

Stress Tests & The Hawthorne Effect in Banking

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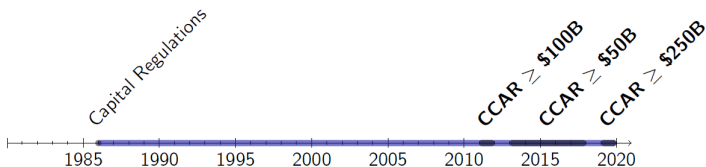
● What's the Hawthorn Effect?

- A type of reactivity in which subjects, in an experimental setting, alter an aspect of their behavior in response to their awareness of being observed – e.g, through increased attention.
- The term was coined in 1958 by Henry A. Landsberger (sociologist) when he was analyzing earlier experiments from 1924–32 at the Hawthorne Works.

● The Dodd-Frank Act of 2010: A Quasi-Experiment

- In response to the recent financial crisis, regulatory attention has focused on improving the quantity and quality of bank capital.
- Started the implementation of the Comprehensive Capital Analysis and Review (CCAR) stress tests with different policy thresholds for compliance.
 - Force large banks to meet stricter (more than the minimum) standard regulatory ratios of equity to assets under simulated adverse economic scenarios.
- We claim that we have an experimental setting to test the existence of Hawthorne effect (or spillover effect) in the banking sector. This is important when evaluating the effectiveness of stress testing.

Stress Test Requirements



Requirement	Banks Required	Definition	Enforcement
CCAR	$\geq \$50B$	Quantitative Fed-run test Qualitative Fed-run test	Revised capital plan Investors
DFAST	$\geq \$50B$	Quantitative Fed-run test	No supervisory action
DFAST	$\geq \$10B$	Quantitative bank-run test	No supervisory action

Minimum Capital Requirements

This table reports the required capital ratios for banks of the year 2002-2016. Note that large banks will also face separate required ratios during the stress tests, which can be found in the CCAR results published by the Federal Reserve Board in the years 2011-2016. This data in the table was compiled using a variety of sources: Financial Stability Board global systemically important bank (G-SIBs) publications, FDIC capital manuals, and Federal Reserve press releases.

Year	Banks >= \$50B					Banks < \$50B				
	Capital Ratio	Tier 1 Ratio	CET1 Ratio	Leverage Ratio*	SLR	Capital Ratio	Tier 1 Ratio	CET1 Ratio	Leverage Ratio*	SLR
	6.625 -									
2016	8.625	10.125	5.125	4	3-6	8.625	6.625	4.5	4	-
2015	8	6	4	4	-	8	6	4	4	-
2014	8	4 - 5.5	4	3-4	-	8	4	-	4	-
2013	8	4	-	3-4	-	8	4	-	4	-
2012	8	4	-	3-4	-	8	4	-	4	-
2011	8	4	-	3-4	-	8	4	-	4	-
2010	8	4	-	4	-	8	4	-	4	-
2009	8	4	-	4	-	8	4	-	4	-
2008	8	4	-	4	-	8	4	-	4	-
2007	8	4	-	4	-	8	4	-	4	-
2006	8	4	-	4	-	8	4	-	4	-
2005	8	4	-	4	-	8	4	-	4	-
2004	8	4	-	4	-	8	4	-	4	-
2003	8	4	-	4	-	8	4	-	4	-
2002	8	4	-	4	-	8	4	-	4	-

*The leverage ratio requirement is actually 3-4% in some years prior to 2015, 3% for a BHC with a composite supervisory rating of "1" or a BHC subject to the Federal Reserve Board's market-risk rule. I use 4% to be conservative when it is not directly reported by the bank

Related Literature

Bank Capital & Lending

- Bernanke and Lown (1991); Berger and Udell (1994); Berrospide and Edge(2010); Carlson et al. (2013); Berger and Bouwman (2013)
- Acharya et al. (2018); Chen et al. (2017); Cortes et al. (2018); Calem et al. (2017); Bassett and Berrospide (2017); Garcia and Steele (2019)

Testing Modigliani-Miller Irrelevance (Costly Capital)

- Fama & French (1992), Baker et al. (2011), Baker & Wurgler (2013)

What's Missing from the Literature?

- 1) Very little research on how banks actually respond to the stress tests plus relative no attention has been given to the effect of the non-tested banks (optimality and Hawthorne effects)
- 2) Some argue stress test requirements are costly, hence banks respond by decreasing lending. But in reality it is an empirical question:

Stress testing → increases capital → ambiguous effect

- If equity is costly (the jury is still out on this) lending may decline ¹
- In a Modigliani-Miller world there is no effect

Stress testing → decreases asset risk → ambiguous effect

- Since risk weights for traditional loans range from 0 (for safe assets such as treasuries) to 150%, whereas available for sales securities and off-balance sheet activities can carry risk weights up to 600% and 1,250% respectively.

¹Costly Capital Literature: Fama & French (1992), Baker et al. (2011), Baker et al. (2013)

