The Effects of Capital Buffers on Bank Lending and Firm Activity: What can we learn from Stress tests results?

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Motivation

- Higher capital and bank stress tests improve the resilience and stability of the financial sector, but many industry stakeholders have increasingly questioned whether stress tests are having unintended effects on bank lending and hindering economic growth.
- In light of current proposals to simplify the U.S. regulatory regime, it is important to estimate the size of the impact of the capital buffers implied by the stress tests (e.g., implementation of the proposed SCB) on bank lending and firm activity (real effects).
- In the U.S. the consequences for banks of not meeting stress-test buffers are similar to those for not satisfying an activated Countercyclical Capital Buffer (CCyB).
  - Our results are also informative for the effects of the CCyB
- Our general approach:
  - Look at the bank-specific capital buffers implied by the 2012-2016 CCAR stress tests (similar to proposed SCB)
  - Use BHC-firm matched data from regulatory filings (FR Y-14) on C&I loans.

Outline

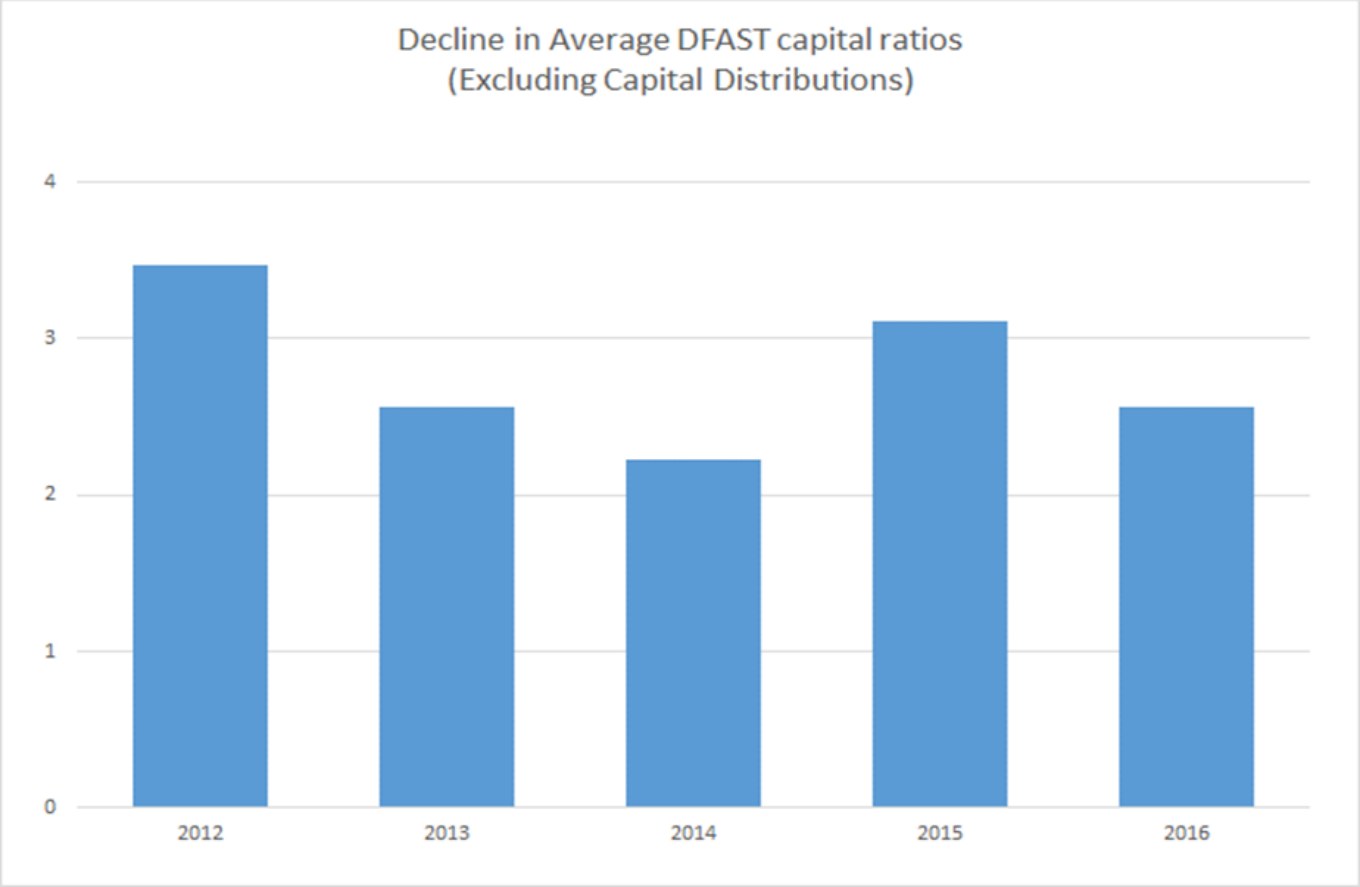
- Background
  - Bank-specific capital buffer from stress tests
- Related literature
- Data
- Empirical analysis:
  - Using BHC-firm level data
  - Using firm level outcomes: total bank borrowing, total debt, investment
  - Using county-level employment data
  - Robustness: Using publicly traded firms in FR Y-14 matched with COMPUSTAT
- Conclusions

