Bank Stress Test Results and Their Impact on Consumer Credit Markets

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October 9, 2020

The views expressed herein are solely those of the authors and do not necessarily reflect the views of the Federal Reserve Bank of Philadelphia or the Federal Reserve System.

Motivation

- Stress testing arguably the most important development in post-crisis supervision
  - To ensure BHCs/banks have sufficient capital to continue operating and lending even during times of stress
- Markets pay serious attention to stress tests
  - Analogy to the ratings of banks, securities, and even countries - stock market reacts to the signal
  - Fed authority to limit bank capital distributions under the stress tests
  - Given these consequences, banks should be responsive to stress tests.

Research Questions

- Stress test results confidential prior to public release.
  - Test results could be shocks to banks.
- How do banks respond to such shocks, and how do these shocks affect credit markets?

Literature

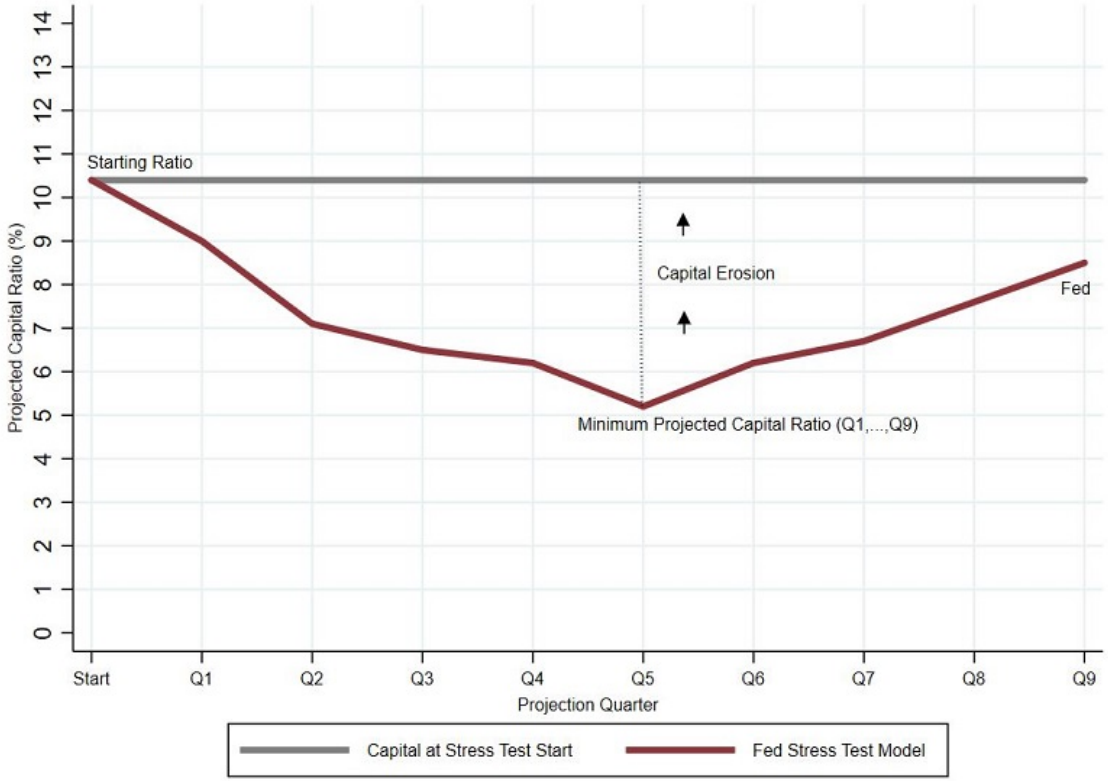
- **Stress tests on banks**
  - Acharya, Engle, and Pierret (2014); Cornett, Minnick, Schorno, and Tehranian (2018); Clark, Francis, Garcia, and Steele (2020); Neretina, Sahin, and De Haan (2020); Schneider, Strahan, and Yang (2020)
- **Stress tests on business loans**
  - Lambertini and Mukherjee (2016); Flannery, Hirtle, and Kovner (2017); Acharya, Berger, and Roman (2018); Covas (2018); Bassett and Berrospide (2019); Berrospide and Edge (2019); Cortès, Demyanyk, Li, Loutskina, and Strahan (2020); Doerr (2020)
- **Stress tests on consumer credit**
  - Morris-Levenson, Sarama, and Ungener (2017); Paradkar (2019); Calem, Correa, and Lee (forthcoming)

