Appendix for online publication

A Proofs and details

A.1 Proof of Proposition 1

All the comparative static results in Proposition 1 result from implicit differentiation of the first-order condition 6:

$$\frac{dH_{idt}}{dA_{idt}} = \frac{-\frac{\partial^2}{\partial s^2}\mathrm{PD}(\varrho_{idt}, s_{idt})\,\frac{\partial}{\partial A}h^{-1}(H,A)\,W_{idt} - \frac{\partial}{\partial s}\mathrm{PD}(\varrho_{idt}, s_{idt})\,\frac{dW_{idt}}{dA_{idt}} - \frac{\partial^2}{\partial A \partial s}h(s_{idt}, A_{idt})\,\Lambda_{dt}}{\frac{\partial^2}{\partial s^2}\mathrm{PD}(\varrho_{idt}, s_{idt})\,\frac{1}{\frac{\partial}{\partial s}h(s_{idt}, A_{idt})}W_{idt} + \frac{\partial^2}{\partial s^2}h(s_{idt}, A_{idt})\,\frac{1}{\frac{\partial}{\partial s}h(s_{idt}, A_{idt})}\Lambda_{dt}}$$

$$\frac{dH_{idt}}{d\varrho_{idt}} = \frac{-\frac{\partial^2}{\partial \rho \partial s}\mathrm{PD}(\varrho_{idt}, s_{idt})\,W_{idt}}{\frac{\partial^2}{\partial s^2}\mathrm{PD}(\varrho_{idt}, s_{idt})\,\frac{1}{\frac{\partial}{\partial s}h(s_{idt}, A_{idt})}W_{idt} + \frac{\partial^2}{\partial s^2}h(s_{idt}, A_{idt})\,\frac{1}{\frac{\partial}{\partial s}h(s_{idt}, A_{idt})}\Lambda_{dt}}$$

$$\frac{dH_{idt}}{dW_{idt}} = \frac{-\frac{\partial}{\partial s}\mathrm{PD}(\varrho_{idt}, s_{idt})}{\frac{\partial^2}{\partial s^2}\mathrm{PD}(\varrho_{idt}, s_{idt})\,\frac{1}{\frac{\partial}{\partial s}h(s_{idt}, A_{idt})}W_{idt} + \frac{\partial^2}{\partial s^2}h(s_{idt}, A_{idt})\,\frac{1}{\frac{\partial}{\partial s}h(s_{idt}, A_{idt})}\Lambda_{dt}}$$

$$\frac{dH_{idt}}{d\Lambda_{dt}} = \frac{-\frac{\partial}{\partial s}h(s_{idt}, A_{idt})}{\frac{\partial^2}{\partial s^2}\mathrm{PD}(\varrho_{idt}, s_{idt})\,\frac{1}{\frac{\partial}{\partial s}h(s_{idt}, A_{idt})}W_{idt} + \frac{\partial^2}{\partial s^2}h(s_{idt}, A_{idt})\,\frac{1}{\frac{\partial}{\partial s}h(s_{idt}, A_{idt})}\Lambda_{dt}}$$

The denominator is the same in all four expressions and is positive since $\frac{\partial^2}{\partial s^2}\mathrm{PD} > 0$,[30]

$$\frac{\partial}{\partial s}\mathrm{PD}(\varrho_{idt}, s_{idt}) = -\phi\left(\frac{\varrho_{idt} - \gamma s_{idt}}{\sigma_u}\right)\frac{\gamma}{\sigma_u} < 0$$
$$\frac{\partial^2}{\partial s^2}\mathrm{PD}(\varrho_{idt}, s_{idt}) = \phi'\left(\frac{\varrho_{idt} - \gamma s_{idt}}{\sigma_u}\right)\frac{\gamma^2}{\sigma_u^2} > 0$$

$\frac{\partial h}{\partial s} > 0$, and $\frac{\partial^2 h}{\partial s^2} \geq 0$.

- Larger banks receive more attention, $dH_{idt}/dA_{idt} > 0$, as long as

$$\underbrace{-\overbrace{\frac{\partial^2}{\partial s^2}\mathrm{PD}(\varrho_{idt}, s_{idt})}^{<0}\frac{\partial}{\partial A}h^{-1}(H,A)\,W_{idt} - \overbrace{\frac{\partial}{\partial s}\mathrm{PD}(\varrho_{idt}, s_{idt})}^{<0}\frac{dW_{idt}}{dA_{idt}}}_{>0} > \underbrace{\frac{\partial^2}{\partial A \partial s}h(s_{idt}, A_{idt})\,\Lambda_{dt}}_{>0},$$

  i.e. as long as the cross-partial $\frac{\partial^2 h}{\partial s \partial A}$ is not too big compared to the effect of size on hours and on the preference weight. With our functional form for h, this condition is satisfied.

[30] Note that the decreasing marginal impact requires the distress threshold $D_{idt} = \varrho_{idt} - \gamma s_{idt}$ to be in the left tail of the distribution of u_{idt} where the density ϕ is increasing. This requires $\mathrm{PD}_{idt} < 0.5$ which is satisfied in the data.

- Riskier banks receive more attention, $dH_{idt}/d\varrho_{idt} > 0$, since

$$-\frac{\partial^2}{\partial\rho\partial s}\mathrm{PD}(\varrho_{idt}, s_{idt}) = \phi'(\varrho_{idt} - \gamma s_{idt})\,\gamma > 0.$$

- Banks with a higher preference weight receive more attention, $dH_{idt}/dW_{idt} > 0$, since

$$-\frac{\partial}{\partial s}\mathrm{PD}(\varrho_{idt}, s_{idt}) = \phi(\varrho_{idt} - \gamma s_{idt})\,\gamma > 0.$$

- A higher shadow cost reduces attention, $dH_{idt}/d\Lambda_{dt} < 0$, since

$$-\frac{\partial}{\partial s}h(s_{idt}, A_{idt}) < 0.$$

A.2 Proof of Proposition 2

For any variable x_{idt} that enters the distress threshold y^*_{idt} with loading κ and the log supervisory preference weight $\log W_{idt}$ with loading $\widetilde{\kappa}$, implicit differentiation of the first-order condition (8) yields

$$\frac{d\log H_{idt}}{dx_{idt}} = \frac{\phi'(z_{idt})\,\frac{\kappa}{\sigma_\varepsilon}\frac{\gamma}{\sigma_\varepsilon}\,W_{idt} + \phi(z_{idt})\,\frac{\gamma}{\sigma_\varepsilon}\,W_{idt}\widetilde{\kappa}}{\phi'(z_{idt})\,\frac{\gamma}{\sigma_\varepsilon}\frac{\gamma}{\sigma_\varepsilon}\,W_{idt} + H_{idt}\Lambda_{dt}},$$

where

$$z_{idt} = \frac{\varrho(r_{idt}) - \gamma\log H_{idt} + \alpha\gamma\log A_{idt} + \eta_{idt}}{\sigma_\varepsilon}.$$