Research Questions, Data, and Identification

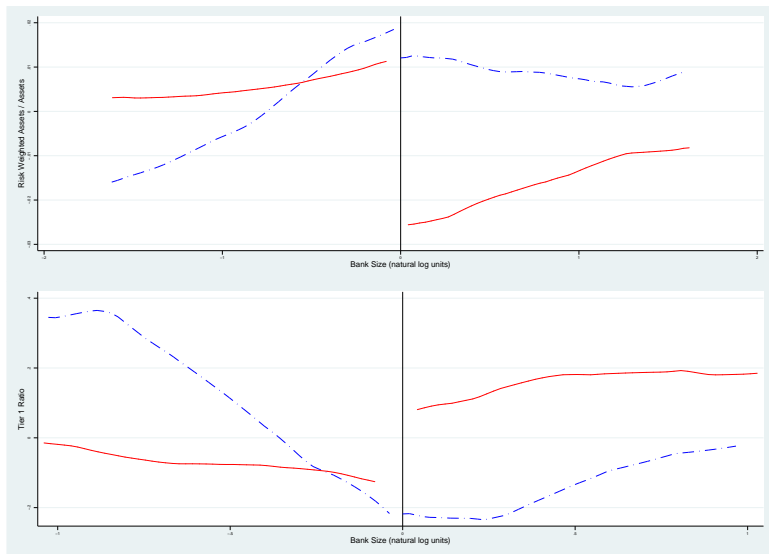
- **Economic Research Questions:** Do forward-looking transparency disclosure requirements consequentially treat the untreated? If so, how much of the average treatment effect is due to reaction of the non-tested subjects (control group)?
 - Use the banking sector as our experimental setting to test for the existence of Hawthorne effect.
 - Evaluate the effect of the additional transparency disclosure and added regulatory attention on bank risk, capital ratios, loan outcomes, and overall performance.
- **Data:** Bank-level data are from FR-Y9C reports for the 2010-2016 period. We use a recently published dataset on firm-level political risk created by **Hassan, Hollander, van Lent, and Tahoun (2019)**. We use these measures of firm-level political risk as our instruments to quantify the level of Hawthorne effects across both the treated and non-treated banks.
- **Identification Strategy:** We implement both diff-in-diff and difference-in-discontinuities designs around the \$50B bank size threshold to analyze the effect of the CCAR stress tests on US bank holding companies.

Preview of Results

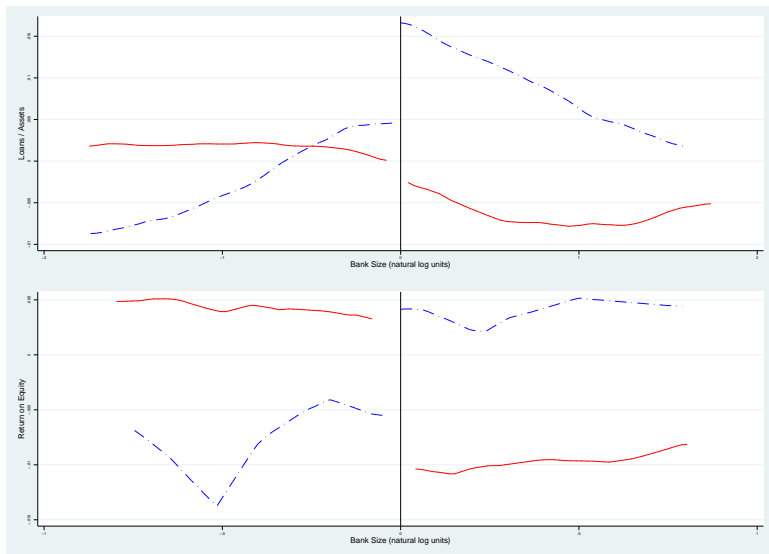
Stress testing affects both treated banks and banks in the control group.

- Non-tested banks reacts by increasing capital and risk ratios by up to 60% while the treated banks decrease them by almost a similar percentage.
- Reaction by the non-treated banks contributed up to 20% of the average treatment effects in lending, particularly in residential real estate and commercial and industrial loans.
- Due to stress testing the treated banks switched to less risky assets which helped decrease their risk densities by 16% relative to the control group while maintaining similar profitability to those in the control group.
- However, when we control for different Hawthorne effect channels, the impact on bank risk turns statistically insignificant. The regulation itself does seem to increase residential real estate lending, bank federal funds, and net interest margin. Our findings are consistent with the Hawthorne effect literature in the social sciences and optimality conditions in banking.

Risk-Weighted Capital and Tier 1 Ratio (\$50B Threshold)



Total Loans and Return on Equity (\$50B Threshold)



Levitt & List (2011): At Least Three Channels for the Hawthorne Effect & How to Measure It

- **Participation Channel**
- **Experimental Treatment Channel**
- **The Experimenter's Demand-Effect Channel**

Suggestion on How to Quantify the Hawthorne Effect: To quantify the Hawthorne effect, they recommend dividing the sample into three:

- Sample 1: Clean Control and Hawthorne-Control groups
- Sample 2: Clean Control and Treated groups
- Sample 3: Hawthorne-Control and Treated Groups .

Existence Hawthorn Effect = The difference between Sample 3 and Sample 2 effects.

Diff-in-Diff Methodology

In order to quantify these optimality and Hawthorne-like effects, we first implement a simple dummy regression and a difference-in-difference methodology as follow:

$$Y_{it} = \beta_0 + \beta_2 T_{it} + \delta + \nu_{it}, \quad (1)$$

$$Y_{it} = \alpha_0 + \alpha_1 T_{it} * C_{it} + \alpha_2 T_{it} + \alpha_3 C_{it} + \delta + \zeta_{it}, \quad (2)$$

where,

- Y_{it} is one of our dependent variables of interest (such as a return on equity, tier 1 ratio, loan percentage, etc.) for bank i at time t .
- T_{it} is a dummy equals to 1 for the CCAR period (2013-2016) and zero otherwise.
- C_{it} is a dummy variable equal to 1 if total bank assets (size) is equal to or larger than the policy cutoff of \$50B in total assets.
- δ is a vector of fixed effects that includes bank and year fixed effects.