Preview of results

- Larger stress tests capital buffers lead to material reductions in bank C&I lending: 1 pp. increase in capital buffers results in 2 pp. lower loan growth of utilized amounts and 1 ½ lower growth rate of committed amounts.
- Positive and significant effects of bank capital ratio on lending. This positive effect is larger than the negative effect of the stress test capital buffer.
- Effects of capital buffer are larger at the firm level (multibank firms) when we look at total bank borrowing (summing across all their CCAR lenders): 1 pp. increase in capital buffers lead to
  - 4 pp. decline in growth rate of utilized amounts
  - 3 pp. decline in growth rate of committed amounts
- However, we find no impact of larger capital buffers on firm outcomes such as overall debt, investment spending and employment.
  - This result suggests that firms manage to substitute their bank loans with other borrowing sources from smaller non-CCAR banks, nonbank financial institutions and issuing bonds in capital markets.

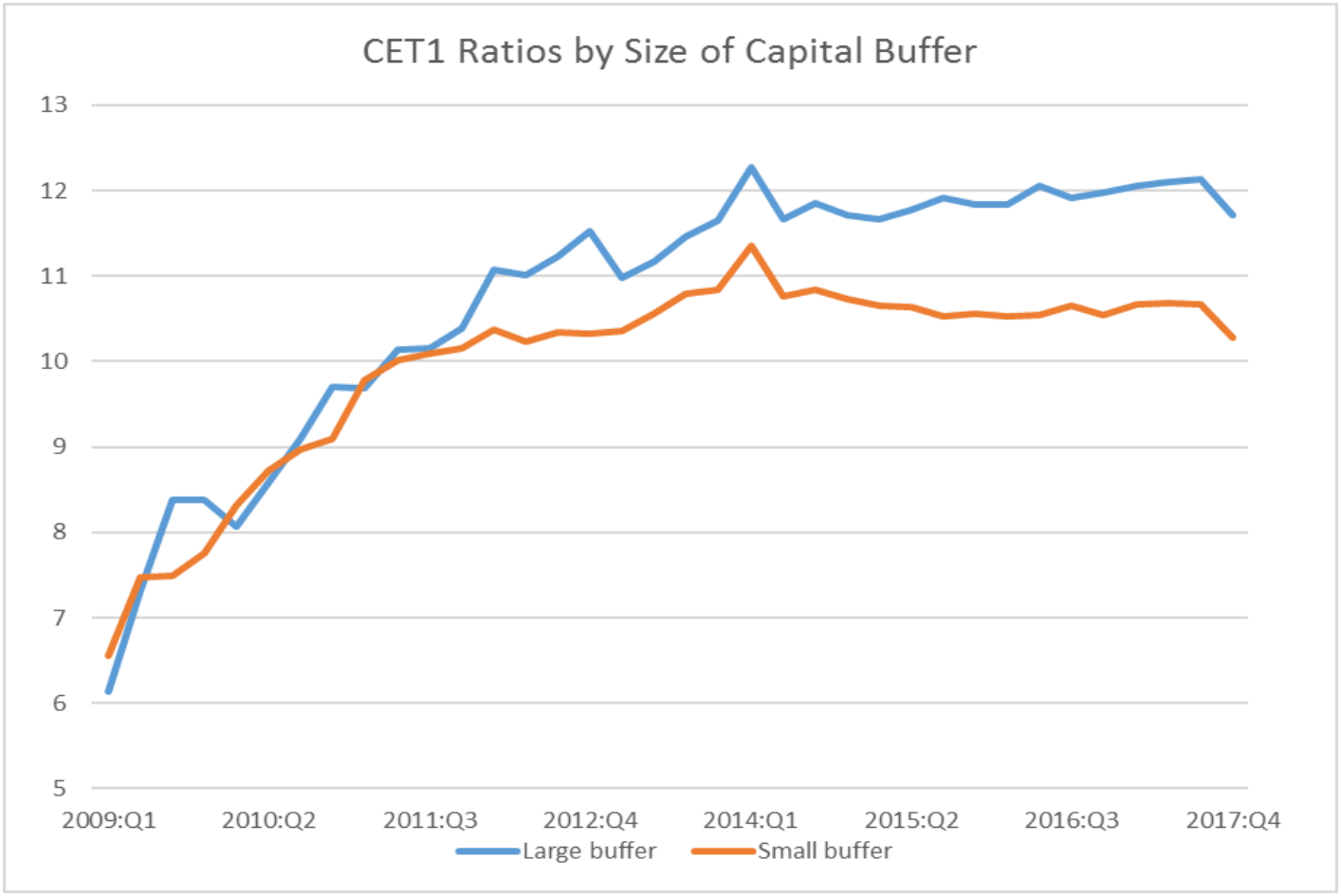
Stress Tests Capital Buffers

- Measured as the decline in capital from start to minimum in severely adverse scenario of CCAR exercise (conceptually similar to proposed stress capital buffer, SCB)



Capital Buffers and increase in regulatory capital

- The stress capital decline is a buffer that each CCAR BHC needs to hold in normal times to cover forward-looking risks (severe economic and financial conditions).