Substituting in the LHS of the first-order condition for $H_{idt}\Lambda_{dt}$ yields

$$\begin{aligned}\frac{d\log H_{idt}}{dx_{idt}} &= \frac{\phi'(z_{idt})\,\frac{1}{\sigma_\varepsilon}\,\kappa + \phi(z_{idt})\,\widetilde{\kappa}}{\phi'(z_{idt})\,\frac{\gamma}{\sigma_\varepsilon} + \phi(z_{idt})}\\ &= \pi_{idt}\frac{\kappa}{\gamma} + (1-\pi_{idt})\,\widetilde{\kappa},\end{aligned}$$

where the local weight π_{idt} is given by

$$\pi_{idt} = \frac{\phi'(z_{idt})\,\frac{\gamma}{\sigma_\varepsilon}}{\phi'(z_{idt})\,\frac{\gamma}{\sigma_\varepsilon} + \phi(z_{idt})}.$$

Making use of the fact that $\phi'(z) = -\phi(z)\, z$ and the definition of the distress probability in (7) yields

$$\begin{aligned}\pi_{idt} &= \frac{-z_{idt}\frac{\gamma}{\sigma_\varepsilon}}{-z_{idt}\frac{\gamma}{\sigma_\varepsilon}+1} \\ &= \frac{\Phi^{-1}(\mathrm{PD}_{idt})}{\Phi^{-1}(\mathrm{PD}_{idt}) - \frac{\sigma_\varepsilon}{\gamma}}.\end{aligned}$$

A.3 Linearization of first-order condition

The first-order condition for the supervisor's problem 5 is given by

$$\begin{aligned}\sigma_\varepsilon^{-1}\phi\Big(\big(\varrho(r_{idt}) - \gamma\log H_{idt} + \alpha\gamma\log A_{idt} + \eta_{idt}\big)\,\sigma_\varepsilon^{-1}\Big)\,\gamma\exp(\widetilde{\varrho}(r_{idt}) + \widetilde{\alpha}\log A_{idt} + w_{idt}) \\ = \Lambda_{dt}\exp(\log H_{idt})\end{aligned}$$

Suppose we linearize around a point

$$(r_{idt}, \log H_{idt}, \log A_{idt}, \eta_{idt}, w_{idt}, \Lambda_{dt}) = \left(\overline{r}, \overline{\log H}, \overline{\log A}, \overline{\eta}, \overline{w}, \overline{\Lambda}\right),$$

where the first-order condition holds:

$$\phi\left(\frac{\varrho(\overline{r}) - \gamma\overline{\log H} + \alpha\gamma\overline{\log A} + \overline{\eta}}{\sigma_\varepsilon}\right)\frac{\gamma}{\sigma_\varepsilon}\,\exp\left(\widetilde{\varrho}(\overline{r}) + \widetilde{\alpha}\overline{\log A} + \overline{w}\right) = \overline{\Lambda}\exp\overline{h}$$

Solving for $\log H_{idt}$ then yields

$$\log H_{idt} \approx \overline{Y} + \frac{\overline{\pi}}{\gamma}\varrho(r_{idt}) + (1-\overline{\pi})\,\widetilde{\varrho}(r_{idt}) + \big(\overline{\pi}\alpha + (1-\overline{\pi})\,\widetilde{\alpha}\big)\log A_{idt} + \delta_w w_{idt} + \delta_\Lambda\Lambda_{dt} + \delta_\eta\eta_{idt}$$

with coefficients

$$\begin{aligned}\overline{\pi} &= \frac{\sigma_\varepsilon^{-1}\phi'(\overline{y})\,\gamma}{\sigma_\varepsilon^{-1}\phi'(\overline{y})\,\gamma + \phi(\overline{y})}, \\ \delta_\Lambda &= -\frac{\exp\left(\overline{\log H}\right)}{\sigma_\varepsilon^{-1}\phi'(\overline{y})\,\gamma + \phi(\overline{y})}, \\ \delta_w &= \frac{\phi(\overline{y})}{\sigma_\varepsilon^{-1}\phi'(\overline{y})\,\gamma + \phi(\overline{y})}, \\ \delta_\eta &= \frac{\sigma_\varepsilon^{-1}\phi'(\overline{y})}{\sigma_\varepsilon^{-1}\phi'(\overline{y})\,\gamma + \phi(\overline{y})}.\end{aligned}$$

and a constant

$$\overline{Y} = \overline{\log H} - \frac{\overline{\pi}}{\gamma}\varrho(\overline{r}) - (1-\overline{\pi})\,\widetilde{\varrho}(\overline{r}) - (\overline{\pi}\alpha + (1-\overline{\pi})\,\widetilde{\alpha})\,\overline{\log A} - \delta_w\overline{w} + \delta_\Lambda\overline{\Lambda} - \delta_\eta\overline{\eta},$$

where

$$\begin{aligned}\overline{y} &= \left(\varrho(\overline{r}) - \gamma\overline{\log H} + \alpha\gamma\overline{\log A} + \overline{\eta}\right)\sigma_\varepsilon^{-1},\\ \overline{W} &= \exp\left(\widetilde{\varrho}(\overline{r}) + \widetilde{\alpha}\overline{\log A} + \overline{w}\right).\end{aligned}$$

Since we estimate the linearized first order condition, the point around which the linearization is evaluated is determined by the regression coefficients. The regression fits a linear relationship to the potentially nonlinear relationship between log hours and the covariates minimizing the mean squared error. Since the relationship between log hours and log assets is approximately linear and we control for ratings as well as most shifters nonlinearly with dummies, the approximation error of our linearization is likely to be low.

A.4 Details on counterfactuals

The transfers of the different counterfactual allocatoins are as follows:

- No expansion:

$$\widehat{\tau}_{dt}^{\text{expan}} = \log\left(\frac{\sum_{i\in\mathcal{I}_{dt}}\exp\left(\widehat{\log H_{idt}}\right)}{\sum_{i\in\mathcal{I}_{d2008}}\exp\left(\widehat{\log H_{id2008}}\right)}\right)$$

- No reallocation:

$$\widehat{\tau}_{dt}^{\text{reall}} = \log\left(\frac{\sum_{i\in\mathcal{I}_{d2008}}\exp\left(\widehat{\log H}_{id2008}\right)}{\sum_{i\in\mathcal{I}_{dt}}\exp\left(\widehat{\log H}_{idt} - \widehat{\delta}_{\text{post-large}}\mathbb{I}(t>2008)\,\mathbb{I}(A_{idt}>\$10\text{b})\right)}\right)$$

- Resources perfectly mobile:

$$\widehat{\tau}_{t}^{\text{mobile}} \equiv \log\left(\frac{\sum_{i\in\bigcup_d\mathcal{I}_{dt}}\exp\left(\widehat{\log H_{idt}}\right)}{\sum_{i\in\bigcup_d\mathcal{I}_{dt}}\exp\left(\widehat{\log H_{idt}} + \widehat{\lambda}_{dt}\right)}\right)$$

- No disproportionate supervision of district top 5:

$$\widehat{\tau}_{dt}^{\text{top5}} \equiv \log\left(\frac{\sum_{i\in\mathcal{I}_{dt}}\exp\left(\widehat{\log H_{idt}}\right)}{\sum_{i\in\mathcal{I}_{dt}}\exp\left(\widehat{\log H_{idt}} - \widehat{\delta}_{\text{top5}}\mathbb{I}(i\in\text{top5}_{dt})\right)}\right)$$

- No response to risk:

$$\widehat{\tau}_{dt}^{\text{risk}} = \log\left(\frac{\sum_{i\in\mathcal{I}_{dt}} \exp\left(\widehat{\log H_{idt}}\right)}{\sum_{i\in\mathcal{I}_{dt}} \exp\left(\widehat{\log H_{idt}} - \sum_{r=2}^{5}\widehat{\rho}_{Hr}\mathbb{I}[r_{idt}=r]\right)}\right)$$