Our Focus

- **Consumer credit**
  - How did stress tests affect the credit supply?
  - Consumer credit usage and credit performance?
- **Mainly focusing on consumer credit cards**
  - Cards are the largest consumer credit product in terms of total users, affecting about 170 million consumers (e.g., CFPB, 2019).
  - Stress tested banks are dominant players (market share ~75%).
  - Cards are unsecured credit; issuing banks should be sensitive to card risk exposure.
  - In recent years, card losses have been the single largest loss item in the stress tests ($100-113 billion between 2017-2019).
- **In supplementary analyses, we study secured consumer credit such as mortgages and HELOCs**

Challenges

- **Endogeneity**
  - Most other papers use stress tests projected capital ratio erosion as a measure of “shock" to banks. However, the erosion is partially driven by banks' risk-taking behavior unrelated to the stress tests, which affects both credit supply and consumer credit outcomes, raising endogeneity concerns.



- **Other complications**

Our Approach

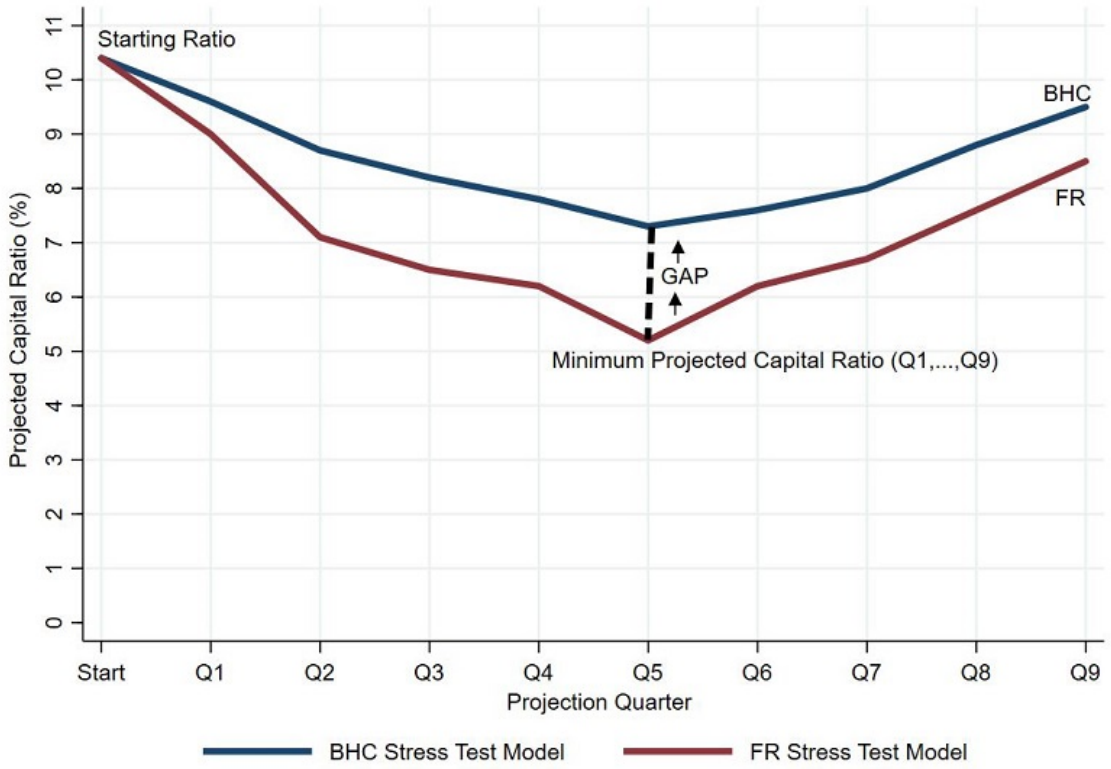
- We exploit an exogenous variation to banks in the stress tests: the difference between capital projections made by the banks and those by the Fed.
  - Banks and the Fed have separate models.
  - Banks' passage of the stress tests is ultimately determined by the Fed's model results. Banks with a more optimistic, capital projection relative to the Fed's may face the risk of not passing the stress test the next year, limiting their ability to make capital distributions or expand lending.
  - Thus, a positive difference between the bank and the Fed capital projections represents a negative shock to the banks.
  - We examine banks' supply of credit and consumer credit outcomes in the months subsequent to the revelation of the shock, i.e., the release of the Fed's stress test results.

