative exposure to its adverse economic scenarios (nine-quarter ahead potential paths for risk drivers) by constructing hypothetical nine-quarter ahead paths for several regulatory capital ratios (e.g., the Tier 1 capital ratio, the Total risk-based capital ratio and the Tier 1 leverage ratio). Until 2020, the forecasted paths of the capital ratios embed each bank's planned dividend increases and share repurchases. If one of the capital ratios falls below the regulatory minimum during the forecast horizon, however, the bank was required to reduce its planned capital payouts. In addition, CCAR provides a qualitative assessment of each bank's overall risk management practices.[8]

In addition to CCAR, the Dodd-Frank Act requires the Fed to conduct a parallel set of annual stress tests, known as the Dodd-Frank Act Stress Tests (DFAST). These began in 2013. DFAST requires banks to run (and disclose) their quantitative stress tests results using their own

[8] For a detailed description of the stress test regime, see Schneider, et al. (2022).

internally developed models. Under DFAST, each bank is required to simulate its capital ratios using both the Fed's scenario (common to all) and also using its own scenario. We focus on measures using the Fed's scenario. From 2011 to 2018, all banks with consolidated assets above $50 billion were subject to CCAR and DFAST. Effective in 2019, however, the tailoring rule was implemented, according to which, banks with less than $250 billion consolidated assets received less regulatory scrutiny. The Fed moved some banks to a biannual testing cycle, while others, including Silicon Valley Bank, were exempt from being tested entirely.[9]

During each year in our sample, the Fed first releases the results of DFAST in a document containing the results from the Fed's proprietary model. About one week later, they release a second document with results from CCAR, again containing quantitative results based on the Fed's model, along with a discussion of the qualitative results of the test. Banks also release their results around the same time, using a common set of scenario assumptions dictated by the Fed.

We build three stress testing measures from the publicly disclosed data for CCAR and DFAST. First, we utilize all testing cycles from 2011 to 2021 to construct indicators for whether a bank is tested in the current year ($Tested_{i,t}$) or is expected to be tested in the following year ($Tested_{i,t+1}$).

Our second set of measure focuses on failures in CCAR. Failure occurs if the bank's stressed capital ratios fall below a regulatory minimum threshold, or if the Fed finds deficiencies in a bank's internal risk management policies or practices. As the Fed says, "The Federal Reserve's qualitative assessment of the capital plans focused on the robustness of a BHC's internal capital adequacy processes, including each BHC's stress test under its own internally designed stress scenario." In some cases, a bank's capital plans under CCAR are outright rejected; in other less

[9] See https://www.congress.gov/bill/115th-congress/senate-bill/2155 and https://www.federalreserve.gov/newsevents/pressreleases/bcreg20191010a.htm

severe cases banks are required to make internal changes but may maintain their stated capital plan ("conditional non-objections"). In these cases, banks commit to making improvements to their risk management practice but receive approval of their planned capital distributions. These outcomes were disclosed starting from 2013, upon which we build a failure metric which varies from 0 to 2. A value of zero indicates no objection by the Fed; a value of one represents a conditional non-objection, and a value of two represents an outright objection (failure).

Starting in 2020, the impact of the CCAR on bank capital planning was substantially reduced. First, banks were no longer required to pre-commit to a capital plan, which until 2019 was used as a key component of the quantitative portion of CCAR. Second, the qualitative review was no longer disclosed publicly. So, while we do extend our analysis into the last two years, we code all banks as having passed the qualitative portion of CCAR in 2020 and 2021.

Our third set of measures equal the difference between the stressed value for a given capital ratio (under the severely adverse scenario) from its value at the start of the test, based on each bank's internal model (i.e., using DFAST data). These variables are available from 2013 to 2021 and measure the exposure of a bank's portfolio to the test. We focus on the results from bank's model under the Fed's scenarios, instead of Fed's model, because they represent bank's own assessment of their exposure to the scenarios before the results under the Fed's model are disclosed.

3. HIRING DATA

To assess banks' labor demand, we analyze granular job posting data provided by Lightcast (formerly known as Burning Glass Technologies). Lightcast collects information from online job advertisements via data scraping techniques. These data cover the near universe of online job postings continuously from 2010 through 2021.[10] Each data entry is a unique job posting and

[10] See Hershbein and Kahn (2018) for an excellent overview of the Lightcast database.

contains information such as the name of the employer, location of the job, industry, required education/experience, and occupation classification. One distinctive feature of the Lightcast database is that it provides a detailed description of required skills listed in each job ad. We hand-match large banks from FR-Y9C data with job posting data from Lightcast through bank/employer name and location. We consider a bank for our sample if it ranks among the top 300 banks by total assets in any year during our sample period, 2010-2021.

We extract risk management job posts from Lightcast by filtering on the skill clusters and job titles provided in the data. We define risk management jobs as those requiring at least one skill that falls within the "Financial Risk Management" or "Financial Regulations" skill clusters and contains one of the following key strings in the job title: *analy, audit, ccar, compliance, credit, econom, model, ppnr, quant, regulat, risk,* or *stress*. We require this secondary filter as many bank jobs involve extraneous forms of risk management, such as tellers managing cash drawers and guards overseeing physical premises.

After hand-matching to Lightcast, we end up with 412 bank holding companies. This number drops to 337 after we require these banks to have pre-Crisis Y9C data for our cross-sectional analysis. Some banks drop out because previously they were not filed as bank holding companies, such as Goldman Sachs.[11] In some tests we require stock market returns, which reduces the sample further to 197, because some banks are private or foreign.

[Insert Figure 1 Here]

Figure 1 shows the increasing demand for risk management expertise throughout the past decade. Figure 1.A. plots the raw number of risk management job posts and shows that it has increased dramatically from approximately 12,000 in 2010 to over 70,000 in 2019 before the

[11] All stress tested banks, including Goldman Sachs, are present in our panel analysis.

coronavirus pandemic. This upward trend is dominated by stress-tested banks: the share of risk management jobs posted by stress-tested banks is over 80% in any given year. Risk management talents also become a more significant portion of labor force at banks, especially at stress-tested banks. Figure 1.B. demonstrates that the share of risk management job posts of all job posts is about 4% for all banks in 2010, but this fraction climbs to over 12% for stress-tested banks by the end of the decade, surpassing the increase to 8% at other banks.

[Insert Figure 2 Here]

Banks' rising demand for risk management skills is not limited to the risk management department; it can also be seen across various functions within the banking organization. We select the largest four occupation categories: branch managers (ONET = "11-3031.02"), personal and relationship bankers (ONET = "41-3031.02"), loan officers (ONET = "13-2072.00" or "43-4131.00"), and analysts (ONET name contains the word "analyst").[12] The plots in Figure 2 represent the number (left axis) and fraction (right axis) of job posts that require any risk management skills for each major occupation. As Figure 2 demonstrates, the fraction of job posts that require risk management skill has increased from below 10% in 2010 to over 40% in 2021 for branch managers and personal bankers; and doubled for loan officers and analysts over the same time period.

4. RESULTS

4.1 *CROSS-SECTIONAL ANALYSIS: GFC AND LABOR DEMAND*

Do banks scarred by losses during the Global Financial Crisis respond by strengthening their risk management practice and refreshing their talent pool? To answer this question, we link losses experienced in the Crisis with subsequent demand for risk-management skills. We merge

[12] The Occupational Information Network (O*NET) is a Standard Occupational Classification (SOC) based system. Lightcast provides the O*NET occupation code using its proprietary coding rules for each job.

banks' financial information from FR-Y9C reports and stock returns from CRSP with the Lightcast data. Risk management job postings are aggregated at the bank level over 2010-2021, scaled by total job posts during the same period. (Summing over time removes temporal variation, which we explore below.) We capture banks' exposure to losses in the GFC in two ways. First, we use net income summed across the worst quarters of the Crisis (from Q2 2008 through Q2 2009), scaled by pre-Crisis total assets at the end of 2006. Second, we measure stock returns from the peak (June 2007) to trough (March 2009) of the Crisis. We control for banks' pre-Crisis characteristics by including log of assets, real estate loans/assets, and capital ratio at the end of 2006.

[Insert Table 1 Here]

Table 1 presents summary statistics. For an average bank in the sample, 5.2% of total job posts during 2010-2021 are risk management positions. Cumulative net income over the Crisis quarters is near zero for the average bank, and there is substantial variation in net income across banks with a standard deviation of 2.2% of assets. Stock prices fell on average by more than 50% from peak to trough, with a cross-sectional standard deviation of 27%.

To test the effect of GFC losses on hiring, we estimate regressions of the following form,

$$Risk\ Management\ Jobs_i = \beta\ Losses_i + \lambda X_i + \epsilon_i\,, \qquad (1)$$

where i indexes bank, *Risk Management Jobs* are measured over the twelve-year period from 2010 to 2021, *Losses* refers to either *Net Income* or *Stock Return* during the GFC as described above, and X represents a vector of pre-Crisis bank-level controls.

[Insert Table 2 Here]

The results in Table 2 support the idea that banks which experienced higher losses during the GFC subsequently post more risk management positions. For example, Column 3 indicates that a one standard deviation decrease in banks' net income during the Crisis is associated with 0.6% (=0.27*2.23) increase in labor demand for risk management talent, corresponding to 12% (=0.6/5.235) of the sample mean. Similarly, columns 4-6 suggests that stock returns correlate negatively with risk management job posts, with similar economic magnitude.[13]

Column 2 of Table 2 suggests that stress-tested banks demand more risk management skills, with a very large magnitude equal to about 45% of the mean (=2.287/5.235). But this effect becomes statistically insignificant with bank size included. The stress-tested indictor equals one for banks ever tested during our sample period, so it is mechanically related to size. Larger banks clearly demand more risk management talent than smaller ones, as columns 3 and 6 show, but this effect has some ambiguity in interpretation. Large and small banks differ not only in their exposure to post-Crisis regulatory changes such as stress testing, but also across other dimensions.[14] The panel approach below, however, allows us to separate size from regulatory effects.

[Insert Table 3 Here]

Next, we test whether banks' responses to losses from the GFC are distinct from banks' responses to performance in other periods. We divide sample years into two non-overlapping periods of 2010-2015 and 2016-2021 and calculate the fraction of risk management job postings for each bank. In Panel A of Table 3, we regress risk management jobs from the first half of the

[13] We have also tested whether banks with a board-level risk-management committee before the 2008 crisis increased their subsequent stress-test hiring. These results suggest little evidence that this governance variable matters, although its inclusion does not change our main findings on GFC loss exposure.

[14] For robustness, we estimate Equation (1) using only the sample of non-stress tested banks and report the results in Appendix 3. The results are similar to the full sample, meaning that non-stress tested banks respond to GFC losses by hiring risk managers as well.

sample on losses from the GFC. In Panel B, we regress job posts from the second half of the sample on losses from a placebo period from 2013 to 2015. To keep the same window length as in Panel A, losses are measured from Q2 2014 to Q2 2015. Consistently, controls are measured at the end of 2012. We find significant results only when losses are measured from the GFC, and we conclude that the scarring that occurred during the crisis was indeed unique in shaping risk management practices going forward.