Related Literature

- **Impact of higher capital requirements on bank lending**: Peek and Rosengreen (1997), Gambacorta and Mistrulli (2004), Jimenez, Ongena, Peydro and Saurina (2013), Aiyar, Calomiris, and Wieladek (2014), Mésonnier and Monks (2015), Gropp, Mosk, Ongena, and Wix (2016), Lambertini and Mukherjee (2016), Fraisse, Le and Thesmar (2017), and Calem, Correa, and Lee (2017).

- **Impact of higher capital on bank lending**: Bernanke and Lown (2000), Francis and Osborne (2009), Berrospide and Edge (2010), Carlson, Shan, and Warusawitharana (2013), Chu, Zhang, and Zhao (2017).

- **Impact of Stress tests on bank lending and risk taking**: Acharya, Berger and Roman (2017), The Clearing House (2017), Vojtech (2017), Pierret and Steri (2018), Bassett and Berrospide (2018), Cortes, Demyanyk, Li, Loutskina, and Strahan (2018), Connolly (2018), and Niepmann and Stebunovs (2018).

This paper

- We evaluate the impact of the stress test capital buffers on bank loan growth and firm outcomes: bank borrowing, total debt volumes, investment spending and employment.

- Identification strategy based on Khwaja and Mian (2008):
  - Using firm-BHC data: Within-firm estimation, which compares loan growth for the same firm between banks with large capital buffers relative to banks with small capital buffers between 2012 and 2016.
  - Using firm-level data: consider the effect of weighted average stress test capital declines (firm level stress test exposure) on firm loan growth, overall debt growth and investment.
  - Using county-level employment data: impact of weighted average stress test capital declines faced by each bank lending to firms in specific counties on employment.
  - Robustness using matched FR Y-14 and COMPUSTAT data: impact of firm level stress test exposure on publicly traded firm outcomes: loan growth, overall debt growth and investment, and employment.

Data

We use the following sources of quarterly data between 2012 and 2016:

- Consolidated balance sheet data for 16 CCAR BHCs (FR Y-9C reports) combined with matched lender-borrower data from FR Y-14 Corporate schedule. We look at:
  - C&I loans, utilized and committed amounts, and
  - Firm balance sheet information for both private and publicly traded firms
- Balance sheet data for publicly traded firms in COMPUSTAT
- County-level employment data from the BLS.

After some data cleaning, we have information for about 78,265 firms borrowing from 16 BHCs (248,201 bank-firm observations):

- Out of these, 10,961 (63,212 bank-firm observations) correspond to multibank firms
- About 15 percent of firms in our sample borrow from at least two banks (with at least one in the high-capital buffer group and the other one in the low-capital buffer group).

Summary statistics

CCAR BHC and FIRM DATA

Variable	Obs.	Mean	Std. Dev.	Min	Max
CCAR BHC VARIABLES					
Total Loan growth	248,201	0.050	0.753	-2.559	2.699
Total committed amount growth	331,430	0.047	0.507	-1.609	1.686
CET1 Capital ratio	331,430	0.106	0.012	0.075	0.163
Tier1 Capital ratio	331,430	0.122	0.011	0.104	0.182
Tier1 Capital ratio Drop	331,430	0.027	0.017	0.000	0.087
Size (log Total assets)	331,430	20.334	1.153	18.288	21.670
Equity / TA	331,430	0.113	0.014	0.077	0.149
ROA	331,430	0.010	0.005	-0.003	0.025
Deposit / TA	331,430	0.614	0.141	0.053	0.796
Liq. Asset / TA	331,430	0.298	0.089	0.146	0.696
Charge-off / TA	331,430	0.377	0.255	-0.001	1.427
C&I Loan / TA	331,430	0.121	0.069	0.002	0.265
Firm Variable					
Size (log Total assets)	257,561	4.273	2.944	-3.972	11.036
Cash / TA	255,956	0.099	0.111	0.000	0.381
Ebitda / TA	256,093	0.077	0.095	-0.064	0.324
Leverage	250,492	0.348	0.260	0.000	0.856
Sales / TA	256,443	2.147	1.530	0.169	5.450
Operating Margin	159,817	0.104	0.112	-0.052	0.398
Tangible Assets/TA	253,060	0.886	0.187	0.347	1.000
Rating A Dummy	324,505	0.146	0.353	0.000	1.000
Rating B Dummy	324,505	0.899	0.301	0.000	1.000
Rating C Dummy	324,505	0.054	0.225	0.000	1.000
Rating D Dummy	324,505	0.005	0.072	0.000	1.000