Our “Shock" Measure

- **Stress test capital GAP**:

$$Capital\ GAP = \min[(Capital\ Ratio_{BHC})_{Q1,\ldots,Q9}] - \min[(Capital\ Ratio_{FR})_{Q1,\ldots,Q9}]. \quad (1)$$

  - A positive GAP means that the bank's projection is more optimistic than the Fed's, so the Fed's result would come in as a negative shock to the bank.



Preview of Main Findings

- A positive feedback loop among credit supply, credit usage, and credit performance due to the stress tests.
  - Banks in the 90th percentile of the capital gap reduce their new supply of risky credit by 13 percent compared with those in the 10th percentile and cut their overall credit card risk exposure on an annual basis.
  - However, these banks find alternative ways to remain competitive and attract customers by lowering interest rates and offering more rewards and promotions to selected groups of borrowers.
  - Finally, consumers at banks with a gap increase their credit card spending and debt payoff and at the same time experience fewer delinquencies.
- Our results can be generalized to other lending products such as mortgages and HELOCs.

Data and Sample

- Loan-level data on consumer credit cards from Y-14M:
  - A rich set of consumer-level and loan-level characteristics and local market characteristics which allow us to control for credit demand and help us disentangle riskier versus safer borrowers
  - 2013:M6-2017:M12, more than 500 million obs. per month
- Capital projections from the Federal Reserve's DFAST and CCAR stress tests under the severely adverse scenario
- BHC financial data from the quarterly FR Y-9C reports to control for supply factors
- For additional controls and analyses: U.S. Census Bureau, FDIC Summary of Deposits, FFIEC Census Demographic Data

Empirical Methodology

- We estimate the following regression model based on the full population of Y-14M credit card loans aggregated at the bank-county-month level:

$$\begin{aligned} Y_{c,b,t} = & \beta_0 + \beta_1 \textit{BHC Capital GAP}_{b,t-k} + \\ & \beta_2 \textit{Consumer \& Loan Characteristics}_{c,t} + \\ & \beta_3 \textit{BHC Characteristics}_{b,t-1} + \beta_4 \textit{BHC FE}_b + \\ & \beta_5 \textit{County} \times \textit{Month} - \textit{Year FE}_{c,t} + \epsilon_{c,b,t}. \end{aligned} \tag{2}$$

  - c indexes the county, b indexes the bank, and t indexes the month-year.
  - $\textit{BHC Capital GAP}_{b,t-k}$ if the BHC's Capital GAP (Tier 1 Capital GAP or Total Capital GAP) in the last stress test, where k ranges between 1 and a maximum of 12 months before the current reporting month.
  - We also include a battery of consumer, loan, and BHC characteristics. In all specifications, we include $\textit{County} \times \textit{Month} - \textit{Year}$ and BHC fixed effects and heteroskedasticity-robust standard errors are clustered at the county level.
- Similarly, we estimate a loan-level model, where consumer and loan characteristics are at the loan level, for a 1 percent random sample of new credit card originations.

Effects on Aggregate Consumer Credit Supply (Firm-County-Month Sample)

Independent Variables:	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable = (Credit Limit/County Population) for New Originations					
Stress Test Measures						
Tier 1 Capital GAP	-0.2017***		-0.2024***		-0.2188***	
	(-36.7084)		(-35.7901)		(-36.1995)	
Total Capital GAP		-0.2186***		-0.2337***		-0.2258***
		(-38.2008)		(-38.2371)		(-36.6330)
Consumer & Loan Characteristics at Origination						
Consumer Credit Score			0.0148***	0.0148***	0.0153***	0.0153***
			(60.6965)	(60.6516)	(61.3014)	(61.2634)
Log(1+ Consumer Income)			0.1038***	0.1040***	0.0689***	0.0703***
			(20.272)	(20.3609)	(13.1214)	(13.4083)
Consumer Utilization Rate			-0.5043***	-0.5219***	-0.4802***	-0.4908***
			(-13.1851)	(-13.6031)	(-12.5644)	(-12.8171)
% Consumers with Joint Accounts			0.5394***	0.5213***	0.5045***	0.4978***
			(10.7759)	(10.4502)	(10.1037)	(9.9858)
% Variable Interest Rate Accounts			-0.4637***	-0.5503***	-0.5930***	-0.6333***
			(-9.1021)	(-10.6008)	(-10.5283)	(-11.1479)
% Relationship Consumers			2.8618***	2.8659***	2.9153***	2.9159***
			(36.5226)	(36.5647)	(37.0028)	(37.0167)
BHC Characteristics (Lagged one quarter)	YES	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES	YES
Observations	1,337,577	1,337,577	1,335,178	1,335,178	1,335,178	1,335,178
R-squared	0.567	0.568	0.583	0.583	0.587	0.587