4.2 *Panel Analysis: Stress Tests and Labor Demand*

Stress testing is not only the most important change in bank regulation emerging from the GFC, but its implementation has been staggered, and its effects have varied by bank over time. For example, failures and objections occur in some years but not others (Schneider et al., 2022). Hence, we can bring panel analysis to bear in answering how stress testing has affected banks' demand for relevant skills. To do so, we select jobs within the risk-management category that require "stress testing" or "CCAR regulatory rules" as skills and categorize them as *Stress Test Jobs*.[15] We classify the remaining risk management jobs that do not specifically mention stress testing skills as *Other Risk Management Jobs*.

[Insert Figure 3 Here]

Figure 3 plots the prevalence of stress test jobs and other risk management jobs at stress-tested banks in the top and bottom panels, respectively. Demand for stress testing jobs increased in the years following the implementation of the tests, accelerating in 2014 as the Fed expanded its scope to include smaller banks (see Appendix 2), and retreating after 2017 as the Fed's

[15] Although the Dodd-Frank Act contains a stress testing component (DFAST), the Act is broad and introduced a substantial amount of risk management regulation that is not specific to stress tests. Job posts that require Dodd-Frank regulatory skills are only classified as *Stress Test Jobs* if they also require stress testing skills or CCAR regulatory skills.

leadership on banking supervision changed.[16] In subsequent years, changes to stress testing have reduced its effects on large banks, and smaller banks have moved to a biannual testing cycle.

[Insert Figure 4 Here]

In Figure 4, we plot stress test jobs posted by non-bank employers and the Federal Reserve. Employers in the top figure include consulting firms that specialize in bank stress testing (*e.g.* Accenture, Deloitte, and KPMG) and other firms that provide support services for stress testing such as IBM. These firms expanded their labor demand for stress test jobs in the early years when stress tests were first implemented on a large and consistent scale. This demand declined since 2017, consistent with the pattern observed for stress tested banks (Figure 3). The bottom panel of Figure 4 depicts the Federal Reserve's job posts for stress test positions. The rise and fall of the Fed's demand leads the trends in demand by stress tested banks and non-bank employers by about one year. Even though many consulting firms have added stress testing services to their lines of business, banks' demand for stress test jobs dwarfs that of the consulting industry.

We further partition jobs into high- and low-skilled bins, based on whether they require higher education or advanced quantitative skills. Since bank jobs typically require at least some college, our measure considers whether the job post lists a preference for a master's or doctorate degree. To capture quantitative requirements, we flag jobs containing the most frequently listed quantitative or programming skills such as *C++*, *MATLAB*, *physics*, and *SAS*.[17] We define a job to be *High Skilled* if it requires either an advanced degree or at least one quant skill and *Low Skilled* otherwise.

[Insert Figure 5 Here]

[16] President Donald Trump appointed Randy Quarles as the Vice Chair for Bank Supervision at the Federal Reserve in 2017, replacing Daniel Tarullo. The stress-testing regime was developed during Tarullo's tenure as head of supervision at the Fed.

[17] We report the full list of advanced quantitative and programming skills in Appendix 1.

[Insert Figure 6 Here]

Figure 5 shows that stress test jobs require considerably more high skilled workers than other bank jobs. Out of all posts, only 14% are *High Skilled*. This fraction rises to 29% for all risk management jobs and to 53% for stress test jobs. Figure 6 plots the proportion of *High Skilled* stress test jobs compared to other risk management jobs by year. The stark difference between the panels shows that stress test jobs consistently require a higher skilled workforce than other types of risk management. In most years, over half of stress test jobs require an advanced degree or quant skills. In our regressions, we expect high skilled stress test jobs to produce the strongest effects, and we find that they do.

[Insert Table 4 Here]

Panel A of Table 4 presents summary statistics for the job measures used in our bank-year panel regressions (outlined below) for the sample of stress-tested banks. Our sample begins with the 38 banks which are ever stress tested under CCAR between 2010 and 2021, producing 456 (=38×12) bank-years. Each job measure observation represents the number of job posts within that category during a [t-3, t+3], where t denotes the month when that year's stress test results were publicly disclosed, as a fraction of the bank's total job posts over the same period. For example, the 2020 stress test results were released in June, so our measure considers job posts from March through September of that year. We include the months leading up to the disclosure because banks have private information about their performance on the test prior to the public release. We exclude months further from the tests to avoid potential simultaneous effects between labor demand and our variables of interest, although our results are quantitatively similar if we consider the whole year. The mean of *Risk Management Jobs* is 9.15, indicating that risk management job posts comprise 9.15% of all job posts within the sample window in a typical bank-year. This share is

1.20% for *Stress Test Jobs* and 7.88% for *Other Risk Management Jobs*. Further partitioning jobs into *High Skilled* and *Low Skilled* confirms that stress test jobs require higher skilled workers than other risk management jobs. For stress test jobs, 50% (= 0.60÷1.20) require an advanced degree or quant skills, while only 27% (= 2.15÷7.88) of other risk management jobs do.

In our first set of panel regressions, we examine the impact of stress tests on banks' labor demand, including all banks which ever undergo the CCAR test. We hypothesize that banks scheduled to be tested in the following cycle expand their stress testing work force in anticipation of the test. Specifically, we estimate the following regression:

$$Stress\ Test\ Jobs_{i,t} = \beta\ Tested_{i,t+1} + \lambda X_{i,t} + \alpha_i + \alpha_t + \epsilon_{i,t} \quad (2)$$

where $Tested_{i,t+1}$ indicates that bank i is tested in year t+1, and *Stress Test Jobs* is measured as a fraction of the bank's total job posts. The largest banks were tested across all cycles, while others were added and dropped, as shown in Appendix Table 2. This heterogeneity provides within-bank variation in our variable of interest ($Tested_{i,t+1}$). Our model assumes that banks know at least one year in advance whether or not they will face a test in the subsequent cycle (*i.e.* banks know at time t whether they are tested at time $t+1$); hence, it makes sense that their hiring would respond to their anticipation of an upcoming test. The vector X represents time-varying bank characteristics: whether it is tested in year t, bank size (log of total assets), loan portfolios (loans and unused commitments as a fraction of total assets), profitability (net income/assets), and capital (tier 1 capital ratio). We absorb time-invariant bank characteristics and macro time trends by including bank fixed effects and time fixed effects, and we cluster standard errors at the bank-year level.

[Insert Table 5 Here]

We report estimates of Equation (2) in Table 5. Columns 1 to 4 of Panel A confirm that banks increase their demand for stress test labor prior to facing a test, and that the effect is not sensitive to whether or not we control for the contemporaneous test. In Column 4, our most restrictive model, the coefficient of 0.290 on $Tested_{i,t+1}$ implies that stress test job posts make up 0.29% more of a bank's total job posts in the year prior to a test. This number is economically large, representing an increase of over 25% (=0.29÷1.201) of the sample mean and 20% (=0.29÷1.526) of the sample standard deviation. Columns 5 to 8 of Panel A present alternative specifications where the dependent variable is *Other Risk Management Jobs*. In contrast to stress test jobs, we find no significant relationship between facing a test and demand for other risk management labor.

We estimate Equation (2) separately for *High Skilled* and *Low Skilled* stress test jobs in Panel B. The results reveal that banks demand primarily high skilled stress test labor prior to a test: the coefficient on $Tested_{i,t+1}$ is statistically positive at the 1% level of significance in columns 1 to 4 for high skilled labor, while it is weak or insignificant in columns 5 to 8 for low skilled labor.

Table 5 shows that bank hiring responds to anticipated future tests. We next proceed to investigate how banks' labor demands respond to past stress-test performance, focusing on bank-years for which stress test performance data are disclosed. This limits our sample to 215 bank-years from 2013 to 2021 (see Appendix 2).[18] We hypothesize that banks that fail tests subsequently increase their demand for stress test related labor. As described above, we build a categorical variable, *Failure Score*, that takes values of 0 (no objection or capital adjustments), 1 (conditional non-objection), and 2 (objection) depending on the Fed's response to the bank's capital plan under CCAR to capture the severity of a failure (Schneider, et al., 2022). Additionally, we consider the

[18] Due to the coronavirus pandemic, the Fed made disclosure voluntary in 2020. Our results are similar if we only consider the 199 bank-years tested and disclosed from 2013 to 2019 (unreported).

three capital ratios consistently disclosed in all testing cycles: the *Tier 1 Capital Ratio*, the *Total Risk-based Capital Ratio (TRBC)*, and the *Tier 1 Leverage Ratio*. We define a bank's *Exposure* for each ratio as the difference between the ratio's actual value at the beginning of the test and the ratio's projected minimum value over the forecast horizon under DFAST (Cortes, et al., 2020). Thus, *Exposure* measures how much a bank's capital ratio is projected to decline during the test, with higher values corresponding to greater losses.

[Insert Figure 7 Here]

Figure 7 visualizes the relationship between stress test performance and labor demand. The first three pairs compare the average demand for stress test jobs following bank-years with above vs. below median exposure using the three capital ratios. The last pair compares demand for stress test jobs in the period following bank-years that pass vs. fail the stress test. In each pair, banks with worse performance on the test demand more stress test related labor. We formalize this analysis by regressing current period hiring on past stress test performance:

$$Stress\ Test\ Jobs_{i,t} = \beta Failure\ Score_{i,t-1} + \lambda\ Exposure_{i,t-1} + \alpha_i + \alpha_t + \epsilon_{i,t}. \quad (3)$$

Controlling for *Exposure* enables us to separate the effect of failing the test from the overall riskiness of the bank.

[Insert Table 6 Here]

Table 6 presents results from estimating Equation (3). Columns 1 to 4 of Panel A show that banks increase their demand significantly for stress test jobs following a stress test failure. The effect of failure on hiring for other types of risk management jobs reported in columns 5 to 8 is positive but not statistically significant. In Panel B, we find statistically positive effects of failure

on hiring for both *High Skilled* and *Low Skilled* jobs, and the magnitude of the relationship is strongest for higher skilled labor. Taken together with the results in Table 5, we conclude that stress testing has had meaningful effects on banks' internal labor demand, particularly among high skilled workers. The regression results also suggest that the main impact of stress testing works through our failure score measure, which depends on the disclosed outcomes from the qualitative portion of CCAR (recall section 2). As noted, this component of the public disclosure was ended after 2019, suggesting that the beneficial impact of stress testing on banks' human capital investments may be waning.

We would like to draw a causal inference from the results of both Tables 5 and 6. That is, we argue that stress tests causally shape banks' human capital investment, not the reverse. In the first set of panel models (Eq. 2), where we focus on just the effect of the stress test cycle (or, a bank's exposure to future stress tests), this interpretation seems easy to justify because the stress test cycle depends only on actions taken by the Federal Reserve, not the bank. In our second set of models, we focus on stress test outcomes. Here, reverse causality could bias the effects we observe *down* because hiring fewer skilled employees for stress test compliance would likely raise the probability of failing the test. In fact, we find a positive effect on stress test hiring on the odds of failure. Hence, the true causal effect is, if anything, likely to be more positive than our estimates would suggest.