Empirical analysis: regression specification I

- For BHC-firm level analysis, we use the following panel regression specification for C&I annual loan growth:

$$Loan\ growth_{ijt+1} = \alpha_{ij} + \beta_1 ST\ Buffer_{it} + \beta_2 K\ ratio_{it} + \gamma X_{it} + \tau_{jt} + \varepsilon_{ijt+1}$$

- Loan growth of BHC i to firm j (utilized and committed amounts): the log difference of C&I loan average 3 quarters after and 3 quarters before stress test exercise of year t.
- ST Buffer: stress test capital buffer of BHC i (decline in CET1 capital ratio) in stress tests exercise of year t.
- Bank controls: Size (log of total assets), ROA, deposits/total assets, charge-offs, and share of C&I loans in total assets. All controls measured at the beginning of stress test exercise in year t.
- Also include: firm-bank fixed effects and firm-time fixed effects. Alternatively, use firm controls and interactions of ST Buffer with dummies by type of firms.
- **Hypotheses**: $\beta_1 < 0$ and $\beta_2 > 0$

Impact of Capital Buffer on Bank-Firm Loan Growth

	Utilized amounts			Committed amounts		
Variable	(1)	(2)	(4)	(6)	(7)	(9)
ST Buffer	-2.324***	-1.710***		-1.850***	-1.480***	
	[0.350]	[0.385]		[0.208]	[0.225]	
ST Buffer x year 2012			-1.318*			-2.139***
			[0.704]			[0.423]
ST Buffer x year 2013			-3.382***			-2.956***
			[0.521]			[0.290]
ST Buffer x year 2014			-2.081***			-2.005***
			[0.505]			[0.290]
ST Buffer x year 2015			-0.924**			-0.719***
			[0.465]			[0.263]
ST Buffer x year 2016			-2.659***			-3.057***
			[0.862]			[0.445]
Equity Capital ratio		5.656***	5.201***		5.230***	5.147***
		[1.046]	[1.078]		[0.608]	[0.627]
Observations	248201	248201	248401	331430	331430	331430
Bank Controls	No	Yes	Yes	No	Yes	Yes
Year - Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.81	0.81	0.81	0.67	0.67	0.67

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Impact of Capital Buffer on Bank-Firm Loan Growth

	Utilized amounts				Committed amounts			
Variable	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
ST Buffer x Private Firm	-3.400***	-2.848***			-3.000***	-2.658***		
	[0.536]	[0.546]			[0.404]	[0.412]		
ST Buffer x Public Firm	-1.644***	-0.994**			-1.364***	-0.985***		
	[0.460]	[0.491]			[0.240]	[0.255]		
ST Buffer x Inv. Grade firm			-2.384***	-1.764***			-1.818***	-1.441***
			[0.388]	[0.428]			[0.215]	[0.234]
ST Buffer x Non-Inv. Grade firm			-2.153***	-1.570***			-1.946***	-1.595***
			[0.544]	[0.552]			[0.365]	[0.372]
Equity Capital ratio		5.789***		5.619***		5.285***		5.227***
		[1.049]		[1.051]		[0.606]		[0.608]
Observations	248201	248201	243978	243978	331430	331430	324505	324505
Bank Controls	No	Yes	No	Yes	No	Yes	No	Yes
Year - Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.81	0.81	0.81	0.81	0.67	0.67	0.67	0.67

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Empirical analysis: regression specification II

- For firm level analysis, we use the following panel regression specification:

$$Firm\ Outcome_{jt+1} = \alpha_j + \beta \Delta Exposure_{jt} + \gamma X_{jt} + \tau_{mt} + \varepsilon_{jt+1}$$

- Firm Outcome: total bank borrowing, overall debt growth, investment, and employment (measured as log changes from before to after the stress tests).
  - In FRY-14 data, investment is measured as the change in fixed assets.
  - In COMPUSTAT, investment is measured as the log change in property, plant and equipment, and in robustness exercise as log changes in capital expenditures.
- Firm controls: Size (log of total assets), cash to total assets, the leverage ratio (debt to total assets), and the ratios of EBITDA, sales, and tangible assets to total assets.
- Include firm fixed effects and industry-year fixed effects
- *Exposure:* firm-level exposure to stress test capital buffers measured as:

$$Exposure_{jt} = \sum_{i=1}^{N} \Delta Reg.Cap_{it}\ x\ \frac{loan\ amount_{ijt-1}}{\sum_{all\ i} loan\ amount_{jt-1}}$$