Key RD Design Assumptions

- 1 **No Manipulation** - Agents can not manipulate the assignment variable and *precisely* sort around the policy cut-off. A series of tests to test for this:
 - **Density tests**
 - **Balanced baseline covariate tests**
 - **Inclusion or exclusion of baseline covariates tests**
 - **Falsification tests**
- 2 **No Compound Treatment** - No multiple policies that change sharply at the same policy threshold (or very close to it).
 - **Falsification tests**

Diff-in-Disc Methodology

The econometric specification is the following diff-in-disc regression.

$$\begin{aligned}
 Y_{it} = & \gamma_0 + \gamma_1 T_{it} * C_{it} + \gamma_2 T_{it} * C_{it}(L_{it} - c) + \gamma_3 T_{it} * C_{it}(L_{it} - c)^2 + \gamma_4 T_{it} + \gamma_5 C_{it} \\
 & + \gamma_6(L_{it} - c) + \gamma_7(L_{it} - c)^2 + \gamma_8 T_{it}(L_{it} - c) + \gamma_9 C_{it}(L_{it} - c) \\
 & + \gamma_{10} T_{it}(L_{it} - c)^2 + \gamma_{11} C_{it}(L_{it} - c)^2 + \delta + \epsilon_{it},
 \end{aligned}
 \tag{3}$$

where,

- Y_{it} , T_{it} , C_{it} , and δ are defined as in the previous slide.
- L_{it} is the bank total assets measured in natural logs.
- c is the policy cutoff, of \$50B or more in total assets, measured in natural logs.
- $L_{it} - c$ is the normalized assets and the $(L_{it} - c)^2$ is the square of the normalized assets.
- The coefficient for the interaction term $\gamma_1 T_{it} * C_{it}$, γ_1 , is our coefficient of interest, the diff-in-disc coefficient.

McCrary (2008) Manipulation Test Around the Policy Threshold for 2011-2016

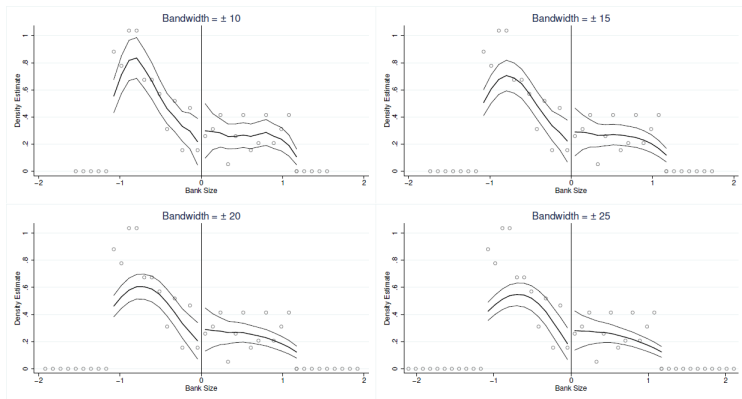


Table: Capital & Risk Ratios: Treated vs Non-Treated Banks

Variables	Sample 1			Sample 2			Sample 3		
	Control	Hawthorne-Control	Difference	Control	Treated	Difference	Hawthorne-Control	Treated	Difference
Risk Weighted Assets / Assets	0.001 (0.006) [711]	0.002 (0.006) [259]	0.000 (0.000) [970]	0.008 (0.006) [711]	-0.043*** (0.006) [99]	-0.042*** (0.009) [1,069]	0.007 (0.008) [259]	-0.020*** (0.005) [99]	-0.027*** (0.010) [358]
Tier 1 Equity / Assets	0.001 (0.002) [351]	-0.002 (0.003) [155]	0.000 (0.000) [506]	0.001 (0.002) [351]	-0.002 (0.002) [78]	-0.002 (0.003) [584]	0.001 (0.003) [155]	-0.002 (0.001) [78]	-0.003 (0.003) [233]
Tier 1 Ratio	0.147 (0.363) [300]	-0.220 (0.303) [129]	0.000 (0.000) [429]	0.090 (0.363) [300]	-0.319 (0.211) [69]	-0.331 (0.293) [498]	0.119 (0.321) [129]	-0.193 (0.211) [69]	-0.312 (0.332) [198]
Leverage Ratio	0.089 (0.198) [286]	-0.243 (0.194) [125]	0.000 (0.000) [411]	0.196 (0.198) [286]	-0.869*** (0.225) [68]	-0.902*** (0.277) [479]	0.382* (0.220) [125]	-0.334 (0.217) [68]	-0.716** (0.312) [193]
Capital Ratio	0.283 (0.283) [226]	-0.106 (0.315) [110]	0.000 (0.000) [336]	0.252 (0.285) [226]	-0.415** (0.167) [63]	-0.840** (0.334) [399]	0.638* (0.364) [110]	-0.449** (0.167) [63]	-1.087*** (0.363) [173]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Bank Lending: Treated vs Non-Treated Banks

Variables	Sample 1			Sample 2			Sample 3		
	Control	Hawthorne-Control	Difference	Control	Treated	Difference	Hawthorne-Control	Treated	Difference
Loans / Assets	0.001 (0.006) [821]	-0.002 (0.004) [289]	0.000 (0.000) [1,110]	0.004 (0.006) [821]	-0.034*** (0.004) [98]	-0.032*** (0.007) [1,208]	0.002 (0.006) [289]	-0.018*** (0.005) [98]	-0.020** (0.009) [387]
CRE Loans / Assets	0.002 (0.004) [773]	0.003 (0.009) [274]	0.000 (0.000) [1,047]	0.004 (0.004) [773]	0.001 (0.004) [99]	-0.001 (0.007) [1,146]	0.008 (0.009) [274]	0.010** (0.005) [99]	0.002 (0.010) [373]
RRE / Assets	0.003 (0.004) [299]	-0.007 (0.007) [132]	0.000 (0.000) [431]	0.002 (0.004) [299]	0.031*** (0.006) [68]	0.036*** (0.008) [499]	-0.008 (0.007) [132]	0.032*** (0.006) [68]	0.040*** (0.010) [200]
C&I Loans / Assets	0.002 (0.005) [160]	-0.005 (0.004) [71]	0.000 (0.000) [231]	0.001 (0.005) [160]	0.029*** (0.004) [47]	0.032*** (0.005) [278]	-0.005 (0.003) [71]	0.027*** (0.003) [47]	0.032*** (0.005) [118]
Consumer Loans / Assets	0.000 (0.002) [383]	-0.003 (0.004) [166]	0.000 (0.000) [549]	0.002 (0.002) [383]	-0.018*** (0.005) [81]	-0.016*** (0.004) [630]	0.000 (0.004) [166]	-0.013** (0.006) [81]	-0.013*** (0.004) [247]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Bank Portfolio: Treated vs Non-Treated Banks