- Response proportional to risk:

$$\widehat{\tau}_{dt}^{\text{tilt}} = \log\left(\frac{\sum_{i\in\mathcal{I}_{dt}} \exp\left(\widehat{\log H_{idt}}\right)}{\sum_{i\in\mathcal{I}_{dt}} \exp\left(\widehat{\log H_{idt}} - \sum_{r=2}^{5}\widehat{\rho}_{Hr}\mathbb{I}[r_{idt}=r] + \sum_{r=2}^{5}\widehat{\rho}_{r}\mathbb{I}[r_{idt}=r]\right)}\right)$$

B OCC assessment fees

One potential concern in using the Fed supervisory hours data as a measure of supervisory efforts is that the quality of hours are unaccounted for because we do not measure price information. In addition, the hours data may not be representative of banking supervisors other than the Federal Reserve. To validate the hours data, we compare the estimated elasticities of supervisory hours with respect to bank size and risk just discussed to those of assessment fees collected by the Office of the Comptroller of the Currency (OCC) on its supervised entities.

We use data on supervisory fees assessed on federally chartered commercial banks by the OCC, which we obtain from the OCC's public website.[31] The OCC supervises nationally chartered commercial banks as well as federal savings associations (FSAs) since 2011 following the integration of the Office of Thrift Supervision (OTS) into the OCC. The OCC levies assessments, fees, and other charges on federally chartered banks to meet the expenses of carrying out its supervisory activities. The OCC assesses semi-annual fees on its supervised entities under 12 U.S.C. 13 and 12 CFR 8. The fee schedule is adjusted by the OCC each year and determines fees as a function of bank size and bank risk, as measured by confidential supervisory ratings. As the hours data discussed above could in principle be very noisy measures, we use this information to compare how Fed supervisory hours and OCC fees vary as a function of bank assets and supervisory rating. In contrast to the hours data, this fee data is a more direct measure of the supervisory cost function as fees are expressed in dollar terms (see Appendix B.1 for details). However, because of potential cross-subsidies across different size or risk categories, the assessment schedule may not be directly informative of the supervisory production function at an institution level.

Bearing these caveats in mind, we apply the fee structure to the universe of nationally chartered commercial banks using asset information as of 2006:Q4 and 2013:Q4 (relevant periods for fee calculations in 2007 and 2014) and regress log fees on log assets and bank rating in Table A2, column (1). The elasticity of OCC fees to assets is 0.70, which is close to the 0.75 estimate for the within-bank estimate using Fed hours data (Table 2, column 6).

[31] www.occ.treas.gov/topics/examinations/assessments-and-fees/index-assessments-fees.html. See also Kisin and Manela (2014) for another work using this same information.

The increase in OCC fees with respect to bank risk is similar although not as steep as the estimated increase in Fed hours. Relative to 1-rated institutions, fees increase by about 50 percent on average for 3-rated institutions ($\exp(0.4) - 1 \approx 0.5$) and by about 100 percent for 4- or 5-rated institutions. Overall, we find that size and risk elasticities of assessment fees are similar to those estimated on Federal Reserve supervisory hours, suggesting that federal supervisors display similar sensitivities and that hours sensitivities capture cost sensitivities reasonably well. Among other instruments discussed in Section 4, we use pre- and post-2008 asset discontinuities. Columns (2) and (3) of Table A2 extend the baseline OCC specification to include asset thresholds at $10 billion and $50 billion, and with interactions of each threshold with a post-2008 dummy variable. In the next Section we provide evidence that Fed supervisory hours at the largest banks increased after 2008. Consistently, OCC assessment fees for these banks also increased in the post-2008 sample after controlling for log assets (discontinuities are present both at $10 billion and $50 billion). Overall, the OCC assessment fee data shows that the sensitivities of supervisory hours and assessment fees to size and risk are similar.

B.1 OCC fee data

The OCC's base assessment is calculated using a table with eleven categories, or brackets, each of which comprises a range of asset-size values. In addition to the base amount, which is the same for every bank in its asset-size bracket, the fee includes a marginal amount, which is computed by applying a marginal assessment rate to the assets in excess of the lower bound of the asset-size bracket. The marginal assessment rate declines as asset size increases, "reflecting economies of scale in bank examination and supervision" (Federal Register Vol. 79, No. 81, April 28, 2014).

Table A1 provides summaries for semiannual assessments (meaning that annual fees are twice as large) as a function of assets in 2007 and 2014 that we obtain from OCC bulletins. The 2014 fee structure includes a new bracket for the largest banks, with assets greater than $250 billion. This additional bracket was introduced to help the OCC recover additional costs associated with supervising large and complex banks. Starting in 2001, the OCC began imposing a surcharge of 25% on their original (size-based) assessment for national banks with a 3, 4, or 5 rating, to "reflect the increased cost of supervision" (OCC 2000-30). By 2004, the size of the surcharge had been increased to 50% for 3-rated banks and to 100% for 4- or 5-rated banks.[32]

C Robustness checks

We consider two sets of controls: year fixed effects and bank-level risk controls in addition to supervisory ratings. The year effects account for co-movements of supervisory practices and distress over the business cycle. Although our specifications condition on bank ratings, mis-specification concern may be particularly relevant for district-year variation in

[32] With the exception of the addition of the $250 billion asset bracket, asset brackets and base/marginal fee schedules prior to 2007 were stable over time, except for an annual inflation adjustment. Both inflation adjustments and rating surcharges were capped at $20 billion, prior to 2014, and at $40 billion thereafter.

our estimated shadow cost of resources, which is equally driven by between- and within-district variation (Appendix Table A3). In addition, one may also be concerned that supervisory ratings may not correctly measure risk as relevant for the allocation of hours. We therefore extend the specification to include controls for bank profitability (ROA), asset quality (NPL ratio) and regulatory capital (Tier 1 capital ratio).

Table A11 shows IV probit estimates for severe stress, failure and low ROA when also controlling for year fixed effects and the additional bank risk controls, separately and together, when including all instruments (first stages in appendix Tables A12–A14). Although the sample size is reduced, results are similar to the baseline specification in terms of economic magnitudes. For example, when using severe stress as an outcome variable and including both year fixed effects and additional risk controls, the average marginal effect of hours on the distress probability is now -0.023 compared to -0.028 when the additional controls were omitted; the estimated size elasticity of hours cost is now 0.4 compared to 0.5 previously, indicating similar economies of scale; the coefficient on log assets is smaller in the second stage than in the first stage (not reported), indicating that supervisory preference weights are increasing in bank size; and the coefficients on ratings 2 to 5 are greater in the second stage than in the first stage (not reported), confirming the higher weight on 1-rated banks. In terms of statistical significance, we also find similar effects. And we find similar effects when separately including year fixed effects or additional risk controls, especially for our main outcome variable, severe stress.

In Table A15, we estimate the main specification for each outcome variable as a simple probit regression without instrumenting (columns 2, 5 & 8) and as a linear instrumental variables regression (columns 3, 6 & 9). For convenience, columns 1, 4, and 7 repeat the baseline IV probit specification (last column in Tables 5 & 6). Starting with the uninstrumented probit, the estimated effect of supervisory hours on the probability of all three distress outcomes is much smaller in absolute magnitude and much less significant, or not significant. This attenuation bias, due to an omitted variable, is consistent with the econometric model we posit, in which only the supervisor, but not the econometrician, can observe the signal η_{idt} about bank risk when deciding on the intensity of supervision.