Summary statistics

FIRM LEVEL DATA

Variable	Obs.	Mean	Std. Dev.	Min	Max
Firm Variable					
Exposure to Reg. Capital change	31,758	0.025	0.015	-0.014	0.088
Total Loan growth	31,758	0.080	0.842	-2.614	2.694
Total Committed amount growth	38,713	0.072	0.532	-1.637	1.729
Growth in total debt	30,981	0.107	0.553	-2.290	2.540
Growth in Capex	22,571	0.100	1.513	-8.454	8.880
Growth in Fixed Assets	32,109	0.086	0.409	-1.624	2.246
Growth in Employment					
Size (log Total assets)	28,167	5.620	2.519	-5.185	10.387
Cash / TA	33,375	0.085	0.100	0.000	0.381
Ebitda / TA	33,419	0.062	0.084	-0.064	0.324
Leverage	32,728	0.368	0.239	0.000	
Sales / TA	33,477	1.690	1.372	0.169	5.450
Operating Margin	20,733	0.094	0.099	-0.052	0.398
Tangible Assets/TA	33,287	0.840	0.213	0.347	1.000
Rating A Dummy	38,246	0.202	0.402	0.000	1.000
Rating B Dummy	38,246	0.907	0.291	0.000	1.000
Rating C Dummy	38,246	0.073	0.260	0.000	1.000
Rating D Dummy	38,246	0.007	0.083	0.000	1.000

Impact of Capital Buffer on Firm Loan Growth

	Utilized amounts				Committed amounts			
Variable	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Exposure x Private Firm	-3.979***	-3.355***			-3.412***	-3.140***		
	[0.650]	[0.687]			[0.361]	[0.397]		
Exposure x Public Firm	-5.232***	-6.173**			-3.135***	-2.867**		
	[1.428]	[1.569]			[0.487]	[0.528]		
Exposure x Inv. Grade firm			-2.395***	-1.955**			-1.908***	-1.983***
			[0.849]	[0.935]			[0.413]	[0.450]
Exposure x Non-Inv. Grade firm			-5.277***	-5.068***			-3.818***	-3.428***
			[0.682]	[0.751]			[0.314]	[0.343]
Observations	31758	27385	31459	27385	38173	32563	38246	32563
Firm Controls	No	Yes	No	Yes	No	Yes	No	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-bank firms only	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.3	0.4	0.3	0.32	0.35	0.4	0.36	0.4

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Impact of Capital Buffer on Firm Debt Growth and Investment

	Overall Debt growth				Investment			
Variable	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Exposure x Private Firm	-0.629	-0.464			-0.343	-0.138		
	[0.432]	[0.422]			[0.342]	[0.349]		
Exposure x Public Firm	0.083	0.190			-0.380	-0.212		
	[0.526]	[0.465]			[0.295]	[0.293]		
Exposure x Inv. Grade firm			-0.135	-0.804*			-0.185	-0.359
			[0.468]	[0.447]			[0.320]	[0.313]
Exposure x Non-Inv. Grade firm			-0.365	0.004			-0.279	-0.100
			[0.362]	[0.340]			[0.260]	[0.263]
Observations	32154	31170	31904	31170	33359	31979	33071	31979
Firm Controls	No	Yes	No	Yes	No	Yes	No	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-bank firms only	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.29	0.37	0.29	0.37	0.31	0.35	0.31	0.35

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Impact of Capital Buffer on County Employment

	(1)	(2)	(3)	(4)
Exposure	0.016		0.037	
	[0.038]		[0.038]	
Exposure_12		0.005		0.016
		[0.063]		[0.062]
Exposure_13		0.026		0.022
		[0.061]		[0.062]
Exposure_14		0.017		0.031
		[0.062]		[0.063]
Exposure_15		-0.062		-0.014
		[0.091]		[0.093]
Exposure_16		0.052		0.108
		[0.062]		[0.066]
Log Wages			-0.023**	-0.023**
			[0.010]	[0.010]
Log Population			-0.223***	-0.224***
			[0.062]	[0.063]
House price index			0.014***	0.014***
			[0.003]	[0.003]
Observations	13025	13025	12764	12764
R-squared	0.33	0.33	0.33	0.33

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Robustness

- Use a restricted sample with firms that remain in the sample for at least 3 consecutive years.
- Use FR Y14-COMPUSTAT matched data for about 3000 publicly traded firms.