- Economic significance: Changing Tier1 Capital GAP from the 10th percentile to the 90th percentile results in a 13.21% decline in credit limit.

Decomposition of the Credit Supply Effects

Independent Variables:	(1) Log(1+Total Credit Limit)	(2) Log(1+Total Credit Limit)	(3) Log(1+Avg Credit Limit)	(4) Log(1+Avg Credit Limit)	(5) Log(1+No New Accounts)	(6) Log(1+No New Accounts)
Stress Test Measures						
Tier 1 Capital GAP	-0.0401***		-0.0034***		-0.0331***	
	(-32.7506)		(-6.3115)		(-36.0161)	
Total Capital GAP		-0.0411***		-0.0048***		-0.0327***
		(-35.3310)		(-9.3677)		(-37.0557)
Borrower & Loan Characteristics at Origination	YES	YES	YES	YES	YES	YES
Bank Characteristics (Lagged one period)	YES	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES	YES
Observations	1,355,032	1,355,032	1,355,032	1,355,032	1,355,032	1,355,032
R-squared	0.815	0.815	0.741	0.741	0.851	0.851

Effects on Credit Supply by Risk Segment (1% Random Sample)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent Variable = Log(1+Credit Limit) for New Originations						
Independent Variables:	Full Sample	FICO <620	FICO [620, 680)	FICO [680, 720)	FICO [720, 760)	FICO [760, 800)	FICO ≥ 800
Stress Test Measures							
Tier 1 Capital GAP	-0.0043***	-0.0363***	-0.0082***	0.0014	-0.0011	0.0012	0.0173***
	(-3.0878)	(-5.2425)	(-2.9100)	(0.5118)	(-0.3660)	(0.4132)	(5.9981)
Consumer & Loan Characteristics at Origination	YES	YES	YES	YES	YES	YES	YES
BHC Characteristics (Lagged one quarter)	YES	YES	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES	YES	YES
Observations	1,686,990	84,103	332,761	269,774	258,159	245,882	361,361
R-squared	0.613	0.453	0.458	0.344	0.412	0.471	0.442

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable = Log(1+Credit Limit) for New Originations				
Independent Variables:	Consumer Income Quintile 1	Consumer Income Quintile 2	Consumer Income Quintile 3	Consumer Income Quintile 4	Consumer Income Quintile 5
Stress Test Measures					
Tier 1 Capital GAP	-0.0200***	-0.0235***	-0.0191***	-0.0129***	-0.0045
	(-6.3859)	(-9.6681)	(-7.2524)	(-4.7316)	(-1.4922)
Consumer & Loan Characteristics at Origination	YES	YES	YES	YES	YES
BHC Characteristics (Lagged one quarter)	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES
Observations	310,587	324,684	301,953	344,542	290,687
R-squared	0.631	0.639	0.643	0.628	0.605

Effects on Price of Consumer Credit by Risk Segment (1% Random Sample)