Variables	Sample 1			Sample 2			Sample 3		
	Control	Hawthorne-Control	Difference	Control	Treated	Difference	Hawthorne-Control	Treated	Difference
Off Balance Sheet Assets/Assets	-0.002 (0.002) [786]	0.002 (0.003) [272]	0.000 (0.000) [1,058]	0.001 (0.002) [786]	-0.006 (0.009) [96]	-0.002 (0.011) [1,154]	-0.006 (0.009) [272]	-0.002 (0.009) [96]	0.004 (0.013) [368]
Held For Sale Loans/Assets	0.000 (0.002) [631]	-0.002 (0.002) [232]	0.000 (0.000) [863]	0.000 (0.002) [631]	0.003*** (0.001) [94]	0.003* (0.002) [957]	-0.001 (0.002) [232]	0.001* (0.001) [94]	0.002 (0.002) [326]
Available for Sale Securities/Assets	-0.002 (0.006) [406]	0.004 (0.009) [164]	0.000 (0.000) [570]	-0.006 (0.006) [406]	0.026*** (0.002) [84]	0.022*** (0.007) [654]	0.000 (0.008) [164]	0.007*** (0.002) [84]	0.007 (0.008) [248]
Held to Maturity Securities/Assets	-0.002 (0.005) [355]	0.007 (0.006) [156]	0.000 (0.000) [511]	-0.002 (0.005) [355]	-0.003 (0.004) [78]	-0.008 (0.006) [589]	0.005 (0.005) [156]	-0.006 (0.004) [78]	-0.012** (0.005) [234]
Cash & Deposits Due/Assets	-0.002 (0.002) [635]	0.002 (0.004) [235]	0.000 (0.000) [870]	-0.005** (0.002) [635]	0.009*** (0.002) [94]	0.008*** (0.003) [964]	-0.006 (0.005) [235]	-0.003 (0.002) [94]	0.003 (0.004) [329]
Federal Funds/Assets	0.001 (0.000) [122]	-0.002 (0.001) [43]	0.000 (0.000) [165]	-0.000 (0.001) [122]	0.001 (0.001) [44]	0.001 (0.001) [209]	-0.001 (0.001) [43]	0.001 (0.001) [44]	0.002 (0.001) [87]
Other/Assets	0.001 (0.001) [1,160]	-0.000 (0.002) [441]	0.000 (0.000) [1,601]	0.000 (0.001) [1,160]	0.004 (0.003) [115]	0.003 (0.003) [1,716]	0.002 (0.002) [441]	0.002 (0.003) [115]	0.000 (0.003) [556]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Bank Performance: Treated vs Non-Treated Banks

Variables	Sample 1			Sample 2			Sample 3		
	Control	Hawthorne-Control	Difference	Control	Treated	Difference	Hawthorne-Control	Treated	Difference
Return on Equity	-0.006 (0.024) [184]	0.007 (0.033) [84]	0.000 (0.000) [268]	-0.001 (0.025) [184]	-0.022*** (0.007) [55]	-0.026 (0.027) [323]	0.013 (0.035) [84]	-0.011 (0.015) [55]	-0.024 (0.039) [139]
Return on Assets	0.001 (0.002) [383]	-0.000 (0.004) [166]	0.000 (0.000) [549]	0.001 (0.002) [383]	-0.006*** (0.001) [81]	-0.005* (0.003) [630]	0.000 (0.004) [166]	-0.006*** (0.001) [81]	-0.006 (0.004) [247]
Net Interest Margin	0.000 (0.001) [550]	0.001 (0.003) [213]	0.000 (0.000) [763]	0.001 (0.001) [550]	-0.000 (0.002) [94]	-0.001 (0.002) [857]	0.001 (0.002) [213]	-0.001 (0.002) [94]	-0.002 (0.002) [307]
Net Non-Interest Margin	0.001 (0.002) [382]	-0.004 (0.003) [166]	0.000 (0.000) [548]	0.002 (0.002) [382]	-0.005* (0.003) [81]	-0.004 (0.003) [629]	-0.001 (0.003) [166]	-0.002 (0.002) [81]	-0.001 (0.003) [247]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Capital & Risk Ratios

Variable	Linear		Quadratic	
	MSE Optimal	CER Optimal	MSE Optimal	CER Optimal
Risk Weighted Assets / Assets	-0.146*** (0.052) [358]	-0.155** (0.059) [224]	-0.169*** (0.063) [358]	-0.163** (0.072) [224]
Tier 1 Equity / Assets	-0.011 (0.012) [233]	-0.008 (0.014) [122]	-0.013 (0.013) [233]	-0.001 (0.019) [122]
Tier 1 Ratio	-0.066 (1.165) [198]	-0.494 (1.691) [109]	-1.083 (1.418) [198]	2.784 (1.948) [109]
Leverage Ratio	-2.307* (1.282) [193]	-2.143 (1.605) [105]	-3.207* (1.666) [193]	-2.387 (2.126) [105]
Capital Ratio	-1.992 (1.499) [173]	-1.855 (2.117) [90]	-2.455* (1.283) [173]	1.505 (2.088) [90]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Controlling for Political Risk Sentiment: Capital & Risk Ratios