Impact of Capital Buffer on Firm Loan Growth – COMPUSTAT

	Utilized amounts				Committed amounts			
Variable	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Exposure	-7.265***	-4.923**			-2.445***	-1.583***		
	[1.948]	[2.311]			[0.476]	[0.546]		
Exposure x Inv. Grade firm			-4.422	-2.615			-1.816**	-1.662**
			[3.556]	[3.648.]			[0.844]	[0.859]
Exposure x Non-Inv. Grade firm			-5.512***	-4.961			-2.048***	-1.346*
			[3.026]	[3.194]			[0.722]	[0.756]
Observations	6344	4879	4654	27385	8270	6181	5913	5344
Firm Controls	No	Yes	No	Yes	No	Yes	No	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-bank firms only	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.26	0.27	0.28	0.29	0.35	0.36	0.34	0.36

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Impact of Capital Buffer on Firm Outcomes - COMPUSTAT

	Total debt				Investment				Employment			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Exposure	-0.754**	-0.329			-0.152	-0.05			-0.228**	0.034		
	[0.350]	[0.385]			[0.138]	[0.154]			[0.096]	[0.106]		
Exposure x Inv. Grade firm			-1.355**	-0.917			0.035	0.061			-0.007	0.005
			[0.605]	[0.588]			[0.213]	[0.220]			[0.147]	[0.148]
Exposure x Non-Inv. Grade firm			-1.445***	-0.518			-0.521**	-0.218			-0.382***	-0.047
			[0.543]	[0.552]			[0.217]	[0.223]			[0.146]	[0.149]
Observations	7560	6077	5708	5235	7833	6442	6014	5542	7516	6230	6086	5518
Firm Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-bank firms only	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.32	0.39	0.32	0.39	0.51	0.56	0.47	0.52	0.56	0.6	0.53	0.57

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Concluding remarks

- The stress test capital buffer (decline in CET1 capital ratio) has contributed to increases in regulatory capital at the largest banks since 2012.
- Larger stress tests capital buffers lead to material reductions in bank C&I lending: 1 pp. increase in capital buffers results in 2 pp. lower loan growth of utilized amounts and 1 ½ lower growth rate of committed amounts.
- Positive and significant effects of bank capital ratio on lending. This positive effect is larger than the negative effect of the stress test capital buffer.
- Using firms in both FR Y-14 and COMPUSTAT we find:
  - Effects of capital buffer are larger at the firm level (multibank firms) on total bank loan growth (summing across all their CCAR lenders): 1 pp. increase in capital buffers lead to:
    - 4 pp. decline in growth rate of utilized amounts
    - 3 pp. decline in growth rate of committed amounts
  - No impact of larger capital buffers on firm outcomes such as overall debt, investment spending and employment.
  - This result suggests that firms manage to substitute their bank loans with other borrowing sources from smaller non-CCAR banks, nonbank financial institutions and issuing bonds in capital markets.

Next steps

- Expand the analysis of bank loan substitution:
  - Use other loan level data: SNC, Deal Scan
  - Who is providing the funding to corporations?
  - How big is the role of nonbank financial intermediaries relative to institutional investors (bond issuance)?
  - Could this be another form of a “revolving door” exposure for banks?
- Further robustness:
  - Syndicated loans
  - Look at loan rates and maturity in FR Y-14

Appendix

Impact of Capital Buffer on Firm Loan Growth

	Utilized Amounts				Committed Amounts			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure	-4.351***		-4.256***		-3.302***		-3.025***	
	[0.655]		[0.724]		[0.298]		[0.329]	
Exposure_12		-4.055***		-4.063***		-1.579***		-1.173**
		[1.204]		[1.385]		[0.521]		[0.547]
Exposure_13		-5.147***		-5.235***		-3.815***		-3.847***
		[0.956]		[1.037]		[0.481]		[0.502]
Exposure_14		-5.073***		-4.865***		-3.529***		-3.118***
		[0.878]		[0.982]		[0.459]		[0.497]
Exposure_15		-3.014***		-2.502**		-3.132***		-2.661***
		[0.960]		[1.086]		[0.420]		[0.461]
Exposure_16		-5.184***		-6.390***		-5.678***		-5.902***
		[1.417]		[1.614]		[0.615]		[0.668]
Firm size			-0.064***	-0.065***			-0.055***	-0.055***
			[0.013]	[0.013]			[0.008]	[0.008]
Firm Cash/TA			0.812***	0.812***			0.146**	0.144**
			[0.153]	[0.153]			[0.071]	[0.071]
Firm Leverage			-0.560***	-0.562***			-0.236***	-0.238***
			[0.055]	[0.055]			[0.030]	[0.030]
Firm Ebitda			0.396***	0.395***			0.231***	0.230***
			[0.144]	[0.144]			[0.078]	[0.078]
Firm Sales/TA			0.02	0.019			0.001	0
			[0.015]	[0.015]			[0.009]	[0.009]
Observations	31758	31758	27385	27385	38713	38713	32563	32563
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.26	0.26	0.27	0.27	0.32	0.32	0.35	0.35