4.3 *Hiring and Bank Risk*

Having established the relationship between stress tests and labor demand, we next ask: Does this new labor change bank's risk characteristics? We hypothesize that skilled stress test labor improves risk management by reducing systematic risk exposure. We focus on three risk

metrics: *Expected Shortfall*, *Beta*, and *Volatility*.[19] *Expected Shortfall* is the model-implied expected fractional loss of the bank's equity in a crisis when the aggregate market declines significantly, following Acharya, Pederson, Phillipon and Richardson (2017); *Beta* is the dynamic conditional beta with respect to the MSCI World Index, as in Engle (2016); and *Volatility* is the annualized standard deviation of stock returns estimated via the Glosten, Jagannathan, and Runkle (1993) GARCH model. The first two metrics capture systematic risk and the latter measures total risk. Since stress testing is principally about mitigating systematic risk, we expect to observe the strongest effects for *Expected Shortfall* and *Beta*. We regress year-end risk measures on current year labor demand while controlling for whether the bank is tested current or upcoming cycle,

$$Y_{i,t} = \beta\, Stress\ Test\ Jobs_{i,t} + \lambda\, Tested_{i,t+1} + \gamma\, Tested_{i,t} + \alpha_i + \alpha_t + \epsilon_{i,t} \qquad (4)$$

and alternatively, controlling for the bank's performance on the test:

$$Y_{i,t} = \beta\, Stress\ Test\ Jobs_{i,t} + \lambda\, Failure\ Score_{i,t} + \gamma\, Exposure_{i,t} + \alpha_i + \alpha_t + \epsilon_{i,t}\,. \qquad (5)$$

Although risk outcomes ($Y_{i,t}$) and the variable of interest ($\beta\ Stress\ Test\ Jobs_{i,t}$) share the same time subscript, we measure risk as of December in each year while measuring labor demand in a window around that year's stress test disclosures in either March or June. Thus, the relationships in Equations (4) and (5) are not contemporaneous, and we interpret them as causal. As before,

[19] The source for all three measures is the Volatility Laboratory of the NYU Stern Volatility and Risk Institute (https://vlab.stern.nyu.edu).

reverse causality would predict high-risk banks to demand more stress test labor, which is the opposite of our findings.

[Insert Table 7 Here]

Equation (4) uses the full sample of banks which are ever tested, focusing on the tested vs. non-tested years. In contrast, Equation (5) considers only bank-years with publicly disclosed test results and studies the effects of the test outcome on risk. We report estimations of Equations (4) and (5) in Panels A and B of Table 7, respectively. The coefficient on *Stress Test Jobs* is negative in all columns, and it is statistically negative in estimations involving the two measures of systematic risk. The coefficient of interest in column 2 of -0.487 implies that a one-standard deviation increase in *Stress Test Jobs* relates to a reduction in *Expected Shortfall* of 74 basis points (=0.487×1.526).[20] This effect is economically large, representing nearly 10% of *Expected Shortfall*'s sample standard deviation of 7.63%. The reduction in systematic risk as measured by *Beta* is of similar economic significance. The coefficient of interest in column 4 of Panel A is -0.022, meaning that a one-sigma increase in stress test jobs implies a reduction in beta by 0.033 (=0.022×1.526), or 12% (=0.033÷0.280) of one sample standard deviation. The absence of statistical significance in columns 5 and 6 for *Volatility* is consistent with the notion that stress testing helps banks understand and reduce their systematic risk but not necessarily their idiosyncratic risk.

The effects of stress test jobs are economically larger in Panel B, where we control for stress-test outcomes. Stress test outcomes are forward looking risk metrics, and the third measure of exposure (*T1 Leverage*) is consistently a good predictor of the *Expected Shortfall* and *Beta*, as one would expect if the tests achieve their purported objectives. The increased magnitude on stress-

[20] Since *Expected Shortfall* is measured in absolute terms, a reduction in expected shortfall corresponds to a decline in systematic risk.

test jobs, after controlling for test results, supports our argument that that reverse causality – the possibility that high-risk banks seek to hire more risk management experts – attenuates our results.

[Insert Table 8 Here]

Next, we re-estimate these equations while considering *High Skilled* and *Low Skilled* stress testing jobs separately and report the results in Table 8. The coefficient on *High Skilled* stress test jobs is strongly negative in columns 1 to 4, confirming that it is those workers with advanced degrees and quant skills driving the reduction in systematic risk. *Low-Skilled* jobs, in contrast, have no effect. The economic effects of *High Skilled* jobs are also larger. Using the parameter estimate of -1.396 in column 2 of Panel A, a one-standard deviation increase for high skilled stress test jobs corresponds to a 100 basis point smaller *Expected Shortfall* (=1.396×0.713). For *Beta,* the coefficient of -0.055 in column 4 of Panel A implies that a one-sigma increase in *High Skilled* stress test jobs predicts a reduction of 0.039 (=0.055×0.713), representing 14% (=0.039÷0.280) of *Beta*'s sample standard deviation. As before, we find no significant effects of hiring on *Volatility*. And, we find larger magnitudes when we control for the stress-test outcomes (compare Panels A and B).

The results suggest that the hiring of stress-test related labor lowers risk but, controlling for that factor, we do not find lower risk at banks in anticipation of a test. In particular, $Tested_{i,t+1}$ increases hiring (recall Tables 5 & 6), which in turn lowers risk (Tables 7 & 8); but $Tested_{i,t+1}$ itself is not correlated with risk outcomes. Hence, banks respond to the prospect of an upcoming test by demanding skilled workers, and the amount of demand for these workers *does* correlate negatively with risk outcomes.

Again, our aim is to draw a causal inference from these effects. As we argue above, if anything reverse causality would attenuate the negative effect of skilled hiring on risk. Banks with

higher risk would tend to want more, not fewer, employees with strong risk management skills; such banks would also face pressure from their regulator to hire such people. Both effects would tend to bias our measured effect down (i.e., toward zero), and in fact our estimates become more negative when we capture risk by controlling for stress-test outcomes.

4.4 *HIRING AND BANK PROFITS*

In our last set of tests, we examine the relationship between demand for stress test jobs and bank profitability. We hypothesize that high skilled stress test jobs result in lower profitability, in part due to reduced risk systematic exposures as evidenced above and in part because these kinds of workers are expensive. Since high skilled jobs require advanced degrees and in-demand quant skills, these employees may command a salary premium, thereby increasing the bank's salary expense. We estimate equations of the form,

$$\pi_{i,t+1} = \beta\ Stress\ Test\ Jobs_{i,t} + \lambda X_{i,t} + \alpha_i + \alpha_t + \epsilon_{i,t} \qquad (6)$$

where π is return-on-assets or average employee salary.

[Insert Table 9 Here]

We report estimates of Equation (6) in Table 9. In column 1, we find that demand for high skilled stress test jobs corresponds to reduced bank profitability. The parameter estimate of -0.326 implies that a one standard deviation increase in *High Skilled* stress test labor leads to a 20 basis point (=0.326×0.713) reduction in return-on-assets, or 22% of the sample mean of 0.91%. In column 2, we find that *Low Skilled* stress test jobs also have a negative effect on profitability, although the effect of *High Skilled* stress test jobs is stronger. Columns 3 and 4 show that *High*

Skilled stress test jobs raise the average employee salary. The coefficient on *High Skilled* stress test jobs in column 3 of 5.356 implies that a one sigma increase in high skilled stress test jobs increases the average employee salary by nearly $4,000 (=5.356×0.713×1000). *Low Skilled* stress test jobs enters negatively in column 4, implying that these jobs receive lower pay, although it is not statistically significant. In all specifications, *Other Risk Management Jobs* exhibit no significant effect on bank profitability.

5. CONCLUSION

This paper provides new evidence on bank internal risk management practices since the Global Financial Crisis by studying the jobs and skills demanded for risk management positions. Banks' overall demand for risk management jobs increased dramatically in the decade following the Crisis, although this pattern has reversed in recent years. Banks which suffered the largest losses in the Crisis responded by increasing their demand for risk-management talent the most. In addition, the stress test regime led banks to increasing their demand for a skilled and educated risk management workforce. These skilled professionals help banks reduce systematic risk at the cost of reduced profitability. Our results suggest that stress testing has succeeded in modernizing banks' internal risk management practices by spurring the acquisition of highly skilled risk management talent. Recent changes supervisory stress tests, however, indicate that these tests may have lower risk management hiring in the future.

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Appendix 1: Data Definitions

Variable Name	Variable Description
Job Measures*	
Risk Management Jobs	The number of job postings that (1) require at least one skill that can be categorized as "Financial Risk Management" or "Financial Regulations"; and (2) the job title contains at least one of the following key strings: "risk", "audit", "credit", "analy", "compliance", "quant", "model", "regulat", "stress", "ccar", "ppnr", "econom".
Stress Test Jobs	The subset of Risk Management Jobs that require "Stress Testing" or "CCAR Regulatory Rules".
Other Risk Management Jobs	The subset of Risk Management Jobs that are not Stress Test Jobs.
High Skilled	Jobs requiring higher education (master's or doctorate degrees) or advanced quantitative or programming skills defined as the top-30 quant skills by frequency: Apache Hadoop, Apache Hive, Apache Webserver, C++, Git, Java, JavaScript, Linux, MATLAB, Microsoft C#, Oracle, Oracle PL/SQL, PERL Scripting Language, Physics, Python, R, SAP, SAS, Shell Scripting, SPSS, SQL, SQL Server, Swift, Teradata, Teradata DBA, UNIX, UNIX Shell, VBA, Visual Basic, and .NET.
Low Skilled	Jobs that are not classified as High Skilled.
**Note:*	All job measures are scaled by total job posts in regressions.
Stress Test Measures	
Tested	A binary measure equal to one if a bank-year was subjected to the CCAR stress test.
Failure	A binary measure equal to one if a bank receives a conditional non-objection or an objection on the CCAR stress test, and zero otherwise.
Failure Score	A categorical measure equal to one or two if the bank received a conditional non-objection or objection, respectively, from the Fed in response to its planned capital actions under CCAR, and zero otherwise.
T1 Capital	Tier 1 Risk-Based Capital Ratio: Tier 1 Capital divided by Risk Weighted Assets.
TRBC	Total Risk-Based Capital Ratio: Total Risk-Based Capital divided by Risk Weighted Assets.
T1 Leverage	Tier 1 Leverage Ratio: Tier 1 Capital divided by Total Assets.
Exposure *of Ratio*	The difference between a ratio's initial value and its minimum projected value during the 9-quarter-ahead horizon under the CCAR's severely adverse stress test scenario, minus projected dividends.
Risk Measures†	
Expected Shortfall	The expected fractional loss of firm equity in a crisis when the aggregate market declines significantly in a six-month period, following Acharya, Pederson, Phillipon and Richardson (2017).
Beta	The Beta of the bank with respect to the MSCI World Index, using the Engle (2016) Dynamic Conditional Beta model.
Stock Volatility	The annualized volatility estimated via the Glosten, Jagannathan, and Runkle (1993) GARCH model.
†Note:	Source: The Volatility Laboratory of the NYU Stern Volatility and Risk Institute (https://vlab.stern.nyu.edu)
Financial Measures	
ROA	Net income divided by lagged total assets.
Salaries	Total salary expense divided by the number of employees.
log Assets	Natural log of total assets.
Loans / Assets	Total loans and unused loan commitments to total assets.