Turning to the linear IV estimates, we see that the estimated linear effect of log hours on the probability of all three distress outcomes is statistically significant. The loading on log hours is -0.018 (p-val$<$ 0.01) for the probability of severe stress (column 3), which is smaller than, but not too different from, the IV-probit estimated average marginal effect of -0.028 (column 1). For probability of failure, the difference between the estimated linear and probit effects is similarly small, -0.003 (column 6) vs. -0.004 (column 4); the difference is also small for probability of low ROA, -0.014 (column 9) vs. -0.021 (column 7). In sum, we find that the IV probit effects are robust to including additional controls and to changing the specification to a linear probability IV model and show evidence of the endogeneity that requires our instrumental variables approach.

D Additional tables

Table A1: OCC general assessment fee schedule. This table shows the OCC assessment fee schedule on federally chartered commercial banks and savings association as a function of asset size. Source: 12 CFR 8 and OCC bulletins.

If the amount of the total balance sheet assets (consolidated domestic and foreign subsidiaries) is: ($ millions)		The Semiannual Assessment will be:		
		Year 2007		
Over	But Not Over	This Amount ($)	Plus	Of Excess Over ($ millions)
0	2	5,480	0	0
2	20	5,480	0.000227454	2
20	100	9,574	0.000181963	20
100	200	24,131	0.000118274	100
200	1,000	35,958	0.000100078	200
1,000	2,000	116,020	0.000081883	1,000
2,000	6,000	197,903	0.000072785	2,000
6,000	20,000	489,043	0.000061932	6,000
20,000	40,000	1,356,091	0.000050403	20,000
40,000		2,364,151	0.000033005	40,000
		Year 2014		
Over	But Not Over	This Amount ($)	Plus	Of Excess Over ($ millions)
0	2	5,997	0	0
2	20	5,997	0.000236725	2
20	100	10,258	0.000189379	20
100	200	25,408	0.000123092	100
200	1,000	37,717	0.000104156	200
1,000	2,000	121,041	0.000085218	1,000
2,000	6,000	206,259	0.000075749	2,000
6,000	20,000	509,255	0.000064454	6,000
20,000	40,000	1,411,611	0.000048553	20,000
40,000	250,000	2,382,671	0.000033132	40,000
250,000		9,340,391	0.0000328	250,000

Table A2: OCC general assessment fees. The table shows estimates from linear regressions of log OCC general assessments on the listed controls. The fees are calculated for the universe of all federally chartered commercial banks that filed Call Reports in 2006:Q4 and 2013:Q4 using the fee schedule in Table A1 and rating surcharges discussed in Section B. Assets are actual, while ratings are generated from a uniform distribution. For detailed variable definitions, see Section 3 and Appendix E. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	Log(Fees)		
	(1)	(2)	(3)
Log(Assets)	0.697***	0.664***	0.663***
	[0.004]	[0.004]	[0.004]
Rating = 2	0.002	-0.002	-0.002
	[0.008]	[0.006]	[0.006]
Rating = 3	0.394***	0.395***	0.395***
	[0.007]	[0.006]	[0.006]
Rating = 4	0.702***	0.699***	0.699***
	[0.007]	[0.006]	[0.006]
Rating = 5	0.693***	0.689***	0.689***
	[0.007]	[0.005]	[0.006]
Post-2008		0.040***	0.041***
		[0.002]	[0.002]
Assets≥$10b		0.353***	0.393***
		[0.033]	[0.032]
Post-2008×(Assets≥$10b)		0.204***	0.091***
		[0.044]	[0.028]
Assets≥$50b			-0.102*
			[0.058]
Post-2008×(Assets≥$50b)			0.284***
			[0.091]
Constant	-0.031	0.118***	0.121***
	[0.024]	[0.022]	[0.021]
Adj. R^2	0.99	0.99	0.99
Obs.	2866	2866	2866
Distinct NAs	1772	1772	1772

Table A3: Variation of shadow cost between and within districts. The table shows the source of between and within district variation in the total shadow cost total shadow calculated as $-\overline{\delta}_H\overline{\log H}_{dt} + \overline{\delta}_A\overline{\log A}_{dt} + \sum_{r=2}^{5}\overline{\delta}_r\overline{\mathbb{I}[r]}_{dt}$, where $\overline{x}_{dt}$ denotes the average of variable x within district d and year t, and where $\overline{\delta}_H$, $\overline{\delta}_A$, and $\overline{\delta}_r$ are the coefficients on average log hours, log assets and rating indicators from Table 3, column (1). The "assets/hours component" is $\overline{\delta}_A\overline{\log A}_{dt} - \overline{\delta}_H\overline{\log H}_{dt}$ and the "ratings component" $\sum_{r=2}^{5}\overline{\delta}_r\overline{\mathbb{I}[r]}_{dt}$. Because the panel is unbalanced, the squared between and within standard deviations may not sum exactly to the squared overall standard deviation.

	Standard deviation		
	Overall	Between districts	Within districts
Total shadow cost	0.45	0.33	0.31
• Assets/hours component	0.43	0.33	0.29
• Ratings component	0.17	0.06	0.16
Observations	$N = 178$	$n = 12$	$\overline{T} = 14.8$

Table A4: Examination frequency requirements. The table shows examination frequency requirements by bank size, complexity and rating. Sources: SR letter 13-21 for banks $<$ \$10 billion; Board policy statement, October 7, 1985 (as cited in BHC Supervision Manual, Section 5000.0.2) for banks $>$ \$10 billion.

		Rating 1 or 2	Rating 3, 4 or 5
$<$ \$10b	Non-complex	At least *every two years*: targeted off-site exam required every two years; additional follow-up and interim exams may be required.	At least *every year*: full-scope off-site exam required annually; additional follow-up and interim exams may be required.
	Complex	At least *every year*: full-scope exam required annually; additional follow-up and interim exams may be required.	At least *every year*: full-scope exam required annually; additional follow-up and interim exams may be required.
$\geq$ \$10b		At least *every year*: full-scope exam required annually; additional limited-scope or targeted exam presumed annually.	At least *twice every year*: full-scope exam required annually; one additional limited-scope or targeted exam required annually.