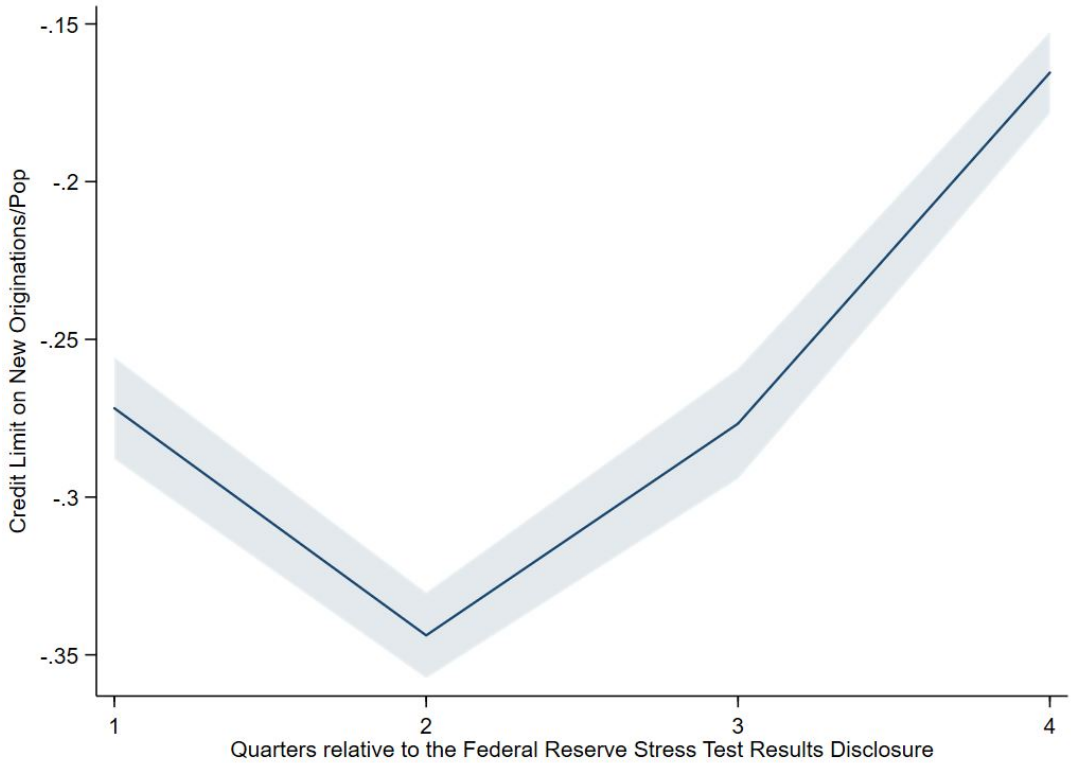
	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable = CC Cycle APR for New Originations					
Independent Variables:	FICO <620	FICO [620, 680)	FICO [680, 720)	FICO [720, 760)	FICO [760, 800)	FICO ≥ 800
Stress Test Measures						
Tier 1 Capital GAP	-0.0177	-0.1198***	-0.1635***	-0.1913***	-0.2010***	0.4124***
	(-0.2528)	(-3.4853)	(-5.4283)	(-6.3327)	(-6.2532)	(12.8118)
Log(1+ Credit Limit)	YES	YES	YES	YES	YES	YES
Consumer & Loan Characteristics at Origination	YES	YES	YES	YES	YES	YES
BHC Characteristics (Lagged one quarter)	YES	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES	YES
Observations	84,103	332,761	269,774	258,159	245,882	361,361
R-squared	0.427	0.422	0.371	0.389	0.402	0.435

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable = CC Cycle APR for New Originations				
Independent Variables:	Consumer Income Quintile 1	Consumer Income Quintile 2	Consumer Income Quintile 3	Consumer Income Quintile 4	Consumer Income Quintile 5
Stress Test Measures					
Tier 1 Capital GAP	0.0185	-0.0712**	-0.0795**	-0.1882***	-0.2402***
	(0.6309)	(-2.2249)	(-2.1422)	(-7.0335)	(-8.0523)
Log(1+ Credit Limit)	YES	YES	YES	YES	YES
Consumer & Loan Characteristics at Origination	YES	YES	YES	YES	YES
BHC Characteristics (Lagged one quarter)	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES
Observations	310,587	324,684	301,953	344,542	290,687
R-squared	0.452	0.414	0.378	0.362	0.323