Variable	Linear		Quadratic	
	MSE Optimal	CER Optimal	MSE Optimal	CER Optimal
Risk Weighted Assets / Assets	-0.090 (0.066) [303]	-0.095 (0.072) [199]	-0.092 (0.069) [303]	-0.085 (0.074) [199]
Tier 1 Equity / Assets	-0.007 (0.014) [205]	-0.007 (0.016) [107]	-0.013 (0.018) [205]	-0.008 (0.025) [107]
Tier 1 Ratio	-0.457 (2.055) [173]	-0.959 (2.382) [97]	-2.133 (2.543) [173]	-0.565 (3.172) [97]
Leverage Ratio	-1.651 (1.694) [168]	-1.460 (1.908) [93]	-2.706 (2.267) [168]	-1.953 (3.020) [93]
Capital Ratio	-2.944 (2.086) [151]	-2.800 (2.831) [81]	-3.180 (1.909) [151]	-1.589 (3.135) [81]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Bank Lending

Variable	Linear		Quadratic	
	MSE Optimal	CER Optimal	MSE Optimal	CER Optimal
Loans / Assets	0.023 (0.040) [387]	0.026 (0.048) [238]	0.026 (0.053) [387]	0.015 (0.063) [238]
CRE Loans / Assets	-0.081 (0.051) [373]	-0.094 (0.060) [234]	-0.108* (0.065) [373]	-0.126* (0.068) [234]
RRE / Assets	0.064* (0.034) [200]	0.102*** (0.032) [110]	0.107*** (0.027) [200]	0.095** (0.037) [110]
C&I Loans / Assets	0.040** (0.015) [118]	0.026 (0.032) [68]	0.053*** (0.019) [118]	0.091*** (0.017) [68]
Consumer Loans / Assets	0.021 (0.032) [247]	0.013 (0.040) [135]	0.026 (0.039) [247]	0.066 (0.051) [135]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Controlling for Political Risk Sentiment: Bank Lending

Variable	Linear		Quadratic	
	MSE Optimal	CER Optimal	MSE Optimal	CER Optimal
Loans / Assets	0.029 (0.041) [328]	0.040 (0.047) [211]	0.050 (0.052) [328]	0.048 (0.061) [211]
CRE Loans / Assets	-0.032 (0.055) [315]	-0.041 (0.062) [206]	-0.041 (0.068) [315]	-0.053 (0.076) [206]
RRE / Assets	0.078 (0.058) [172]	0.123** (0.060) [96]	0.143** (0.066) [172]	0.170* (0.089) [96]
C&I Loans / Assets	0.027 (0.020) [104]	0.006 (0.036) [60]	0.029 (0.047) [104]	0.044 (0.049) [60]
Consumer Loans / Assets	-0.021 (0.057) [218]	-0.029 (0.065) [119]	-0.037 (0.074) [218]	-0.053 (0.095) [119]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Entire Bank Portfolio

Variable	Linear		Quadratic	
	MSE Optimal	CER Optimal	MSE Optimal	CER Optimal
Off Balance Sheet Assets/Assets	-0.028 (0.034) [368]	-0.032 (0.037) [234]	-0.027 (0.040) [368]	0.001 (0.038) [234]
Held For Sale Loans/Assets	0.003 (0.011) [326]	0.004 (0.013) [195]	0.004 (0.015) [326]	-0.000 (0.019) [195]
Available for Sale Securities/Assets	0.006 (0.025) [248]	0.003 (0.030) [145]	0.011 (0.034) [248]	-0.003 (0.036) [145]
Held to Maturity Securities/Assets	-0.033** (0.015) [234]	-0.037** (0.017) [129]	-0.049** (0.020) [234]	-0.034 (0.029) [129]
Cash & Deposits Due/Assets	0.026* (0.015) [329]	0.022 (0.019) [196]	0.037** (0.018) [329]	0.040 (0.024) [196]
Federal Funds/Assets	0.014* (0.008) [87]	0.025*** (0.005) [55]	0.021* (0.010) [87]	0.036*** (0.008) [55]
Other/Assets	-0.004 (0.013) [556]	-0.005 (0.015) [304]	-0.010 (0.015) [556]	-0.022 (0.018) [304]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Controlling for Political Risk Sentiment: Entire Bank Portfolio

Variable	Linear		Quadratic	
	MSE Optimal	CER Optimal	MSE Optimal	CER Optimal
Off Balance Sheet Assets/Assets	-0.048 (0.041) [310]	-0.059 (0.043) [208]	-0.073 (0.051) [310]	-0.051 (0.052) [208]
Held For Sale Loans/Assets	0.005 (0.012) [280]	0.005 (0.014) [170]	0.004 (0.016) [280]	-0.003 (0.019) [170]
Available for Sale Securities/Assets	-0.019 (0.026) [219]	-0.025 (0.028) [129]	-0.016 (0.036) [219]	-0.006 (0.047) [129]
Held to Maturity Securities/Assets	-0.011 (0.019) [208]	-0.014 (0.021) [115]	-0.018 (0.027) [208]	0.015 (0.040) [115]
Cash & Deposits Due/Assets	0.021 (0.020) [282]	0.021 (0.021) [171]	0.034 (0.026) [282]	0.012 (0.027) [171]
Federal Funds/Assets	0.009 (0.008) [78]	0.017*** (0.004) [49]	0.009 (0.009) [78]	0.041* (0.022) [49]
Other/Assets	0.015 (0.020) [462]	0.017 (0.023) [265]	0.014 (0.027) [462]	0.010 (0.031) [265]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Bank Performance