Table A5: Instruments for supervisory hours: resource scarcity (with bank fixed effects). The table shows estimates from linear regressions of log supervisory hours on the listed controls. Other controls are noted at the bottom. For detailed variable definitions, see Section 3 and Appendix E. F-statistics are for the test that the coefficients on the instruments are zero. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	Log(Hours)			
	(1)	(2)	(3)	(4)
District avg. Log Hours	0.621***	1.003***	0.590***	0.599***
	[0.068]	[0.067]	[0.067]	[0.072]
District avg. Log Assets	-0.678***	-1.104***	-0.649***	-0.708***
	[0.157]	[0.155]	[0.162]	[0.182]
District avg. (Rating = 2)	-0.151	-0.323	-0.248	-0.355
	[0.264]	[0.267]	[0.277]	[0.293]
District avg. (Rating = 3)	-0.494	-1.037***	-0.284	-0.726*
	[0.359]	[0.357]	[0.441]	[0.376]
District avg. (Rating = 4)	-1.124*	-1.162*	-1.164	-1.804**
	[0.672]	[0.673]	[0.794]	[0.764]
District avg. (Rating = 5)	-1.997**	-1.550*	-1.549*	-1.965**
	[0.861]	[0.864]	[0.926]	[0.871]
National avg. Log Hours			0.042	
			[0.168]	
National avg. Log Assets			-0.566*	
			[0.312]	
National avg. (Rating = 2)			-0.362	
			[0.671]	
National avg. (Rating = 3)			0.723	
			[1.235]	
National avg. (Rating = 4)			-5.737	
			[3.977]	
National avg. (Rating = 5)			1.304	
			[3.586]	
Dist. avg. Post-2008×(Assets≥$10b)				0.125
				[0.423]
Dist. avg. District top 5				0.959
				[0.806]
Dist. avg. Lagged exam count				0.172
				[0.254]
Dist. avg. Lag exam ct.×(Hi. exam freq.)				-0.112
				[0.271]
Dist. avg. High exam frequency				-0.073
				[0.256]
Log Assets, Ratings	Yes	Yes	Yes	Yes
Leave-out average	Yes	No	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes
F-statistic	17.6	40.6	10.4	10.0
Adj. R^2	0.62	0.64	0.62	0.64
Observations	5900	5900	5900	5188
Distinct BHCs	769	769	769	722

Table A6: Instruments for supervisory hours: preference shocks (with bank fixed effects). The table shows estimates from linear regressions of log supervisory hours on the listed controls. Other controls are noted at the bottom. For detailed variable definitions, see Section 3 and Appendix E. F-statistics are for the test that the coefficients on the instruments are zero. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	Log(Hours)					
	(1)	(2)	(3)	(4)	(5)	(6)
District top 5	0.107					0.016
	[0.162]					[0.149]
Post-2008		-0.130	-0.136			-0.238***
		[0.083]	[0.083]			[0.081]
Assets≥$10b		0.421***	0.377***	0.246		
		[0.130]	[0.141]	[0.182]		
Post-2008×(Assets≥$10b)		0.538***	0.589***			0.692***
		[0.132]	[0.108]			[0.121]
Assets≥$50b		0.204				
		[0.183]				
Post-2008×(Assets≥$50b)		0.064				
		[0.170]				
Small (assets<$10b), complex				-0.073		
				[0.137]		
Small (assets<$10b), stressed				0.012		
				[0.148]		
High exam frequency					-0.047	-0.018
					[0.093]	[0.090]
Lagged exam count				-0.892***	-0.894***	-0.885***
				[0.106]	[0.105]	[0.106]
Lag exam ct.×(Assets≥$10b)				0.944***		
				[0.106]		
Lag exam ct.×(Small, complex)				0.909***		
				[0.119]		
Lag exam ct.×(Small, stressed)				0.863***		
				[0.135]		
Lag exam ct.×(Hi. exam freq.)					0.942***	0.916***
					[0.106]	[0.106]
Log Assets, Ratings	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	0.4	13.5	29.5	26.4	79.0	34.2
Adj. R^2	0.61	0.62	0.62	0.67	0.67	0.68
Observations	5900	5900	5900	5188	5188	5188
Distinct BHCs	769	769	769	722	722	722

Table A7: First stage of IV probit with outcome variable 1y-ahead probability of severe stress. The table shows estimates from IV probit first-stage regressions of log hours on the listed controls (corresponding second stages in Table 5). Other controls are noted at the bottom. For detailed variable definitions, see Section 3 and Appendix E. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	Log(Hours)				
	(1)	(2)	(3)	(4)	(5)
Post-2008			-0.334***		-0.123*
			(0.0678)		(0.0734)
Assets≥$10b			0.271**		
			(0.137)		
Post-2008×(Assets≥$10b)			0.638***		0.548***
			(0.117)		(0.115)
District top 5		0.385***			0.153
		(0.121)			(0.120)
High exam frequency				0.595***	0.453***
				(0.0881)	(0.0825)
Lagged exam count				-0.651***	-0.648***
				(0.106)	(0.103)
Lag exam ct.×(Hi. exam freq.)				0.756***	0.737***
				(0.109)	(0.106)
District avg. Log Hours	0.769***				0.702***
	(0.0542)				(0.0500)
District avg. Log Assets	-0.777***				-0.720***
	(0.0881)				(0.0897)
District avg. (Rating = 2)	-0.120				-0.212
	(0.188)				(0.194)
District avg. (Rating = 3)	-0.833***				-0.908***
	(0.296)				(0.316)
District avg. (Rating = 4)	-1.367**				-1.423**
	(0.657)				(0.638)
District avg. (Rating = 5)	-2.524***				-2.410***
	(0.838)				(0.805)
Lagged Rating = 2				-0.0256	-0.0712
				(0.0658)	(0.0626)
Lagged Rating = 3				-0.348***	-0.303***
				(0.106)	(0.100)
Lagged Rating = 4				-0.463***	-0.437***
				(0.151)	(0.149)
Lagged Rating = 5				-0.552***	-0.561***
				(0.190)	(0.192)
Log Assets, Ratings	Yes	Yes	Yes	Yes	Yes
Observations	5445	5445	5445	4764	4764
Distinct BHCs	744	744	744	704	704

Table A8: First stage of IV probit with outcome variable 1y-ahead probability of failure. The table shows estimates from IV probit first-stage regressions of log hours on the listed controls (corresponding second stages in Table 6). Other controls are noted at the bottom. For detailed variable definitions, see Section 3 and Appendix E. Standard errors clustered by bank reported in brackets; significance: $^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$. Sample is 1998–2014.

	Log(Hours)		
	(1)	(2)	(3)
High exam frequency		0.595***	0.465***
		(0.0882)	(0.0838)
Lagged exam count		-0.651***	-0.664***
		(0.106)	(0.102)
Lag exam ct. × (Hi. exam freq.)		0.756***	0.757***
		(0.109)	(0.106)
District avg. Log Hours	0.762***		0.704***
	(0.0552)		(0.0539)
District avg. Log Assets	-0.781***		-0.767***
	(0.0888)		(0.0861)
District avg. (Rating = 2)	-0.0447		-0.173
	(0.189)		(0.191)
District avg. (Rating = 3)	-0.799***		-0.822***
	(0.299)		(0.298)
District avg. (Rating = 4)	-1.455**		-1.255*
	(0.672)		(0.650)
District avg. (Rating = 5)	-2.439***		-2.665***
	(0.853)		(0.806)
Lagged Rating = 2		-0.0257	-0.0733
		(0.0658)	(0.0627)
Lagged Rating = 3		-0.349***	-0.315***
		(0.106)	(0.102)
Lagged Rating = 4		-0.463***	-0.472***
		(0.152)	(0.148)
Lagged Rating = 5		-0.552***	-0.632***
		(0.190)	(0.187)
Log Assets, Ratings	Yes	Yes	Yes
Observations	5445	4764	4764
Distinct BHCs	744	704	704