Appendix 2: Stress Tested Bank-Years

This appendix lists our sample of all stress-tested banks from 2011 to 2021. An '*X*' indicates that the bank was stress-tested in corresponding year. Our sample consists of 38 banks and 291 tested bank-years. Data from banks' CCAR disclosures is available from 2013 to 2020.

Bank	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Tests
Ally Financial Inc.	X	X	X	X	X	X	X	X		X		9
American Express Co.	X	X	X	X	X	X	X	X		X		9
Bank of America Corp.	X	X	X	X	X	X	X	X	X	X	X	11
Bank of New York Mellon Corp.	X	X	X	X	X	X	X	X	X	X	X	11
Barclays US LLC								X	X	X	X	4
BB&T Corp. (Truist Financial Corp.)	X	X	X	X	X	X	X	X		X	X	10
BVBA Compass Bancshares Inc.				X	X	X	X	X				5
BMO Financial Corp.				X	X	X	X	X		X	X	7
BNP Paribas USA Inc.						X	X	X		X		4
Capital One Financial Corp.	X	X	X	X	X	X	X	X	X	X	X	11
CIT Group Inc.							X					1
Citigroup Inc.	X	X	X	X	X	X	X	X	X	X	X	11
Citizens Financial Group/RBS				X	X	X	X	X		X		6
Comerica Inc.				X	X	X	X					4
Credit Suisse Holdings USA								X	X	X	X	4
Deutsche Bank USA Corp.					X	X	X	X	X	X	X	7
Discover Financial Services				X	X	X	X	X		X		6
Fifth Third Bancorp	X	X	X	X	X	X	X	X		X		9
Goldman Sachs Group Inc.	X	X	X	X	X	X	X	X	X	X	X	11
HSBC North America Holdings Inc.				X	X	X	X	X	X	X	X	8
Huntington Bancshares Inc.				X	X	X	X	X		X		6
JPMorgan Chase & Co.	X	X	X	X	X	X	X	X	X	X	X	11
KeyCorp	X	X	X	X	X	X	X	X		X		9
M&T Bank Corp.				X	X	X	X	X		X		6
Morgan Stanley	X	X	X	X	X	X	X	X	X	X	X	11
MUFG Americas Holdings Corp.				X	X	X	X	X		X	X	7
Northern Trust Corp.				X	X	X	X	X	X	X	X	8
PNC Financial Services Group Inc.	X	X	X	X	X	X	X	X	X	X	X	11
RBC USA Holdco Corp								X		X	X	3
Regions Financial Corp.	X	X	X	X	X	X	X	X		X	X	10
Santander Holdings USA Inc.				X	X	X	X	X		X		6
State Street Corp.	X	X	X	X	X	X	X	X	X	X	X	11
SunTrust Banks Inc.	X	X	X	X	X	X	X	X				8
TD Group US Holdings LLC						X	X	X	X	X	X	6
UBS Americas Holding LLC	X	X	X	X	X	X	X	X	X	X	X	11
US Bancorp								X	X	X	X	4
Wells Fargo & Co.	X	X	X	X	X	X	X	X	X	X	X	11
Zions Bancorp				X	X	X	X					4
Number of Tested Bank-Years	18	18	18	30	31	33	34	35	18	33	23	291

Appendix 3. Global Financial Crisis and Labor Demand at Non-Stress-tested Banks

This table provides robustness for Table 2 and shows that non-stress-tested banks respond to GFC losses with demand for risk management positions. *Risk Management Jobs* measures aggregate risk management job posts during 2010-2021, scaled by total job posts during the same time period. Losses are measured by *Net Income* from 2008Q2 through 2009Q2, scaled by pre-crisis total assets in columns 1-3, and peak-to-through *Stock Return* during June 2007- March 2009 in columns 4-5. All variables are fully defined in Appendix 1. Estimation is cross-sectional linear regression with heteroskedasticity-robust standard errors (in parenthesis).

	Risk Management Jobs 2010-2021					
	(1)	(2)	(3)	(4)	(5)	(6)
$NetIncome_{2008Q2-2009Q2}$	-0.302**	-0.302**	-0.294**			
	(0.125)	(0.125)	(0.137)			
Stock Return				-0.032***	-0.032***	-0.026**
				(0.011)	(0.011)	(0.013)
$Log(Asset)_{2006}$			0.495**			0.451*
			(0.218)			(0.250)
Real Estate Loans/$Assets_{2006}$			-0.013			0.037
			(0.022)			(0.023)
Tier 1 Cap $Ratio_{2006}$			0.004			0.080
			(0.045)			(0.054)
Constant	5.084***	5.084***	-1.561	3.324***	3.324***	-5.948
	(0.233)	(0.233)	(3.589)	(0.491)	(0.491)	(4.196)
Observations	314	314	314	179	179	179
Adjusted R^2	0.023	0.023	0.034	0.043	0.043	0.045

Figure 1. Aggregate Trend in Risk Management Jobs

This figure shows that banks' demand for risk management jobs has risen significantly over the past decade. This trend is driven predominately by banks subject to stress testing under CCAR. The top panel reports the raw number of banks' risk management job posts, and the bottom panel plots risk management jobs as a fraction of total job posts. Please see Appendix 1 for variable definitions.

Figure 1.A.

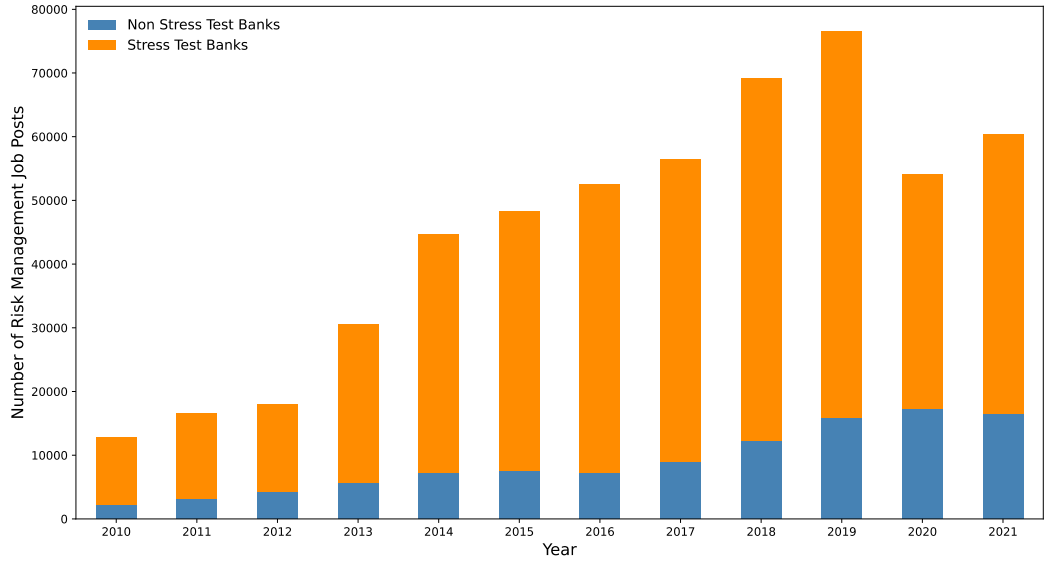

Figure 1.B.

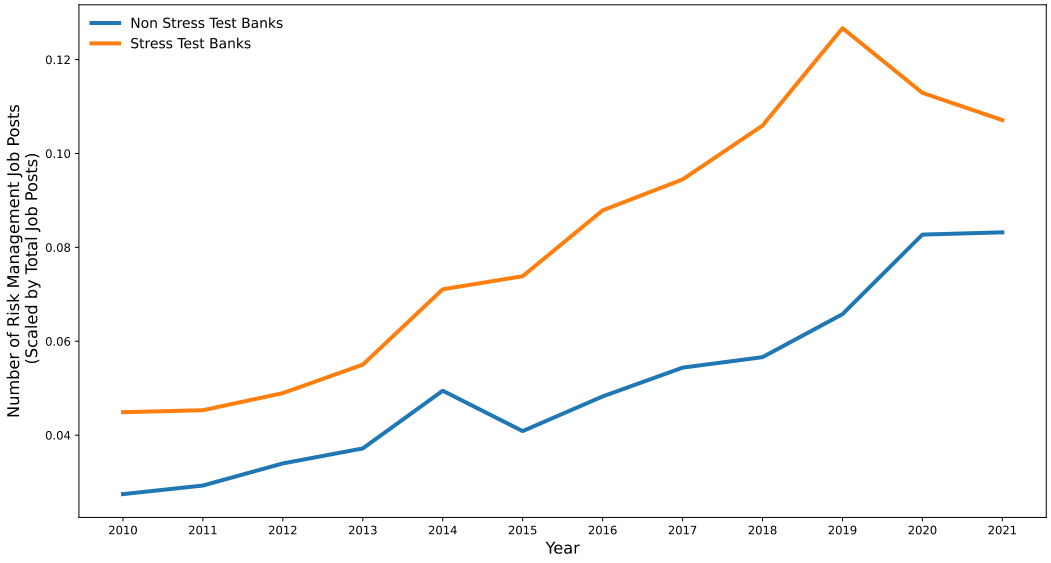

Figure 2. Banks' Attention to Risk Management

This plot depicts the upward trend of banks' general attention to risk management beyond the department of risk management. The figures demonstrate the numbers and fractions of job posts that require risk management skills for the four major occupation categories: branch managers (upper left), personal and relationship bankers (upper right), loan officers (lower left), and analysts (lower right).