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

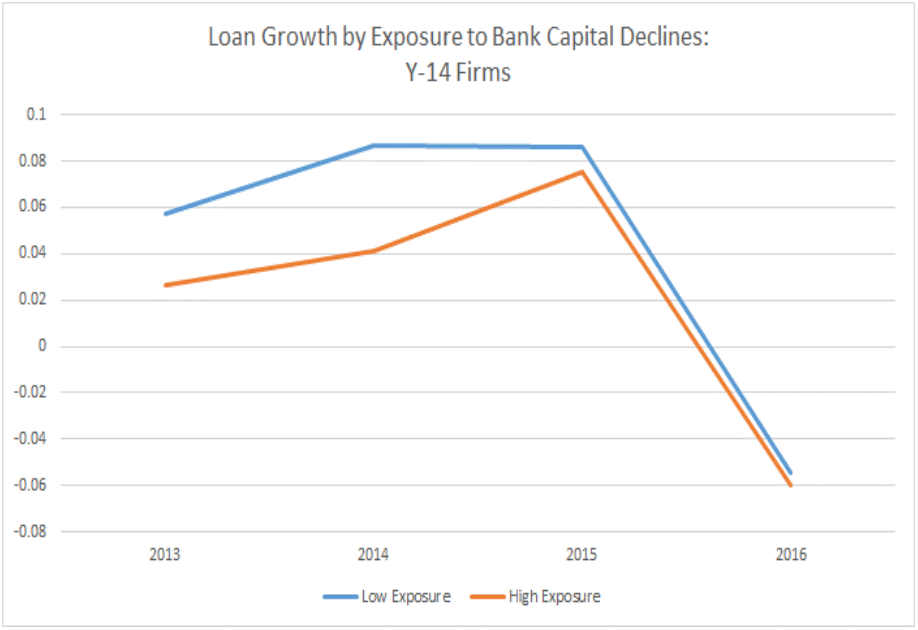
Impact of Capital Buffer on Firm Overall Debt Growth

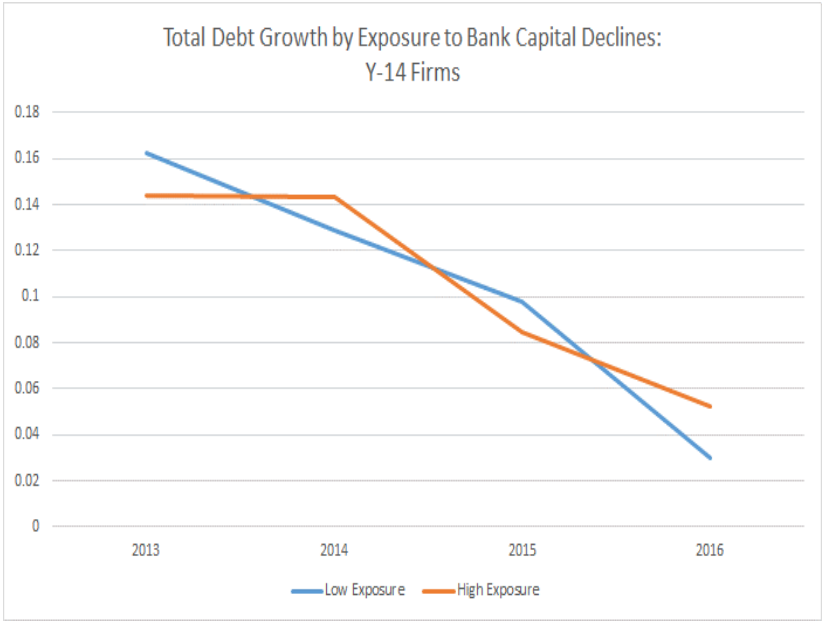
	All Firms				Public				Private			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Exposure	-0.349		-0.205		-0.185		0.023		-0.767*		-0.639	
	[0.341]		[0.320]		[0.539]		[0.474]		[0.450]		[0.441]	
Exposure_12		0.069		0.077		0.064		0.383		-0.318		-0.541
		[0.549]		[0.534]		[0.849]		[0.802]		[0.739]		[0.732]
Exposure_13		-1.008		-1.046*		0.37		0.484		-1.798**		-1.861**
		[0.626]		[0.577]		[1.027]		[0.922]		[0.794]		[0.738]
Exposure_14		0.087		0.212		-0.243		0.171		0.091		0.096
		[0.553]		[0.524]		[0.846]		[0.774]		[0.740]		[0.715]
Exposure_15		-0.875*		-0.536		-0.393		-0.34		-2.022***		-1.193
		[0.495]		[0.456]		[0.650]		[0.578]		[0.779]		[0.744]
Exposure_16		0.654		1.033		-0.574		-0.249		1.257		1.681
		[0.770]		[0.752]		[1.004]		[0.962]		[1.178]		[1.156]
Firm size			-0.271***	-0.271***			-0.201***	-0.200***			-0.296***	-0.296***
			[0.018]	[0.018]			[0.029]	[0.029]			[0.023]	[0.023]
Firm Cash/TA			0.074	0.078			0.292*	0.294*			-0.03	-0.022
			[0.104]	[0.104]			[0.163]	[0.164]			[0.132]	[0.132]
Firm Leverage			-1.250***	-1.250***			-1.381***	-1.381***			-1.205***	-1.203***
			[0.046]	[0.046]			[0.073]	[0.073]			[0.058]	[0.058]
Firm Ebitda			0.231**	0.231**			0.243	0.243			0.234**	0.234**
			[0.094]	[0.094]			[0.165]	[0.165]			[0.114]	[0.114]
Firm Sales/TA			-0.022	-0.023			-0.072**	-0.071**			-0.014	-0.014
			[0.014]	[0.014]			[0.032]	[0.032]			[0.016]	[0.016]
Observations	32154	32154	31170	31170	12110	12110	11791	11791	20044	20044	19379	19379
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.25	0.25	0.33	0.33	0.25	0.25	0.33	0.33	0.25	0.26	0.34	0.34