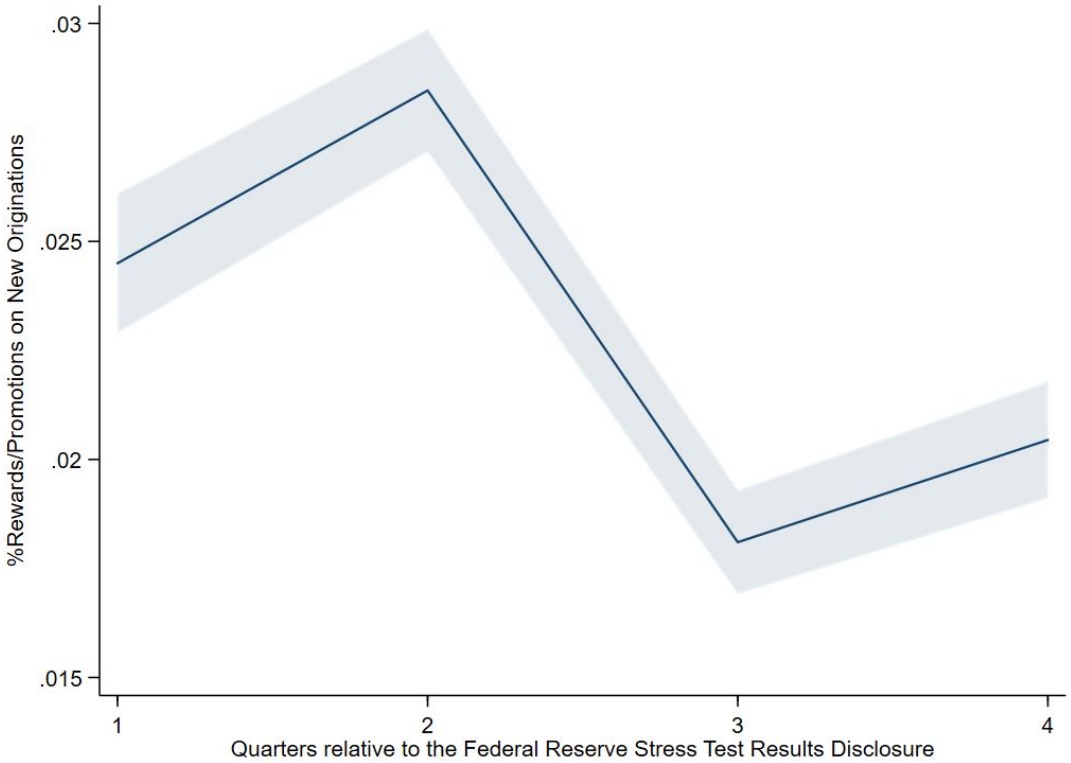
Effects on Rewards and Promotions by Risk Segment (1% Random Sample)

Independent Variables:	CC Cash Rewards, Miles Rewards, and Promotions for New Originations					
	FICO <620	FICO [620, 680)	FICO [680, 720)	FICO [720, 760)	FICO [760, 800)	FICO ≥ 800
	Dependent Variable = CC Rewards: Cash Back for New Originations					
Stress Test Measures	(1)	(2)	(3)	(4)	(5)	(6)
Tier 1 Capital GAP	0.0089***	0.0096***	0.0076***	0.0034**	0.0018	-0.0101***
	(4.0196)	(9.5893)	(6.3085)	(2.4695)	(1.1804)	(-7.9142)
Observations	84,103	332,761	269,774	258,159	245,882	361,361
R-squared	0.293	0.31	0.345	0.345	0.343	0.339
	Dependent Variable = CC Rewards: Miles for New Originations					
Stress Test Measures	(1)	(2)	(3)	(4)	(5)	(6)
Tier 1 Capital GAP	0.0041***	0.0042***	0.0057***	0.0090***	0.0136***	0.0215***
	(3.4880)	(6.4770)	(7.7261)	(10.7418)	(15.1391)	(23.1098)
Observations	84,103	332,761	269,774	258,159	245,882	361,361
R-squared	0.239	0.17	0.167	0.172	0.196	0.181
	Dependent Variable = CC Promotion for New Originations					
Stress Test Measures	(1)	(2)	(3)	(4)	(5)	(6)
Tier 1 Capital GAP	0.0066**	0.0021*	0.0021**	-0.0007	-0.0018*	-0.0002
	(2.5414)	(1.8643)	(2.0667)	(-0.6642)	(-1.6483)	(-0.2353)
Observations	84,103	332,761	269,774	258,159	245,882	361,361
R-squared	0.364	0.39	0.451	0.42	0.411	0.361
Borrower & Loan Characteristics at Origination	YES	YES	YES	YES	YES	YES
Bank Characteristics (Lagged one period)	YES	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES	YES