Table A9: First stage of IV probit with outcome variable 1y-ahead probability of low ROA. The table shows estimates from IV probit first-stage regressions of log hours on the listed controls (corresponding second stages in Table 6). Other controls are noted at the bottom. For detailed variable definitions, see Section 3 and Appendix E. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	Log(Hours)				
	(1)	(2)	(3)	(4)	(5)
Low ROA	-0.0222	-0.178	-0.167	-0.120	0.0357
	(0.134)	(0.135)	(0.132)	(0.116)	(0.114)
Post-2008			-0.278***		-0.102
			(0.0700)		(0.0749)
Assets≥$10b			0.388***		
			(0.138)		
Post-2008×(Assets≥$10b)			0.689***		0.581***
			(0.124)		(0.121)
District top 5		0.430***			0.172
		(0.122)			(0.123)
High exam frequency				0.669***	0.514***
				(0.0969)	(0.0907)
Lagged exam count				-0.607***	-0.594***
				(0.125)	(0.121)
Lag exam ct.×(Hi. exam freq.)				0.714***	0.678***
				(0.127)	(0.124)
District avg. Log Hours	0.776***				0.704***
	(0.0544)				(0.0505)
District avg. Log Assets	-0.782***				-0.705***
	(0.0899)				(0.0897)
District avg. (Rating = 2)	-0.0441				-0.241
	(0.187)				(0.201)
District avg. (Rating = 3)	-0.746**				-0.861***
	(0.315)				(0.333)
District avg. (Rating = 4)	-1.409**				-1.752***
	(0.690)				(0.674)
District avg. (Rating = 5)	-2.703***				-2.802***
	(0.966)				(0.889)
Lagged Rating = 2				0.0568	-0.00834
				(0.0673)	(0.0635)
Lagged Rating = 3				-0.228**	-0.179*
				(0.110)	(0.104)
Lagged Rating = 4				-0.248	-0.221
				(0.173)	(0.170)
Lagged Rating = 5				-0.223	-0.268
				(0.195)	(0.197)
Log Assets, Ratings	Yes	Yes	Yes	Yes	Yes
Observations	5274	5274	5274	4594	4594
Distinct BHCs	745	745	745	675	675

Table A10: Detail on channels of supervisory effects. The table shows estimates from the second stages of IV probit regressions of 1y-ahead probability of tail realizations of balance sheet and income statement items on the listed controls where log hours are instrumented for (using all instruments). Tail realizations are in the top ("H") or bottom ("L") 10th percentile of the distribution of the variable listed at the top of each column ("I" is income, "E" is expense). Each specification also includes the current value of the dependent variable as a control. Other controls are noted at the bottom. Other controls abbreviations: "P08" is post-2008, "HF" is high exam frequency, "LRT" is lagged ratings. For detailed variable definitions, see Section 3 and Appendix E. The effective F-statistic and critical value are for the weak-instrument test of Olea and Pflueger (2013), robust to heteroskedasticity, autocorrelation, and clustering, from the respective first stage. Average marginal effects reported in curly braces. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	(1) Low ROA	(2) High NPL	(3) L tier-1 cap.	(4) L non-int. I	(5) H non-int. E	(6) H LL prov.	(7) L net int. I	(8) L real. gains
Log Hours	-0.149**	-0.180***	-0.073	-0.245***	-0.024	-0.114*	-0.061	-0.130***
	[0.059]	[0.057]	[0.067]	[0.053]	[0.060]	[0.064]	[0.060]	[0.048]
	{-0.021}	{-0.025}	{-0.008}	{-0.027}	{-0.003}	{-0.015}	{-0.006}	{-0.021}
Log Assets (real)	0.072	0.137***	0.135**	0.068	-0.043	0.096*	0.140**	0.113***
	[0.053]	[0.052]	[0.058]	[0.053]	[0.054]	[0.051]	[0.055]	[0.041]
	{0.010}	{0.019}	{0.015}	{0.007}	{-0.005}	{0.013}	{0.015}	{0.018}
Rating = 2	0.627***	0.561***	0.474***	0.586***	0.194*	0.614***	0.091	0.172
	[0.119]	[0.125]	[0.140]	[0.124]	[0.113]	[0.138]	[0.151]	[0.105]
	{0.089}	{0.077}	{0.051}	{0.064}	{0.022}	{0.082}	{0.010}	{0.028}
Rating = 3	1.271***	1.117***	0.958***	1.061***	0.346**	0.609***	0.394**	0.365**
	[0.155]	[0.155]	[0.195]	[0.159]	[0.168]	[0.196]	[0.192]	[0.151]
	{0.180}	{0.153}	{0.104}	{0.116}	{0.039}	{0.081}	{0.042}	{0.059}
Rating = 4	2.066***	1.758***	1.684***	1.199***	0.921***	1.196***	0.956***	0.673***
	[0.258]	[0.267]	[0.247]	[0.232]	[0.215]	[0.289]	[0.255]	[0.215]
	{0.292}	{0.241}	{0.183}	{0.132}	{0.103}	{0.159}	{0.101}	{0.108}
Rating = 5	2.173***	1.512***	1.912***	1.736***	1.217***	0.410	1.373***	-0.020
	[0.468]	[0.386]	[0.384]	[0.329]	[0.294]	[0.574]	[0.306]	[0.291]
	{0.307}	{0.207}	{0.208}	{0.190}	{0.136}	{0.055}	{0.145}	{-0.003}
Other controls	P08 HF LRT	P08 HF LRT	P08 HF LRT	P08 HF LRT	P08 HF LRT	P08 HF LRT	P08 HF LRT	P08 HF LRT
F-statistic	32.7	34.3	34.0	32.6	32.4	33.3	35.0	32.1
Critical value	17.1	17.2	17.4	17.2	17.2	17.1	17.5	17.0
Observations	4594	4713	4758	4798	4777	4615	4816	4538
Distinct BHCs	675	687	682	681	675	682	687	689

Table A11: Robustness of IV probit — year fixed effects and additional risk controls. The table shows estimates from the second stages of IV probit regressions of distress probability (outcome variable noted at the top) on the listed controls where log hours are instrumented for (all instruments, corresponding first stages in Tables A12–A14). Other controls are noted at the bottom. Other controls abbreviations: "P08" is post-2008, "HF" is high exam frequency, "LRT" is lagged ratings. For detailed variable definitions, see Section 3 and Appendix E. The effective F-statistic and critical value are for the weak-instrument test of Olea and Pflueger (2013), robust to heteroskedasticity, autocorrelation, and clustering, from the respective first stage. Average marginal effects reported in curly braces. Standard errors clustered by bank reported in brackets; significance: $^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$. Sample is 1998–2014.