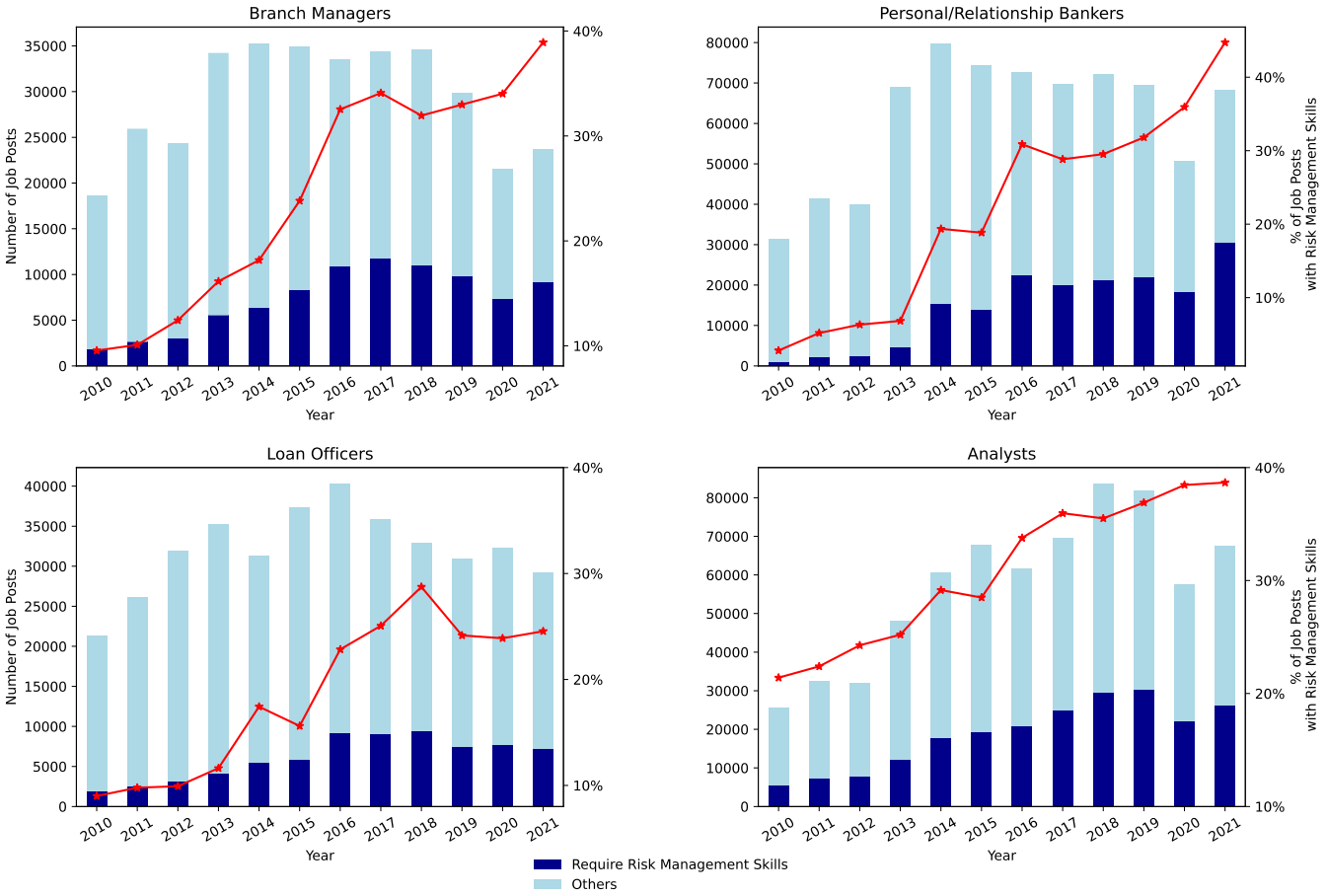

Figure 3. Stress Test Jobs at Stress-Tested Banks

This figure decomposes Risk Management Jobs into Stress Test Jobs and Other Risk Management Jobs at stress-tested banks. Stress Test Jobs are those requiring Stress Testing or CCAR Regulatory Rules skills in Lightcast. The top panel shows that banks subject to stress testing dramatically increased their demand for Stress Test Jobs during the first half of the decade. The second panel shows these banks' demand for Other Risk Management Jobs steadily rose throughout the decade. Figures plot the number of job posts (left axis) and the fraction of job posts out of total job posts (right axis).

Figure 3.A.

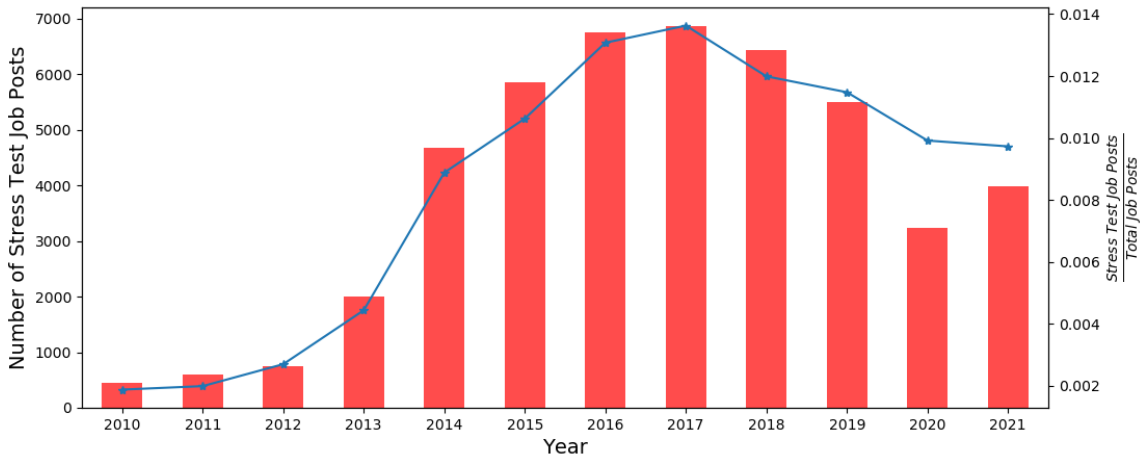

Figure 3.B.

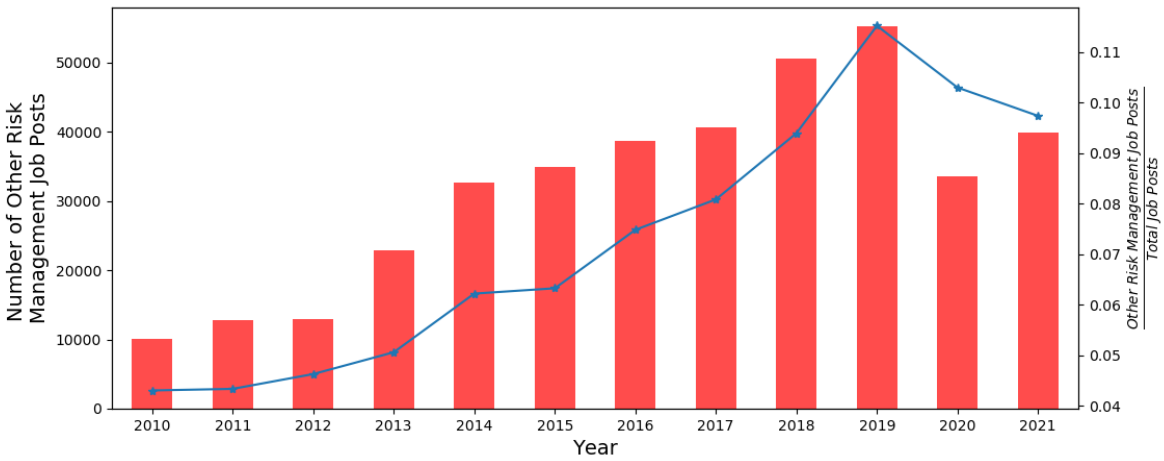

Figure 4. Stress Test Jobs Posted by Other Employers

This figure illustrates the demand for stress test jobs by non-bank employers. Stress Test Jobs are defined in Appendix 1. The top panel shows such demand by consulting firms and others, whereas the bottom panel demonstrates the demand by the Federal Reserve. Figures plot the number of job posts (left axis) and the fraction of job posts out of total job posts (right axis).

Figure 4.A. Consulting Firms and Others

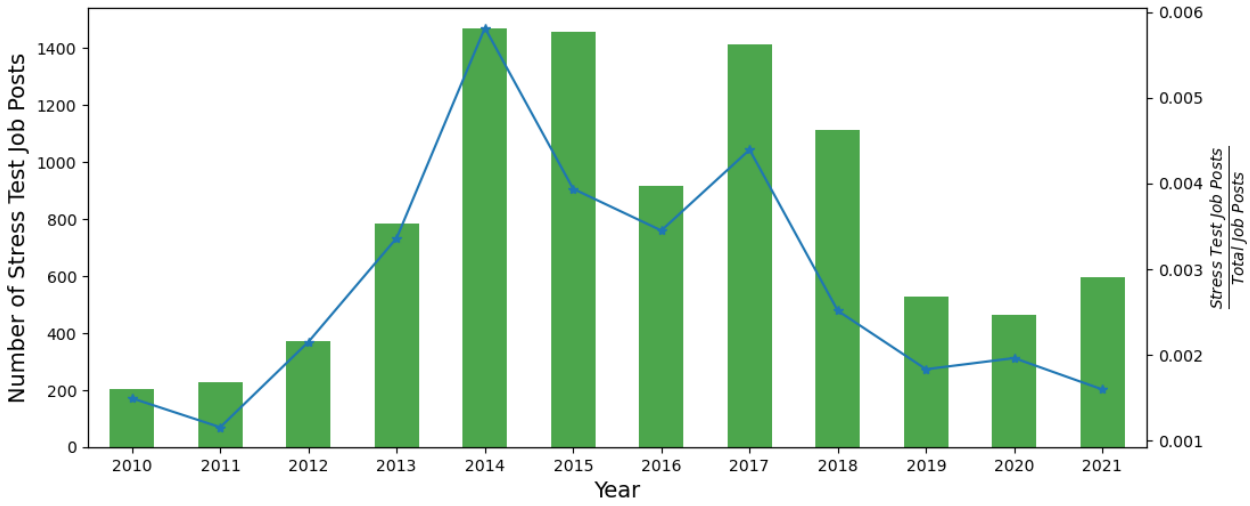

Figure 4.B. The Federal Reserve

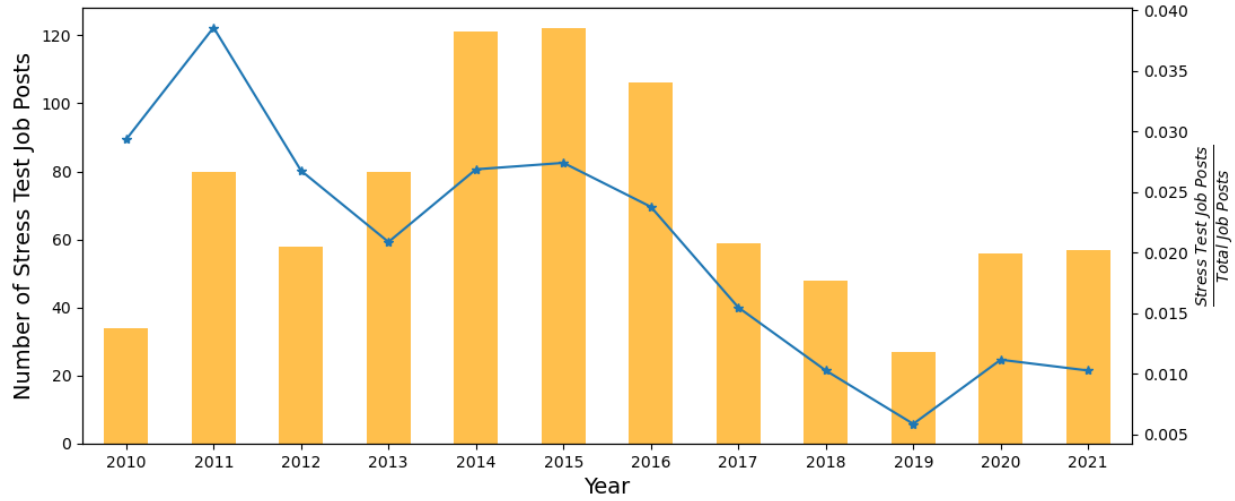

Figure 5. Proportion of High Skilled Jobs

This figure shows that Stress Test Jobs require higher skilled workers than other types of jobs. *Stress Test Jobs* is defined as the subset of risk management jobs that require skills for "Stress Testing" or "CCAR Regulatory Rules". *High Skilled* jobs are those requiring higher education (master's or doctorate degrees) or advanced quantitative skills as listed with variable definitions in Appendix 1.