Persistence of the Effects on Credit Supply Quantity



Persistence of the Effects on Promotions/Rewards



Robustness

- Alternative Measures of Key Variables
  - Alternative Quantity and Price Proxies
  - Alternative Capital Exposure Measures
- Alternative Checks/Specifications/Samples
  - Falsification Tests
  - Non-linearity of the relation between Credit Limit and Capital GAP
  - Cluster Errors at $BHC \times Month - Year$ level
  - Exclude observations of BHCs that Failed the previous Stress Test
  - Include only BHCs that exist in all Stress Years
  - Control for Capital at the Stress Test Start
  - Exclude one Stress Test at a time
  - Exclude one BHC at a time
  - Exclude one BHC due to different business model
  - Include one BHC that reports originations later
  - Alternative 1% Random Samples
  - $Zip \times Month - Year$ fixed effects and clustering by zip code
  - Portfolio-level analysis (BHC-month)

Effects on Credit Card Usage (24mos since Orig.) - Pooled and by Risk

Independent Variables:	(1) Log (1+Sum Purchase Volume)	(2) Log (1+Avg Purchase Volume)	(3) 24mos Avg Util Rate	(4) Log (1+Avg Cycle Balance)	(5) Log (1+Avg Daily Balance)	(6) Log (1+Sum Total Debt)
Stress Test Measures						
Tier 1 Capital GAP	0.0963***	0.0517***	0.0022***	0.0692***	0.1994***	-0.1418***
	(17.7597)	(14.2180)	(3.5560)	(14.2621)	(41.9484)	(-20.0973)
Consumer & Loan Characteristics at Origination	YES	YES	YES	YES	YES	YES
BHC Characteristics (Lagged one quarter)	YES	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES	YES
Observations	1,674,704	1,651,935	1,662,883	1,651,755	1,651,192	1,673,129
R-squared	0.198	0.236	0.096	0.247	0.271	0.285

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Log(1+Sum Purchase Volume)		Log (1+Avg Purchase Volume)		24mos Avg Util Rate		Log(1+ Avg Cycle Balance)		Log(1+ Avg Daily Balance)		Log(1+Sum Total Debt)	
Independent Variables:	FICO <680	FICO ≥680	FICO <680	FICO ≥680	FICO <680	FICO ≥680	FICO <680	FICO ≥ 680	FICO <680	FICO ≥680	FICO <680	FICO ≥680
Stress Test Measures												
Tier 1 Capital GAP	0.0583***	0.1077***	0.0358***	0.0560***	0.0047***	0.0023***	0.0291***	0.0781***	0.1221***	0.2067***	-0.2868***	-0.0623***
	(7.2769)	(15.6839)	(6.5402)	(11.9949)	(4.5674)	(3.0666)	(4.7602)	(13.0665)	(16.9892)	(35.9538)	(-26.9883)	(-7.6034)
Consumer & Loan Characteristics at Origination	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
BHC Characteristics (Lagged one quarter)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	434,402	1,206,379	429,878	1,188,281	431,160	1,197,930	429,860	1,188,160	427,987	1,189,512	433,960	1,205,248
R-squared	0.202	0.22	0.239	0.26	0.245	0.044	0.226	0.269	0.236	0.299	0.36	0.291

Effects on Credit Performance (24mos since Orig.) - Pooled and by Risk

Independent Variables:	(1) 24mos 60DPD	(2) 24mos Avg Days Past Due	(3) 24mos Bankruptcy	(4) 24mos FICO Downgrade
Stress Test Measures				
Tier 1 Capital GAP	-0.0024***	-0.0698***	0.0001	-0.0011**
	(-8.6596)	(-6.9090)	(1.4301)	(-2.1001)
Consumer & Loan Characteristics at Origination	YES	YES	YES	YES
BHC Characteristics (Lagged one quarter)	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES
Observations	1,662,883	1,662,883	1,662,883	1,662,883
R-squared	0.143	0.165	0.066	0.081