	Year fixed-effects			Risk controls			Both		
	Severe stress	Failure	Low ROA	Severe stress	Failure	Low ROA	Severe stress	Failure	Low ROA
Log Hours	-0.279***	-0.366***	-0.143**	-0.323***	-0.187	-0.152**	-0.318***	-0.312***	-0.146**
	[0.063]	[0.082]	[0.065]	[0.065]	[0.123]	[0.061]	[0.070]	[0.097]	[0.069]
	{-0.026}	{-0.012}	{-0.017}	{-0.024}	{-0.002}	{-0.020}	{-0.023}	{-0.008}	{-0.017}
Log Assets (real)	0.117*	0.218***	0.059	0.136**	0.100	0.041	0.124*	0.096	0.028
	[0.062]	[0.075]	[0.061]	[0.065]	[0.102]	[0.056]	[0.071]	[0.079]	[0.066]
	{0.011}	{0.007}	{0.007}	{0.010}	{0.001}	{0.005}	{0.009}	{0.002}	{0.003}
Rating = 2	0.875***	3.617***	0.661***	0.699***	4.086***	0.454***	0.700***	4.281***	0.528***
	[0.193]	[0.229]	[0.126]	[0.201]	[0.190]	[0.122]	[0.219]	[0.166]	[0.130]
	{0.083}	{0.116}	{0.080}	{0.051}	{0.047}	{0.061}	{0.050}	{0.103}	{0.060}
Rating = 3	1.952***	4.344***	1.305***	1.474***	4.372***	0.891***	1.461***	4.630***	1.020***
	[0.210]	[0.324]	[0.166]	[0.253]	[0.400]	[0.170]	[0.272]	[0.452]	[0.180]
	{0.184}	{0.139}	{0.158}	{0.108}	{0.050}	{0.119}	{0.104}	{0.111}	{0.117}
Rating = 4	3.477***	5.465***	2.122***	2.973***	5.076***	1.616***	3.023***	6.223***	1.794***
	[0.229]	[0.437]	[0.267]	[0.361]	[0.562]	[0.332]	[0.372]	[0.801]	[0.318]
	{0.328}	{0.175}	{0.257}	{0.217}	{0.058}	{0.216}	{0.215}	{0.150}	{0.206}
Rating = 5	3.184***	6.126***	2.268***	2.660***	5.693***	0.760	2.769***	11.825***	1.009
	[0.261]	[0.500]	[0.450]	[0.527]	[0.622]	[0.762]	[0.537]	[1.007]	[0.752]
	{0.301}	{0.196}	{0.275}	{0.194}	{0.065}	{0.101}	{0.196}	{0.285}	{0.116}
Year FEs	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Risk controls	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	P08 HF LRT	HF LRT	P08 HF LRT	P08 HF LRT	HF LRT	P08 HF LRT	P08 HF LRT	HF LRT	P08 HF LRT
F-statistic	32.3	29.5	29.7	36.2	36.3	33.4	31.6	21.0	30.2
Critical value	16.5	17.0	17.1	16.6	17.3	17.4	16.9	18.8	17.4
Observations	4290	2860	4594	4277	4277	4347	3821	2229	4347
Distinct BHCs	698	645	675	679	679	664	673	544	664

Table A12: Robustness of IV probit: year fixed effects (first stage). The table shows estimates from IV probit first-stage regressions of log hours on the listed controls (corresponding second stages in Table A11). Second-stage outcome variables and other controls are noted at the bottom. For detailed variable definitions, see Section 3 and Appendix E. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	Log(Hours)		
	(1)	(2)	(3)
Post-2008×(Assets≥$10b)	0.582***		0.587***
	(0.120)		(0.120)
District top 5	0.122		0.180
	(0.126)		(0.125)
High exam frequency	0.488***	0.463***	0.504***
	(0.0864)	(0.0991)	(0.0910)
Lagged exam count	-0.671***	-0.824***	-0.601***
	(0.112)	(0.136)	(0.120)
Lag exam ct.×(Hi. exam freq.)	0.766***	0.932***	0.687***
	(0.115)	(0.140)	(0.123)
Lagged Rating = 2	-0.0642	-0.136*	-0.0135
	(0.0658)	(0.0795)	(0.0618)
Lagged Rating = 3	-0.333***	-0.351**	-0.171
	(0.104)	(0.140)	(0.104)
Lagged Rating = 4	-0.473***	-0.710***	-0.207
	(0.157)	(0.214)	(0.174)
Lagged Rating = 5	-0.591***	-0.606*	-0.247
	(0.197)	(0.313)	(0.199)
District avg. Log Hours	0.671***	0.668***	0.670***
	(0.0523)	(0.0629)	(0.0518)
District avg. Log Assets	-0.731***	-0.777***	-0.709***
	(0.0957)	(0.104)	(0.0912)
District avg. (Rating = 2)	0.00213	-0.0514	-0.0759
	(0.225)	(0.239)	(0.218)
District avg. (Rating = 3)	-0.638*	-0.646	-0.539
	(0.367)	(0.512)	(0.368)
District avg. (Rating = 4)	-1.091	-0.180	-1.359*
	(0.694)	(1.022)	(0.711)
District avg. (Rating = 5)	-2.208***	-2.694**	-2.593***
	(0.820)	(1.208)	(0.891)
Low ROA			0.0529
			(0.119)
Second-stage outcome	Severe stress	Failure	Low ROA
Log Assets, Ratings	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Observations	4290	2860	4594
Distinct BHCs	698	645	675

Table A13: Robustness of IV probit: additional risk controls (first stage). The table shows estimates from IV probit first-stage regressions of log hours on the listed controls (corresponding second stages in Table A11). Second-stage outcome variables and other controls are noted at the bottom. For detailed variable definitions, see Section 3 and Appendix E. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	Log(Hours)		
	(1)	(2)	(3)
Post-2008	-0.242***		-0.199**
	(0.0790)		(0.0776)
Post-2008×(Assets≥$10b)	0.569***		0.569***
	(0.118)		(0.114)
District top 5	0.198		0.205*
	(0.123)		(0.121)
High exam frequency	0.424***	0.439***	0.502***
	(0.0874)	(0.0892)	(0.0941)
Lagged exam count	-0.672***	-0.688***	-0.619***
	(0.108)	(0.108)	(0.124)
Lag exam ct.×(Hi. exam freq.)	0.744***	0.764***	0.692***
	(0.111)	(0.111)	(0.126)
Lagged Rating = 2	-0.0437	-0.0566	0.000987
	(0.0619)	(0.0621)	(0.0630)
Lagged Rating = 3	-0.257**	-0.290***	-0.194*
	(0.102)	(0.106)	(0.101)
Lagged Rating = 4	-0.349*	-0.397**	-0.151
	(0.190)	(0.191)	(0.185)
Lagged Rating = 5	-0.263	-0.358	-0.143
	(0.210)	(0.226)	(0.202)
Tier-1 capital ratio	0.000595	-0.00177	0.00826
	(0.00945)	(0.00914)	(0.00930)
Return on assets	-0.0276	-0.0360	0.00167
	(0.0442)	(0.0452)	(0.0472)
Non-perf. loans ratio	0.0751***	0.0614***	0.0578**
	(0.0239)	(0.0237)	(0.0245)
District avg. Log Hours	0.682***	0.697***	0.688***
	(0.0497)	(0.0535)	(0.0501)
District avg. Log Assets	-0.681***	-0.732***	-0.686***
	(0.0868)	(0.0843)	(0.0856)
District avg. (Rating = 2)	-0.320	-0.326*	-0.242
	(0.202)	(0.197)	(0.204)
District avg. (Rating = 3)	-1.017***	-1.232***	-1.049***
	(0.328)	(0.321)	(0.349)
District avg. (Rating = 4)	-1.419*	-1.420*	-1.876***
	(0.731)	(0.736)	(0.722)
District avg. (Rating = 5)	-2.256**	-2.645***	-2.312**
	(0.917)	(0.913)	(0.937)
Low ROA			0.113
			(0.0831)
Second-stage outcome	Severe stress	Failure	Low ROA
Log Assets, Ratings	Yes	Yes	Yes
Year FEs	No	No	No
Observations	4277	4277	4347
Distinct BHCs	679	679	664