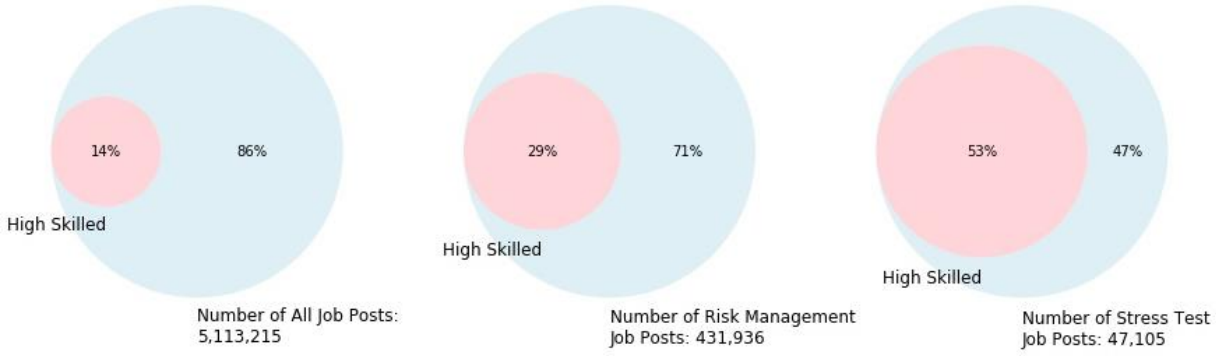

Figure 6. Demand for High-Skill Jobs

This figure shows that Stress Test Jobs require relatively high amounts of skill compared to other risk management jobs. High Skilled jobs are those requiring higher education (master's or doctorate degrees) or advanced quantitative skills as listed in Appendix 1.

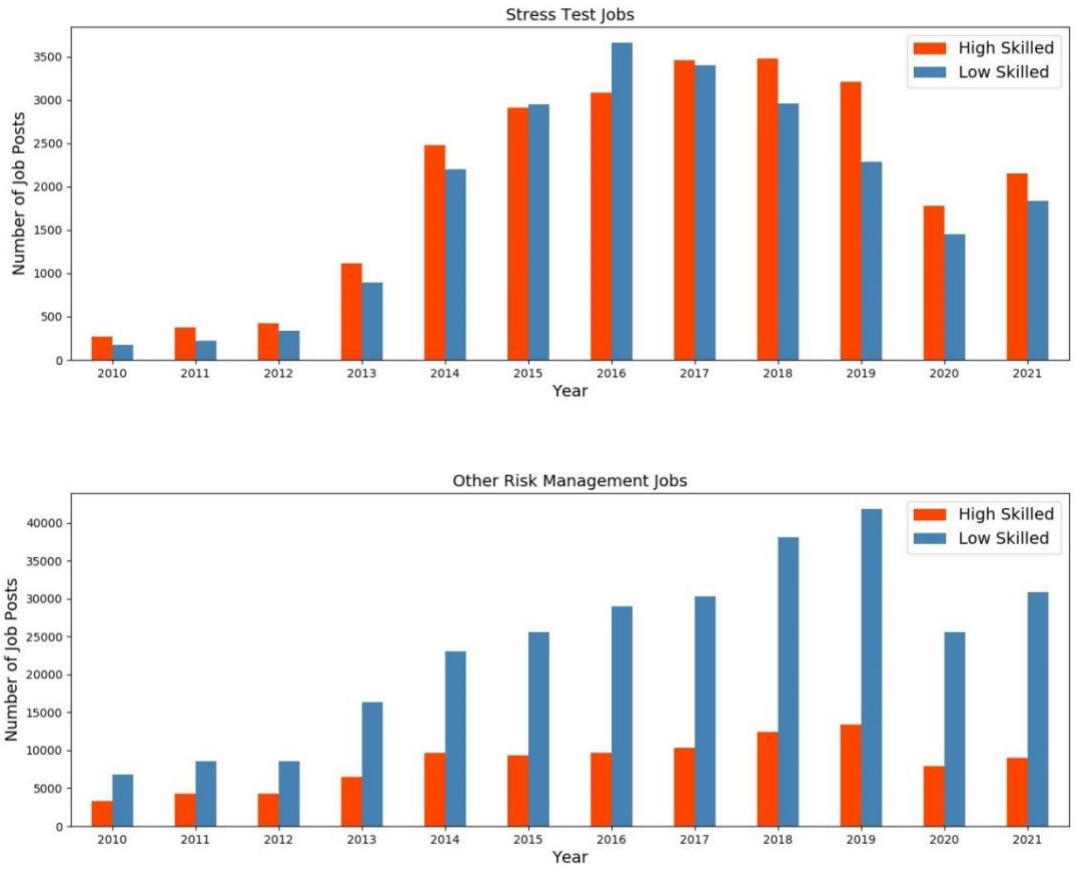

Figure 7. Exposure to Stress Tests and Labor Demand

This figure shows that banks' demand for stress-test specific talent increases following poor stress test performance. Each plot represents the relative demand for stress-test specific talents at banks with high (above median) vs low (below median) exposure to the stress tests. The red bars represent the average demand for stress test jobs for bank-years with exposure to a certain capital ratio above the sample median for exposures (first three pairs) and stress test failures (last pair). The green bars represent the demand for stress test jobs for bank-years with exposure to a certain capital ratio below the sample median and stress test passes.

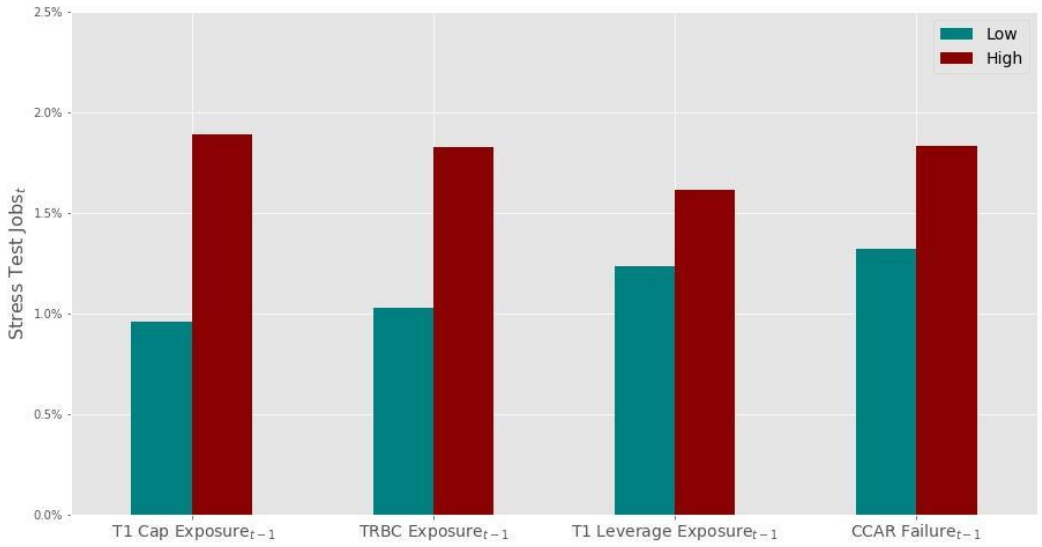

Table 1. Cross-sectional Summary Statistics

This table presents cross-sectional summary statistics at the bank level. The cross-sectional sample consists of all banks that rank among the top 300 banks by total assets in any year from 2010 to 2021 for which pre-Crisis Y9C data is available. *Risk Management Jobs* are defined as risk management job posts scaled by total job posts by a bank over the period of 2010 to 2021. *Net Income* is measured from 2008Q2 to 2009Q2, divided by total assets at the end of 2006. *Stock Return* is measured at the bank level over the period of June 2007 through March 2009. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are fully defined in Appendix 1.

	Obs.	Mean	Std. Dev.	p25	p50	p75
Risk Management $Jobs_{2010\text{-}2021}$ %	337	5.235	4.199	2.405	4.056	7.021
Net $Income_{2008Q2\text{-}2009Q2}$ %	337	0.013	2.227	-0.260	0.611	1.280
Stock $Return_{2007Jun\text{-}2009Mar}$ %	197	-52.132	26.935	-73.543	-54.515	-32.860
$Log(Asset)_{2006}$	337	14.887	1.450	13.923	14.518	15.510
Real Estate $Loans/Asset_{2006}$ %	337	48.780	14.948	40.670	50.108	59.518
Cap $Ratio_{2006}$ %	337	11.766	3.807	9.570	10.910	12.640

Table 2. The Global Financial Crisis and Labor Demand for Risk Management Talents

This table shows that banks that experienced more losses during the GFC exhibit a higher demand for risk management positions in the following decade. *Risk Management Jobs* measures aggregate risk management job posts during 2010-2021, scaled by total job posts during the same time period. Losses are measured by *Net Income* from 2008Q2 through 2009Q2, scaled by pre-crisis total assets in columns 1-3, and peak-to-through *Stock Return* during June 2007- March 2009 in columns 4-5. All variables are fully defined in Appendix 1. Estimation is cross-sectional linear regression with heteroskedasticity-robust standard errors (in parenthesis).