Variable	Linear		Quadratic	
	MSE Optimal	CER Optimal	MSE Optimal	CER Optimal
Return on Equity	0.102 (0.143) [139]	-0.028 (0.243) [79]	0.236 (0.252) [139]	0.322 (0.301) [79]
Return on Assets	0.010 (0.017) [247]	0.011 (0.021) [135]	0.013 (0.024) [247]	0.027 (0.035) [135]
Net Interest Margin	0.010 (0.008) [307]	0.015 (0.011) [183]	0.011 (0.007) [307]	0.002 (0.013) [183]
Net Non-Interest Margin	0.004 (0.016) [247]	0.007 (0.015) [135]	0.010 (0.011) [247]	-0.001 (0.017) [135]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table: Controlling for Sentiment: Bank Performance

Variable	Linear		Quadratic	
	MSE Optimal	CER Optimal	MSE Optimal	CER Optimal
Return on Equity	-0.006 (0.148) [122]	-0.231 (0.305) [70]	-0.151 (0.293) [122]	-0.189 (0.397) [70]
Return on Assets	-0.008 (0.017) [218]	-0.006 (0.022) [119]	-0.014 (0.026) [218]	-0.037 (0.042) [119]
Net Interest Margin	0.011 (0.009) [267]	0.016* (0.009) [159]	0.012 (0.008) [267]	0.003 (0.012) [159]
Net Non-Interest Margin	-0.013 (0.017) [218]	-0.010 (0.017) [119]	-0.009 (0.021) [218]	-0.039 (0.035) [119]

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Concluding Remarks

Stress testing results affect both treated banks and banks in the control group.

- Banks in the control group reacted by increasing capital and risk ratios by up to 60% while the treated banks decrease them by almost a similar percentage.
- Reaction by the non-treated banks contributed up to 20% of the average treatment effects in lending, particularly in residential real estate and commercial and industrial loans.
- Due to stress testing the treated banks switched to less risky assets which helped decrease their risk densities by 16% relative to the control group while maintaining similar profitability to those in the control group.
- Stress tests not surprisingly decrease moral hazard. The risk reduction occurs through an asset risk shifting mechanism (as opposed to a capital mechanism), shifting away from high risk non-traditional (non-lending) assets. However, most of those effects go away when we control for potential Hawthorne effect channels.

Stress Tests and the Hawthorne Effect in Banking

By Brian Clark, Bill Francis, Raffi Garcia, and Suzanne Steele

Discussion by Jose Berrospide

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January 20, 2020

The views expressed do not necessarily reflect those of the Federal Reserve or its staff.

Paper Summary

- Paper considers the impact of stress tests on bank behavior: risk-taking and lending; using U.S. stress tests (CCAR).
- Novelty:
 - Use difference-in-discontinuities approach around the \$50 bn. size threshold (treated versus non-treated banks).
 - Look at the impact of stress tests on non-treated banks: optimality (compete for capital) and Hawthorne effect (be in good standing with regulators).
 - Add firm-level measures of political risks and sentiments.
- Findings:
 - Control (treated) banks increase (decrease) capital and risk ratios.
 - Differences in lending (CRE and C&I) driven by non-treated banks
 - Treated banks reduce risk but keep profits similar to control banks.