Table A14: Robustness of IV probit: year fixed effects and additional risk controls (first stage). The table shows estimates from IV probit first-stage regressions of log hours on the listed controls (corresponding second stages in Table A11). Second-stage outcome variables and other controls are noted at the bottom. For detailed variable definitions, see Section 3 and Appendix E. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	Log(Hours)		
	(1)	(2)	(3)
Post-2008×(Assets≥$10b)	0.590***		0.570***
	(0.120)		(0.113)
District top 5	0.172		0.220*
	(0.130)		(0.122)
High exam frequency	0.467***	0.449***	0.495***
	(0.0922)	(0.111)	(0.0942)
Lagged exam count	-0.697***	-0.869***	-0.625***
	(0.117)	(0.162)	(0.123)
Lag exam ct.×(Hi. exam freq.)	0.773***	0.944***	0.698***
	(0.120)	(0.165)	(0.125)
Lagged Rating = 2	-0.0404	-0.0987	-0.00695
	(0.0657)	(0.0848)	(0.0616)
Lagged Rating = 3	-0.287***	-0.259	-0.179*
	(0.108)	(0.196)	(0.104)
Lagged Rating = 4	-0.369*	-1.140***	-0.132
	(0.199)	(0.262)	(0.190)
Lagged Rating = 5	-0.292	0.359	-0.121
	(0.210)	(0.250)	(0.200)
Tier-1 capital ratio	0.00158	0.00295	0.00846
	(0.0100)	(0.0136)	(0.00952)
Return on assets	-0.0320	-0.0773	-0.0102
	(0.0465)	(0.0632)	(0.0476)
Non-perf. loans ratio	0.0793***	0.144***	0.0679***
	(0.0243)	(0.0320)	(0.0252)
District avg. Log Hours	0.644***	0.613***	0.648***
	(0.0531)	(0.0738)	(0.0518)
District avg. Log Assets	-0.686***	-0.707***	-0.684***
	(0.0925)	(0.113)	(0.0875)
District avg. (Rating = 2)	-0.0753	-0.0938	-0.0713
	(0.226)	(0.251)	(0.217)
District avg. (Rating = 3)	-0.770**	-0.207	-0.690*
	(0.392)	(0.796)	(0.381)
District avg. (Rating = 4)	-1.092	0.384	-1.356*
	(0.796)	(1.366)	(0.762)
District avg. (Rating = 5)	-2.068**	-3.270*	-2.059**
	(0.912)	(1.789)	(0.936)
Low ROA			0.116
			(0.0862)
Second-stage outcome	Severe stress	Failure	Low ROA
Log Assets, Ratings	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Observations	3821	2229	4347
Distinct BHCs	673	544	664

Table A15: Comparison of IV probit to probit without IV and to linear IV. The table shows estimates from the second stages of IV probit regressions, non-instrumented probit regressions, and linear probability IV regressions of distress probability (outcome variable noted at the top) on the listed controls (using all instruments for log hours in the IV regressions). Other controls are noted at the bottom. Other controls abbreviations: "P08" is post-2008, "HF" is high exam frequency, "LRT" is lagged ratings. For detailed variable definitions, see Section 3 and Appendix E. Average marginal effects reported in curly braces. Standard errors clustered by bank reported in brackets; significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample is 1998–2014.

	Severe stress			Failure			Low ROA		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Hours	-0.287***	-0.014	-0.018***	-0.235***	-0.083*	-0.003**	-0.149**	-0.013	-0.014**
	[0.060]	[0.030]	[0.005]	[0.081]	[0.044]	[0.001]	[0.059]	[0.019]	[0.006]
	{-0.028}	{-0.001}		{-0.004}	{-0.001}		{-0.021}	{-0.002}	
Log Assets (real)	0.134**	-0.078*	0.008*	0.165**	0.035	0.002*	0.072	-0.031	0.003
	[0.057]	[0.042]	[0.004]	[0.076]	[0.064]	[0.001]	[0.053]	[0.031]	[0.007]
	{0.013}	{-0.006}		{0.003}	{0.000}		{0.010}	{-0.004}	
Rating = 2	0.926***	0.872***	0.043***	3.566***	3.387***	0.005*	0.627***	0.594***	0.073***
	[0.184]	[0.196]	[0.010]	[0.254]	[0.230]	[0.003]	[0.119]	[0.120]	[0.015]
	{0.089}	{0.065}		{0.062}	{0.036}		{0.089}	{0.081}	
Rating = 3	2.194***	2.072***	0.201***	3.902***	3.932***	0.013**	1.271***	1.182***	0.176***
	[0.199]	[0.211]	[0.023]	[0.312]	[0.303]	[0.006]	[0.155]	[0.155]	[0.027]
	{0.211}	{0.154}		{0.068}	{0.042}		{0.180}	{0.160}	
Rating = 4	3.790***	3.723***	0.733***	4.714***	4.908***	0.035**	2.066***	1.970***	0.386***
	[0.221]	[0.233]	[0.041]	[0.438]	[0.463]	[0.017]	[0.258]	[0.258]	[0.067]
	{0.364}	{0.276}		{0.082}	{0.052}		{0.292}	{0.267}	
Rating = 5	3.650***	3.532***	0.663***	5.211***	5.602***	0.066**	2.173***	2.028***	0.425***
	[0.251]	[0.269]	[0.063]	[0.420]	[0.483]	[0.027]	[0.468]	[0.456]	[0.130]
	{0.351}	{0.262}		{0.091}	{0.060}		{0.307}	{0.275}	
Model	IV probit	Probit	Linear IV	IV probit	Probit	Linear IV	IV probit	Probit	Linear IV
Other controls	P08 HF LRT	P08 HF LRT	P08 HF LRT	HF LRT	P08 HF LRT	HF LRT	P08 HF LRT	P08 HF LRT	P08 HF LRT
Observations	4764	4764	4764	4764	4764	4764	4594	4594	4594
Distinct BHCs	704	704	704	704	704	704	675	675	675

E Detailed variable definitions

Hours and ratings: See the discussion in Section 3.

Return on assets: calculated as 400 $\times$ net income / assets. Asset item is BHCK2170; net income is BHCK4340.

Non-performing loans ratio: The ratio of total non-performing loans (total loans and leases, 90+ days past due [BHCK5525 net of BHCK3506], and nonaccrual [BHCK5526 net of BHCK3507]) to total loans net of unearned income (BHCK2122).

Tier 1 Capital Ratio: Tier 1 Capital Ratio from FR-Y9C. Tier 1 Risk-based capital divided by risk-weighted assets from FR-Y9C. Basel I (pre-2014) BHCK8274/BHCKa223; Basel III (post-2014; including 2014 for advanced-approaches firms) BHCA8274/BHCAA223.

Post-2008: An indicator for all years 2009 and later.

Assets $\geq$ 10bn: An indicator for whether a bank has total assets greater than $10 billion (nominal). Asset data from FR-Y9C, item BHCK2170.

Complex: An indicator of whether a BHC is a "complex organization" based on supervisory judgment and updated at least annually (RSSD 9057); a complex BHC is defined as one with material credit-extending nonbank subsidiaries or debt outstanding to the general public (see SR letter 13-21).

Stressed: An indicator for BHCs with supervisory ratings 3, 4, or 5.

High exam frequency: An indicator for BHCs that are large (assets $\geq$ $10b) and/or complex and/or stressed.

Exam count: Total number of supervisory exams of the BHC in a year.

BHC Distress: Dummy that indicates whether a BHC has a rating of 4 or 5 in the next year and/or fails in the next year . Ratings data from NED. See BHC failure for description of failing.

BHC Failure: Dummy that indicates whether the BHC fails in the next year. A BHC fails when it terminates and the reason for its termination or the termination of a subsidiary within one quarter is failure. Data item: RSSD9061.