	Risk Management Jobs$_{2010\text{-}2021}$					
	(1)	(2)	(3)	(4)	(5)	(6)
Net Income$_{2008Q2\text{-}2009Q2}$	-0.294**	-0.270**	-0.273**			
	(0.119)	(0.120)	(0.130)			
Stock Return$_{2007Jun\text{-}2009Mar}$				-0.033***	-0.030***	-0.026**
				(0.011)	(0.011)	(0.013)
Stress-tested Bank		2.287**	-0.326		1.454	0.186
		(0.968)	(1.231)		(1.071)	(1.205)
Log(Asset)$_{2006}$			0.582***			0.492*
			(0.217)			(0.252)
Real Estate Loans/Assets$_{2006}$			-0.018			0.019
			(0.021)			(0.023)
Tier 1 Cap Ratio$_{2006}$			0.006			0.080
			(0.044)			(0.055)
Constant	5.238***	5.082***	-2.585	3.382***	3.441***	-5.613
	(0.227)	(0.233)	(3.522)	(0.488)	(0.483)	(4.126)
Observations	337	337	337	197	197	197
Adjusted R^2	0.021	0.037	0.058	0.047	0.053	0.054

Table 3. Global Financial Crisis, Labor Demand, and Time Split

This table shows that banks' responses to losses from the GFC are distinct from banks' responses to performance in other periods. Panel A shows that banks respond to GFC losses with higher demand for risk management positions. Panel B shows that banks exhibit limited response to performance in the latter half of the sample. *Risk Management Jobs* are defined as risk management job posts scaled by total job posts by a bank over the sample period. Losses are measured by *Net Income* and *Stock Return*. All variables are fully defined in Appendix 1. Estimation is cross-sectional linear regression with heteroskedasticity-robust standard errors (in parenthesis).

	Risk Management Jobs$_{2010\text{-}2015}$					
Panel A: 2010 – 2015	(1)	(2)	(3)	(4)	(5)	(6)
Net Income$_{2008Q2\text{-}2009Q2}$	-0.406***	-0.395**	-0.367**			
	(0.155)	(0.156)	(0.181)			
Stock Return$_{2007Jun\text{-}2009Mar}$				-0.019	-0.017	-0.013
				(0.012)	(0.012)	(0.013)
Stress-tested Bank		1.174	0.295		0.789	1.300
		(0.884)	(1.393)		(0.967)	(1.419)
Log(Asset)$_{2006}$			0.369			0.189
			(0.253)			(0.303)
Real Estate Loans/Assets$_{2006}$			0.015			0.040
			(0.032)			(0.026)
Tier 1 Cap Ratio$_{2006}$			0.117			0.168
			(0.099)			(0.117)
Constant	4.862***	4.779***	-2.788	3.601***	3.634***	-3.039
	(0.314)	(0.333)	(4.394)	(0.730)	(0.729)	(5.050)
Observations	323	323	323	192	192	192
Adjusted R^2	0.023	0.022	0.021	0.005	0.002	0.003
	Risk Management Jobs$_{2016\text{-}2021}$					
Panel B: 2016 - 2021	(1)	(2)	(3)	(4)	(5)	(6)
Net Income$_{2014Q2\text{-}2015Q2}$	-0.280	-0.235	-0.173			
	(0.306)	(0.294)	(0.311)			
Stock Return$_{2013Jun\text{-}2015Mar}$				-0.008	-0.002	-0.004
				(0.020)	(0.020)	(0.021)
Stress-tested Bank		4.365***	0.322		3.634***	0.039
		(0.976)	(1.415)		(1.023)	(1.386)
Log(Asset)$_{2012}$			0.860***			0.902***
			(0.247)			(0.315)
Real Estate Loans/Assets$_{2012}$			-0.022			-0.004
			(0.020)			(0.024)
Tier 1 Cap Ratio$_{2012}$			0.007			0.050
			(0.052)			(0.050)
Constant	5.934***	5.475***	-6.600	5.713***	5.104***	-9.188*
	(0.559)	(0.537)	(4.150)	(0.678)	(0.692)	(5.369)
Observations	344	344	342	198	198	196
Adjusted R^2	-0.000	0.068	0.106	-0.004	0.062	0.100

Table 4. Panel Summary Statistics

This table reports summary statistics at the bank-year panel level. The panel sample includes the 38 banks which are ever stress tested under the CCAR program, as listed in Appendix 2, over 12 years from 2010 to 2021. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are fully defined in Appendix 1.

Panel A: Labor Demand	Obs	Mean	Std. Dev.	p25	p50	p75
Risk Management $Jobs_{i,t}$	456	9.146	6.151	4.419	7.891	12.695
– High $Skilled_{i,t}$	456	2.780	2.298	1.121	2.061	3.705
– Low $Skilled_{i,t}$	456	6.350	4.335	3.144	5.448	8.386
Stress Test $Jobs_{i,t}$	456	1.201	1.526	0.247	0.624	1.549
– High $Skilled_{i,t}$	456	0.607	0.713	0.126	0.372	0.803
– Low $Skilled_{i,t}$	456	0.600	0.980	0.059	0.212	0.717
Other Risk Management $Jobs_{i,t}$	456	7.884	4.909	4.038	6.794	11.009
– High $Skilled_{i,t}$	456	2.153	1.809	0.876	1.542	3.024
– Low $Skilled_{i,t}$	456	5.743	3.713	2.981	5.127	456
Panel B: Stress Test						
$Tested_{i,t+1}$	456	0.711	0.454	0.000	1.000	1.000
$Tested_{i,t}$	456	0.638	0.481	0.000	1.000	1.000
T1 Cap $Exposure_{i,t}$	227	2.246	2.441	0.649	1.514	3.432
TRBC $Exposure_{i,t}$	227	2.246	2.557	0.538	1.529	3.469
T1 Lev $Exposure_{i,t}$	227	1.146	1.177	0.441	0.991	1.943
CCAR $Failure_{i,t}$	255	0.133	0.341	0.000	0.000	0.000
CCAR Failure $Score_{i,t}$	255	0.180	0.493	0.000	0.000	0.000
Panel C: Risk Measures						
Expected $Shortfall_{i,t}$	441	43.226	7.627	37.550	42.590	47.600
CAPM $Beta_{i,t}$	441	1.127	0.280	0.920	1.090	1.260
$Volatility_{i,t}$	441	26.581	9.914	19.200	24.350	31.460
Panel D: Bank Characteristics						
$LogAssets_{i,t-1}$	410	19.244	1.061	18.568	18.931	19.736
$Loan/Assets_{i,t-1}$	410	90.800	53.130	66.765	88.136	103.243
$Return\text{-}on\text{-}Assets_{i,t-1}$	410	0.872	0.778	0.559	0.855	1.145
$T1CapRatio_{i,t-1}$	410	14.030	4.078	11.591	12.911	15.020
Average Employee $Salary_{i,t}$	410	144.072	74.647	98.576	116.708	149.778

Table 5. Stress Tests and Labor Demand for Risk Management Talents

This table shows that the expectation of being stress tested in the next cycle leads to higher demand of stress-test specific talents, but not other risk management or financial regulation positions. *Stress Test Jobs* is defined as the subset of risk management jobs that require skills for "Stress Testing" or "CCAR Regulatory Rules" as a fraction of the bank's total job postings. *Other Risk Management Jobs* measures the share of jobs that require skills for Financial Risk Management or Financial Regulations but are not Stress Test Jobs. *High (Low) Skilled* jobs are those (not) requiring higher education or advanced quant skills. *Tested* indicates whether the bank is subject to stress testing that year. All variables are fully defined in Appendix 1. Estimation is linear regression with fixed effects and heteroskedasticity-robust standard errors clustered at the bank-level (in parenthesis).

Panel A	**Stress Test Jobs$_{i,t}$**				**Other Risk Management Jobs$_{i,t}$**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tested$_{i,t+1}$	0.675**	0.279**	0.710**	0.290**	0.005	-0.672	0.275	-0.521
	(0.279)	(0.133)	(0.271)	(0.134)	(0.459)	(0.614)	(0.449)	(0.584)
Tested$_{i,t}$			-0.097	-0.102			-0.742	-1.358**
			(0.192)	(0.201)			(0.458)	(0.567)
log Assets$_{i,t-1}$		-0.790**		-0.772**		1.323		1.563
		(0.350)		(0.348)		(1.488)		(1.427)
Loans/Assets$_{i,t-1}$		-0.002		-0.002		-0.017		-0.017
		(0.002)		(0.002)		(0.010)		(0.010)
ROA$_{i,t-1}$		0.013		0.014		-0.534*		-0.531*
		(0.088)		(0.087)		(0.271)		(0.274)
T1 Cap. Ratio$_{i,t-1}$		0.070***		0.074***		0.211		0.259
		(0.018)		(0.020)		(0.163)		(0.157)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	456	404	456	404	456	404	456	404
Adjusted R^2	0.542	0.683	0.541	0.683	0.633	0.648	0.635	0.653
Panel B	**Stress Test Jobs – High Skilled$_{i,t}$**				**Stress Test Jobs – Low Skilled$_{i,t}$**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tested$_{i,t+1}$	0.363***	0.209***	0.345***	0.200***	0.273	0.064	0.341*	0.085
	(0.095)	(0.072)	(0.106)	(0.071)	(0.207)	(0.100)	(0.195)	(0.105)
Tested$_{i,t}$			0.048	0.082			-0.185	-0.183
			(0.085)	(0.072)			(0.152)	(0.161)
log Assets$_{i,t-1}$		-0.093		-0.107		-0.694**		-0.661**
		(0.142)		(0.142)		(0.294)		(0.276)
Loans/Assets$_{i,t-1}$		0.000		0.000		-0.002		-0.002
		(0.001)		(0.001)		(0.002)		(0.002)
ROA$_{i,t-1}$		0.046		0.045		-0.028		-0.027
		(0.039)		(0.040)		(0.050)		(0.049)
T1 Cap. Ratio$_{i,t-1}$		0.022**		0.019		0.048***		0.054***
		(0.011)		(0.011)		(0.015)		(0.016)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	456	404	456	404	456	404	456	404
Adjusted R^2	0.518	0.622	0.518	0.623	0.451	0.613	0.454	0.616

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6. Exposure to Stress Test and Labor Demand for Risk Management Talents

This table shows that banks increase their demand for stress test jobs in response to failing a stress test. *Stress Test Jobs* is defined as the subset of risk management jobs that require skills for "Stress Testing" or "CCAR Regulatory Rules" as a fraction of the bank's total job postings. *Other Risk Management Jobs* measures the share of jobs that require skills for Financial Risk Management or Financial Regulations but are not Stress Test Jobs. *High (Low) Skilled* jobs are those (not) requiring higher education or advanced quant skills. *Failure Score* is a categorical measure equal to one or two if the bank received a conditional non-objection or objection, respectively, from the Fed in response to its planned capital actions under CCAR, and zero otherwise. *Exposure* is the difference between a ratio's initial value and its minimum projected value during the 9-quarter-ahead horizon under the DFAST's severely adverse stress test scenario, minus projected dividends. All variables are fully defined in Appendix 1. Estimation is linear regression with fixed effects and heteroskedasticity-robust standard errors clustered at the bank-level (in parenthesis).