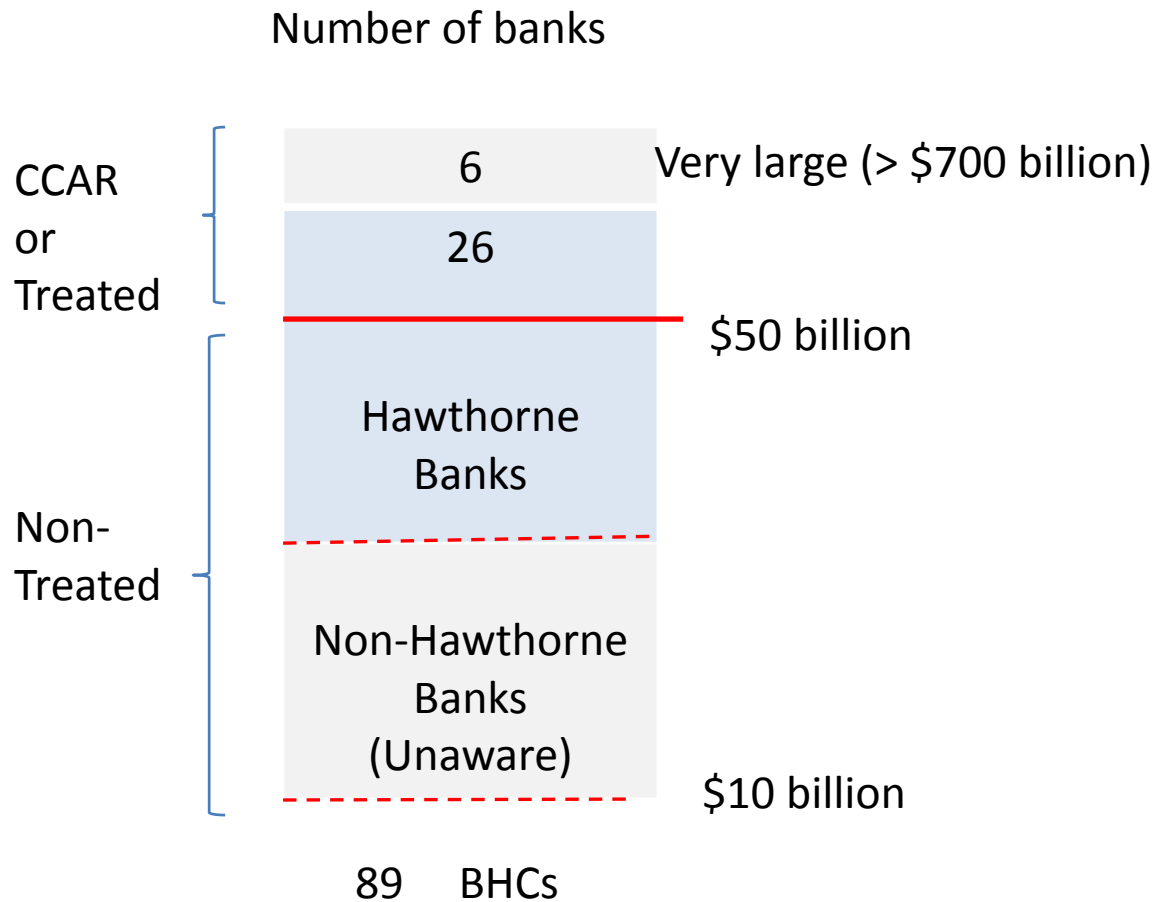
Paper Contribution

- Paper addresses a very interesting and timely topic related to the impact of post-crisis regulation on bank behavior.
- Difference-in-discontinuities seems an interesting approach to address endogeneity of bank capital and risk measures.
- Results on risk-taking beyond being consistent with the Hawthorne effect in banking are also consistent with previous findings associated with stress tests: reduction in bank risk (asset risk shifting) via lower RWAs.
- Important and novel result: positive impact of stress tests on capital ratios of non-treated banks (receive much less attention).

Comments I

- Paper argues that banks in the control group (non-CCAR) banks increase capital and risk ratios, treated (CCAR) banks reduce them.
- However, Tables 3 through 5, and after controlling for political risk and sentiment show:
 - No impact on capital ratios for control or treatment banks
 - Impact only on RWA, and driven by treated (CCAR) banks
- Related concerns:
 - Need to elaborate on political risks and sentiment: what are these factors?
 - What type of political risks explain results during sample period: 2010-2016 (no change in regulatory regime, say due to new administration)
 - If impact is driven only by treated banks, why is this consistent with the Hawthorne effect?

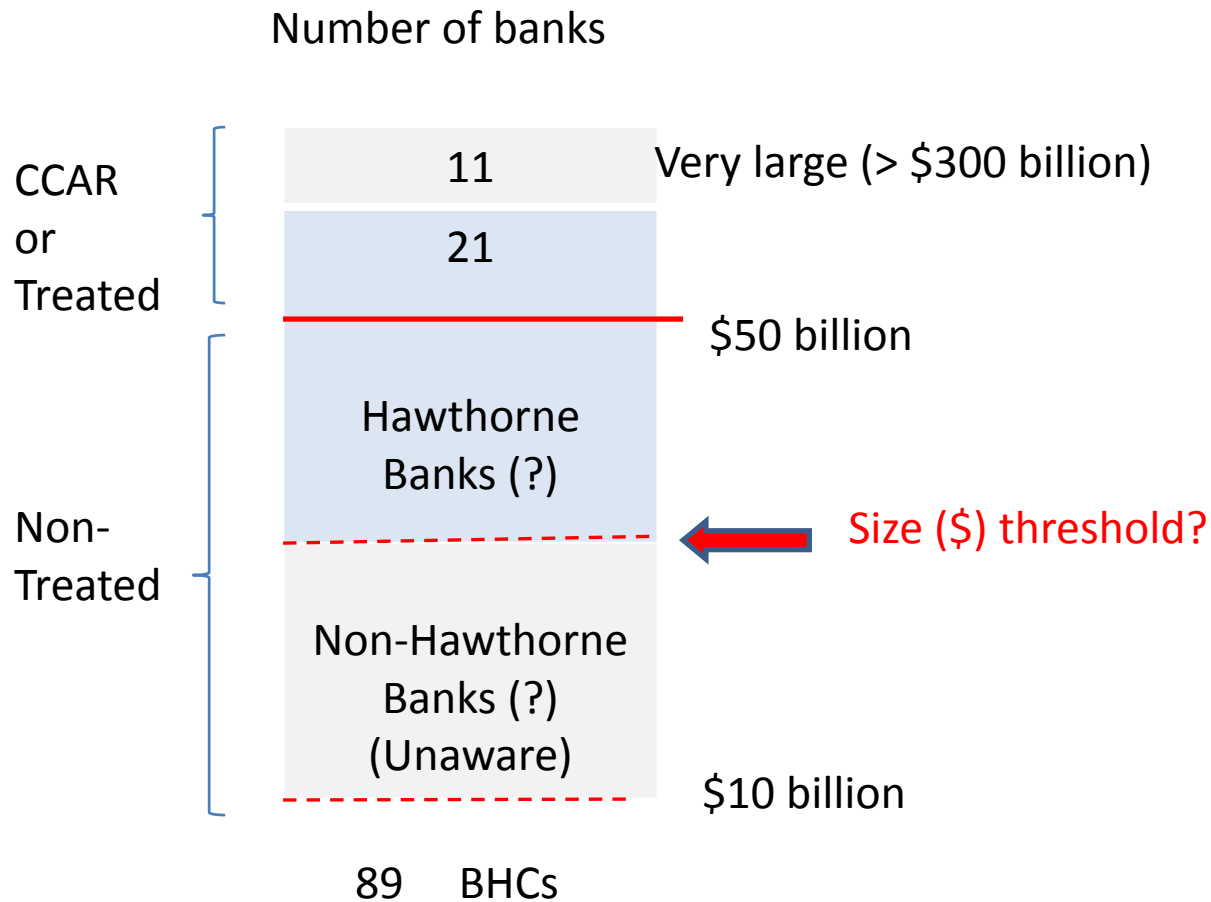
Comments II: Number of BHCs in sample



Some concerns:

- Comparable banks? (may want to exclude the very large banks).
- Not all BHCs with assets > \$50 billion are subject to stress tests

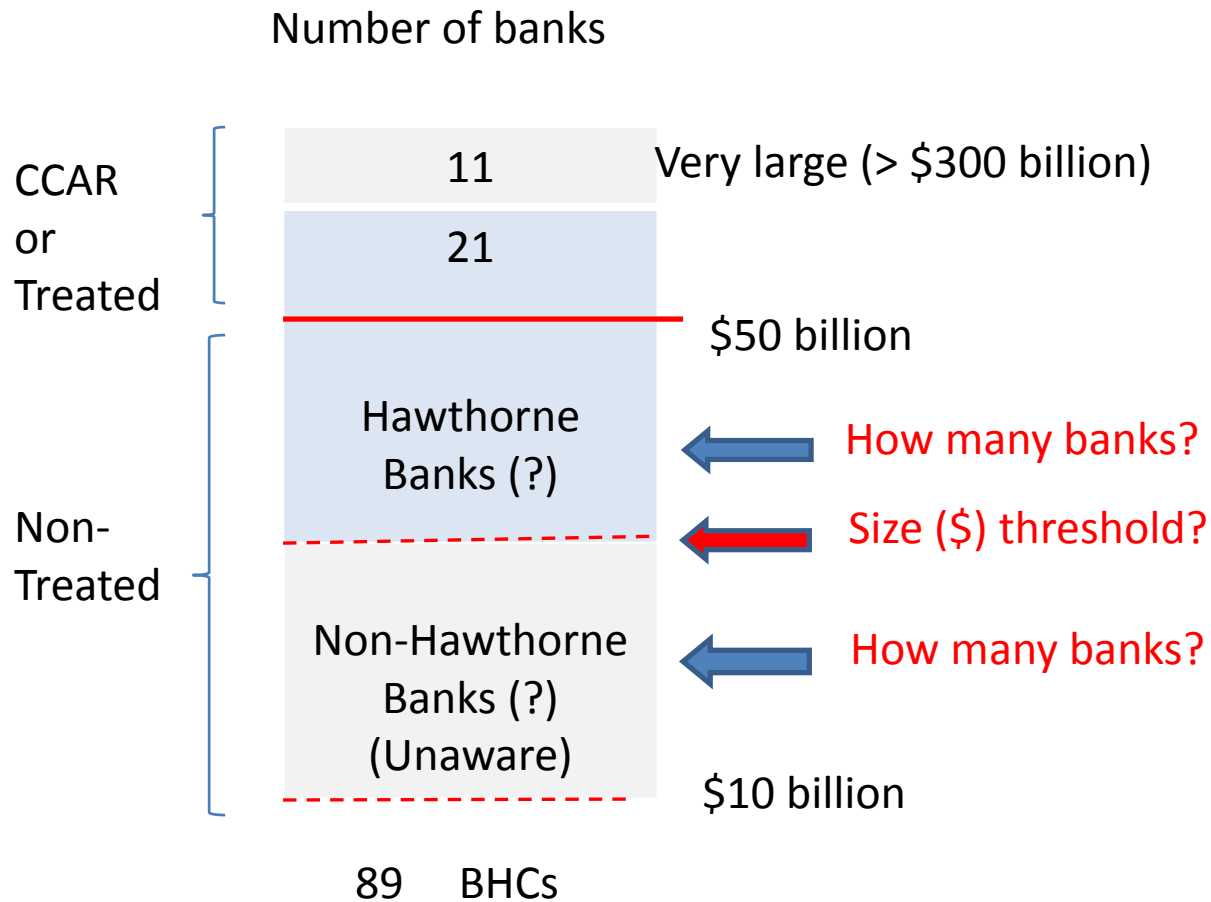
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Some concerns:

- Comparable banks? (may want to exclude the very large banks).
- Not all BHCs with assets > \$50 billion are subject to stress tests
- Elaborate (appendix) on the determination of size cutoffs:
 - MSE vs. CER optimal bandwidth

Comments III: Methodology

- Difference in Discontinuities approach depends on a number of assumptions:
 - Parallel trends: for treated and non-treated (control) groups in the pre-CCAR period
 - No sorting of bank size
- Need to provide some evidence that these assumptions hold reasonably well.
- **Issue**: pre-CCAR period is 2010-2012
 - However, banks were still subject to CCAR in 2011 and 2012
 - May need to use pre-DFAST (before 2013): not sure this is the purpose of the paper (check difference between DFAST and CCAR?)
- All tables, except table 1, exclude Common Equity Tier 1 (CET1) capital ratios.
 - CET1 ratio is new and key ratio (binding capital ratio) under Basel III
 - Focus of recent regulatory changes

Comments IV: Hawthorne Effect and Lending

- Paper novel result is about the Hawthorne effect: change in bank behavior due to awareness of being monitored:
 - Need to explain this earlier in the paper for readers less familiar with this concept.
 - Need to tie paper results (intuitively) with this effect.
- Paper introduction talks about channels through which Hawthorne effect may arise (participation, experimental treatment, and experimenters' demand effect).
 - May want to explore/explain which channel(s) the paper results are identifying.
- Impact on lending?
 - Paper focuses on different loan shares (total assets may change due to non-loan asset changes)
 - Why not loan growth?

Wrapping Up

- Well-written and interesting paper on a timely topic.
- Relevant topic to illustrate that impact of bank regulation may occur as a response to the awareness of being monitored (Hawthorne effect).
- General suggestions:
 - Take care of some institutional details on U.S. stress tests.
 - Push for interpretation of results: if final impact occurs only through a reduction in RWA (asset risk shift), is this due to the Hawthorne effect? How much of it?