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	24mos 60DPD		24mos Avg Days Past Due		24mos Bankruptcy		24mos FICO Downgrade	
Independent Variables:	FICO <680	FICO ≥680	FICO <680	FICO ≥680	FICO <680	FICO ≥680	FICO <680	FICO ≥680
Stress Test Measures								
Tier 1 Capital GAP	-0.0014	-0.0012***	-0.0025	-0.0369***	0.0002	0.0000	-0.0036***	0.0006
	(-1.6261)	(-5.2442)	(-0.0855)	(-6.1262)	(1.0495)	(-0.5170)	(-3.3537)	(0.9111)
Consumer & Loan Characteristics at Origination	YES	YES	YES	YES	YES	YES	YES	YES
BHC Characteristics (Lagged one quarter)	YES	YES	YES	YES	YES	YES	YES	YES
County×Month-Year FE	YES	YES	YES	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES	YES	YES	YES
Observations	431,160	1,197,930	431,160	1,197,930	431,160	1,197,930	431,160	1,197,930
R-squared	0.182	0.086	0.224	0.084	0.123	0.075	0.135	0.09

Effects on New Mortgage Originations

Aggregate Sample	(1)	(2)	(3)	(4)	(5)
Independent Variables:	Loan Amount/ Population	Log(1+ Loan Amount)	Log(1+Avg Loan Amount)	Log(1+ No New Loans)	Log(1+Mortg. Maturity) (Months)
Stress Test Measures					
Tier 1 Capital GAP	-2.0207*** (-23.7610)	-0.0824*** (-19.0585)	0.0231*** -13.9906	-0.0884*** (-24.1228)	0.0049*** (6.7726)
Borrower & Loan Characteristics at Origination	YES	YES	YES	YES	YES
BHC Characteristics (Lagged one period)	YES	YES	YES	YES	YES
Log(1+Loan Amount)	NO	NO	NO	NO	YES
County×Month-Year FE	YES	YES	YES	YES	YES
BHC FE	YES	YES	YES	YES	YES
Cluster by County	YES	YES	YES	YES	YES
Observations	341,355	341,355	341,355	341,355	341,355
R-squared	0.512	0.691	0.744	0.567	0.611

Conclusions

- It has been over a decade since the first bank stress test was implemented in 2009, and a growing literature has analyzed many aspects and goals of stress tests.
- This paper is among the first few to examine the effects of stress tests on consumer credit supply.
- More importantly, we also investigate whether stress tests have real effects on consumers.
- We find:
  - First, stress-tested banks with higher capital gaps significantly reduce limits for new card originations and reduce the number of new accounts. The decline is primarily among riskier consumers.
  - Second, banks with larger capital shocks find alternative ways to remain competitive and attract their best customers by improving pricing, rewards, and promotions to them.

Conclusions (cont.)

- We find (cont.):
  - Third, consumers with new card originations by banks with higher-capital shocks performed better over 24 months after origination, and improvements are applicable to both low- and high-credit score borrowers.
  - With regard to credit usage and debt repayment, consumers who benefit from better pricing and rewards/promotions in the credit card market engage in more credit card usage without increasing delinquencies or total debt.
  - Finally, our additional analyses on mortgages and HELOCs further show that banks with higher capital shocks from stress tests also employ similar risk management for these other consumer products.
- It might be true that some risky borrowers are rationed out of the market. However, borrowers who are granted credit are benefiting from lower APRs and more rewards and promotions.
  - A back-of-the-envelope calculation shows $1.7 billion annual savings from reduced APR alone. Moreover, an additional 2.2 million accounts could get promotions or rewards when banks try to meet stress test requirements.

Policy Implications

- Stress tests may be able to steer both bank and consumer behavior toward their intended goals of improved credit risk management.
  - We demonstrate a positive feedback loop among consumer credit supply, credit usage, and credit performance due to the stress tests.
- Banks keep on pushing for more disclosure of Fed models. However, leaving banks unsure about DFAST model parameters may be able to reduce their heavy reliance on the DFAST model in making their own portfolio choices, thus diversifying the banking system's risk exposure.
  - Opacity provides incentives for banks to adjust their portfolios that have led to positive outcomes as we document in the paper. Thus, the unpredictability of the stress tests can actually provide some important benefits.
  - A key purpose of capital is to protect against unexpected losses. The need for this is no more apparent than in the current economic crisis caused by the COVID-19 pandemic.