Panel A	**Stress Test Jobs$_{i,t}$**				**Other Risk Management Jobs$_{i,t}$**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Failure Score$_{i,t-1}$	0.318**	0.308**	0.297**	0.309**	0.710	0.705	0.663	0.612
	(0.128)	(0.125)	(0.121)	(0.121)	(0.485)	(0.484)	(0.481)	(0.456)
T1 Cap. Exposure$_{i,t-1}$	0.107*			0.084	0.159			-0.698
	(0.053)			(0.197)	(0.167)			(0.955)
TRBC Exposure$_{i,t-1}$		0.102**		0.064		0.223		0.964
		(0.044)		(0.144)		(0.178)		(0.898)
T1 Lev. Exposure$_{i,t-1}$			0.027	-0.109			-0.079	-0.321
			(0.047)	(0.109)			(0.279)	(0.326)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	215	215	215	215	215	215	215	215
Adjusted R^2	0.742	0.742	0.729	0.744	0.721	0.723	0.720	0.727
Panel B	**Stress Test Jobs – High Skilled$_{i,t}$**				**Stress Test Jobs – Low Skilled$_{i,t}$**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Failure Score$_{i,t-1}$	0.174**	0.171**	0.169**	0.173**	0.144*	0.137**	0.128*	0.136**
	(0.083)	(0.083)	(0.082)	(0.083)	(0.071)	(0.068)	(0.067)	(0.064)
T1 Cap. Exposure$_{i,t-1}$	0.034*			0.029	0.073			0.056
	(0.019)			(0.086)	(0.043)			(0.124)
TRBC Exposure$_{i,t-1}$		0.032*		0.012		0.070*		0.052
		(0.016)		(0.071)		(0.037)		(0.082)
T1 Lev. Exposure$_{i,t-1}$			0.020	-0.017			0.007	-0.092
			(0.036)	(0.049)			(0.026)	(0.071)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	215	215	215	215	215	215	215	215
Adjusted R^2	0.587	0.587	0.582	0.582	0.763	0.764	0.745	0.769

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7. Risk Management Labor Demand and Risk

This table shows that demand for stress test jobs leads to lower systematic risk. Outcome variables are measured as of December in year *t*, while *Jobs* variables are measured earlier in the year in a window around the stress test disclosure. *Expected Shortfall* is the expected fractional loss of equity in a crisis. *Beta* is with respect to the MSCI World Index. *Stock Volatility* is annualized stock return volatility. *Stress Test Jobs* is defined as the subset of risk management jobs that require skills for "Stress Testing" or "CCAR Regulatory Rules" as a fraction of the bank's total job postings. *Other Risk Management Jobs* measures the share of jobs that require skills for Financial Risk Management or Financial Regulations but are not Stress Test Jobs. All variables are fully defined in Appendix 1. Estimation is linear regression with fixed effects and heteroskedasticity-robust standard errors clustered at the bank-level (in parenthesis).

Panel A	**Expected Shortfall$_{i,t}$**		**Beta$_{i,t}$**		**Volatility$_{i,t}$**	
	(1)	(2)	(3)	(4)	(5)	(6)
Stress Test Jobs$_{i,t}$	-0.407	-0.487**	-0.018*	-0.022**	-0.317	-0.367
	(0.241)	(0.239)	(0.010)	(0.010)	(0.302)	(0.304)
Other Risk		0.104		0.004		0.066
Management Jobs$_{i,t}$		(0.089)		(0.004)		(0.134)
Tested$_{i,t+1}$	-0.255	-0.226	-0.011	-0.010	-0.120	-0.101
	(0.751)	(0.754)	(0.029)	(0.029)	(0.889)	(0.875)
Tested$_{i,t}$	0.395	0.462	0.025	0.028	0.732	0.774
	(0.606)	(0.619)	(0.023)	(0.024)	(0.723)	(0.744)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	441	441	441	441	441	441
Adjusted R^2	0.701	0.701	0.688	0.689	0.682	0.682
Panel B	**Expected Shortfall$_{i,t}$**		**Beta$_{i,t}$**		**Volatility$_{i,t}$**	
	(1)	(2)	(3)	(4)	(5)	(6)
Stress Test Jobs$_{i,t}$	-0.794*	-0.940**	-0.031*	-0.035**	-0.271	-0.292
	(0.432)	(0.421)	(0.016)	(0.015)	(0.490)	(0.416)
Other Risk		0.112		0.003		0.016
Management Jobs$_{i,t}$		(0.119)		(0.005)		(0.148)
Failure Score$_{i,t}$	0.959	0.963	0.034	0.035*	1.561**	1.562**
	(0.571)	(0.572)	(0.021)	(0.020)	(0.659)	(0.663)
T1 Cap Exposure$_{i,t}$	-0.355	-0.268	-0.015	-0.013	-0.020	-0.007
	(0.597)	(0.644)	(0.022)	(0.024)	(0.840)	(0.885)
TRBC Exposure$_{i,t}$	-0.279	-0.366	-0.008	-0.010	-0.057	-0.070
	(0.487)	(0.545)	(0.018)	(0.020)	(0.617)	(0.661)
T1 Lev Exposure$_{i,t}$	0.851**	0.792**	0.030**	0.029**	0.462	0.453
	(0.320)	(0.324)	(0.012)	(0.012)	(0.401)	(0.412)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	221	221	221	221	221	221
Adjusted R^2	0.745	0.745	0.736	0.736	0.768	0.767

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8. Skilled Labor and Risk

This table shows that demand for high-skilled stress test jobs leads to lower systematic risk. Outcome variables are measured as of December in year *t*, while *Jobs* variables are measured earlier in the year in a window around the stress test disclosure. *Expected Shortfall* is the expected fractional loss of equity in a crisis. *Beta* is with respect to the MSCI World Index. *Stock Volatility* is annualized stock return volatility. *Stress Test Jobs* is defined as the subset of risk management jobs that require skills for "Stress Testing" or "CCAR Regulatory Rules" as a fraction of the bank's total job postings. *Other Risk Management Jobs* measures the share of jobs that require skills for Financial Risk Management or Financial Regulations but are not Stress Test Jobs. *High (Low) Skilled* jobs are those (not) requiring higher education or advanced quant skills. All variables are fully defined in Appendix 1. Estimation is linear regression with fixed effects and heteroskedasticity-robust standard errors clustered at the bank-level (in parenthesis).

Panel A	**Expected Shortfall$_{i,t}$**		**Beta$_{i,t}$**		**Volatility$_{i,t}$**	
	(1)	(2)	(3)	(4)	(5)	(6)
Stress Test Jobs-High Skilled$_{i,t}$	-1.280**	-1.396**	-0.053**	-0.055**	-0.777	-0.725
	(0.544)	(0.521)	(0.023)	(0.022)	(0.669)	(0.644)
Stress Test Jobs-Low Skilled$_{i,t}$		0.150		0.002		-0.067
		(0.279)		(0.011)		(0.355)
Other Risk Management Jobs$_{i,t}$	0.114	0.111	0.005	0.005	0.065	0.066
	(0.088)	(0.088)	(0.004)	(0.004)	(0.134)	(0.135)
Tested$_{i,t+1}$	-0.124	-0.134	-0.007	-0.007	-0.091	-0.086
	(0.735)	(0.737)	(0.027)	(0.028)	(0.858)	(0.864)
Tested$_{i,t}$	0.578	0.609	0.033	0.033	0.846	0.832
	(0.636)	(0.623)	(0.025)	(0.024)	(0.780)	(0.763)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	441	441	441	441	441	441
Adjusted R^2	0.704	0.703	0.691	0.690	0.682	0.681
Panel B	**Expected Shortfall$_{i,t}$**		**Beta$_{i,t}$**		**Volatility$_{i,t}$**	
	(1)	(2)	(3)	(4)	(5)	(6)
Stress Test Jobs-High Skilled$_{i,t}$	-2.079**	-2.166**	-0.074**	-0.078**	-0.326	-0.108
	(0.825)	(0.817)	(0.030)	(0.029)	(1.157)	(1.333)
Stress Test Jobs-Low Skilled$_{i,t}$		0.206		0.008		-0.519
		(0.529)		(0.019)		(0.740)
Other Risk Management Jobs$_{i,t}$	0.151	0.147	0.004	0.004	0.074	0.084
	(0.134)	(0.136)	(0.005)	(0.005)	(0.150)	(0.151)
Failure Score$_{i,t}$	0.688	0.662	0.026	0.025	1.421**	1.486**
	(0.603)	(0.620)	(0.021)	(0.022)	(0.636)	(0.700)
T1 Cap Exposure$_{i,t}$	-0.356	-0.340	-0.013	-0.013	-0.080	-0.121
	(0.698)	(0.689)	(0.025)	(0.025)	(1.045)	(1.014)
TRBC Exposure$_{i,t}$	-0.484	-0.513	-0.017	-0.018	0.122	0.196
	(0.529)	(0.504)	(0.018)	(0.017)	(0.715)	(0.704)
T1 Lev Exposure$_{i,t}$	1.092**	1.120**	0.042**	0.043**	0.294	0.224
	(0.434)	(0.481)	(0.016)	(0.018)	(0.565)	(0.548)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	193	193	193	193	193	193
Adjusted R^2	0.741	0.739	0.721	0.719	0.774	0.773

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9. Labor Demand for Risk Management Talents and Bank Profits

This table shows that banks experience lower profitability and pay higher employee salaries following demand for high skilled stress test jobs. *ROA* is net income divided by lagged total assets. *Salaries* is total salary expense divided by the number of employees. *Stress Test Jobs* is defined as the subset of risk management jobs that require skills for "Stress Testing" or "CCAR Regulatory Rules" as a fraction of the bank's total job postings. *Other Risk Management Jobs* measures the share of jobs that require skills for Financial Risk Management or Financial Regulations but are not Stress Test Jobs. All variables are fully defined in Appendix 1. Estimation is linear regression with fixed effects and heteroskedasticity-robust standard errors clustered at the bank-level (in parenthesis).

	$ROA_{i,t+1}$		$Salaries_{i,+1}$	
	(1)	(2)	(3)	(4)
Stress Test Jobs-High Skilled$_{i,t}$	-0.326**	-0.264**	5.356**	7.326**
	(0.129)	(0.115)	(2.291)	(3.016)
Stress Test Jobs-Low Skilled$_{i,t}$		-0.171**		-5.393
		(0.064)		(3.513)
Other Risk Management Jobs$_{i,t}$	0.0213	0.0247	-0.182	-0.0751
	(0.019)	(0.017)	(0.349)	(0.344)
Tested$_{i,t+1}$	0.0581	0.0690	-0.948	-0.605
	(0.114)	(0.115)	(4.262)	(4.394)
Tested$_{i,t}$	0.142	0.109	4.201	3.175
	(0.112)	(0.109)	(4.008)	(4.354)
log Assets$_{i,t-1}$	-0.430	-0.564**	15.17	10.95
	(0.255)	(0.247)	(9.602)	(11.447)
Loan/Assets$_{i,t-1}$	0.256	0.217	-16.45	-17.67
	(0.540)	(0.526)	(26.019)	(24.794)
T1 Cap. Ratio$_{i,t-1}$	-0.0280*	-0.0219	2.546***	2.736***
	(0.015)	(0.016)	(0.574)	(0.655)
Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Observations	331	331	331	331
Adjusted R^2	0.610	0.622	0.944	0.945

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.011$