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Impact of Capital Buffer on Firm Bank Loan and Debt Growth





- Firms with low exposure to bank capital buffers show a larger growth of their bank loans relative to firms with large exposure.
- Total debt has grown at a decreasing rate for all firms. There is no significant difference in growth rates between low- and high-exposure firms.
- Most of the differences in bank loan growth occurs at private firms (not shown):
  - Publicly traded firms (particularly those with high exposure to capital buffers) managed to sustain or grow their total debt between 2013 and 2015.

Impact of Capital Buffer on Firm Investment

	All Firms				Public				Private			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Exposure	-0.358		-0.168		-0.251		-0.073		-0.543		-0.334	
	[0.241]		[0.244]		[0.299]		[0.299]		[0.358]		[0.364]	
Exposure_12		1.060***		1.170***		0.353		0.607		1.535**		1.633***
		[0.409]		[0.396]		[0.498]		[0.511]		[0.613]		[0.583]
Exposure_13		-0.722		-0.673		-0.4		-0.1		-1.017		-1.075*
		[0.450]		[0.444]		[0.587]		[0.575]		[0.634]		[0.626]
Exposure_14		-0.869**		-0.659		-0.172		-0.038		-1.474**		-1.256**
		[0.412]		[0.416]		[0.520]		[0.498]		[0.600]		[0.623]
Exposure_15		-0.552*		-0.351		-0.368		-0.351		-0.8		-0.361
		[0.325]		[0.321]		[0.381]		[0.370]		[0.543]		[0.549]
Exposure_16		-0.814		-0.406		-0.741		-0.302		-1.15		-0.767
		[0.508]		[0.503]		[0.635]		[0.633]		[0.791]		[0.779]
Firm size			-0.186***	-0.186***			-0.154***	-0.154***			-0.201***	-0.201***
			[0.015]	[0.015]			[0.021]	[0.021]			[0.020]	[0.020]
Firm Cash/TA			0.152**	0.153**			0.326***	0.329***			0.072	0.069
			[0.071]	[0.071]			[0.105]	[0.105]			[0.094]	[0.093]
Firm Leverage			-0.149***	-0.152***			-0.099**	-0.100**			-0.178***	-0.182***
			[0.030]	[0.030]			[0.042]	[0.042]			[0.040]	[0.040]
Firm Ebitda			0.278***	0.279***			0.301***	0.301***			0.273***	0.276***
			[0.070]	[0.070]			[0.094]	[0.094]			[0.090]	[0.090]
Firm Sales/TA			-0.012	-0.012			-0.012	-0.012			-0.012	-0.013
			[0.012]	[0.012]			[0.025]	[0.025]			[0.014]	[0.014]
Observations	33359	33359	31979	31979	12802	12802	12355	12355	20557	20557	19624	19624
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.27	0.27	0.3	0.3	0.28	0.28	0.31	0.31	0.26	0.26	0.3	0.3

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Impact of Capital Buffer on Firm Loan Growth – COMPUSTAT

	Utilized Amounts				Committed Amounts			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure	-7.265***	-4.923**			-2.445***	-1.583***		
	[1.948]	[2.311]			[0.476]	[0.546]		
Exposure_12			-6.774**	-4.243			-3.200***	-3.098***
			[3.119]	[3.419]			[0.731]	[0.848]
Exposure_13			-7.840***	-7.504**			-3.091***	-1.19
			[2.889]	[3.290]			[0.882]	[0.984]
Exposure_14			-8.982***	-6.891**			-1.746**	-0.84
			[2.602]	[3.020]			[0.764]	[0.866]
Exposure_15			-6.007**	-3			-2.070***	-1.502**
			[2.371]	[2.873]			[0.609]	[0.697]
Exposure_16			-10.219***	-3.655			-2.572***	-0.73
			[3.525]	[4.291]			[0.921]	[1.020]
Firm size		-0.139		-0.137		-0.094***		-0.093***
		[0.095]		[0.095]		[0.030]		[0.030]
Firm Cash/TA		1.213***		1.210***		-0.175		-0.183
		[0.447]		[0.448]		[0.141]		[0.142]
Firm Leverage		-1.093***		-1.109***		-0.468***		-0.470***
		[0.297]		[0.298]		[0.092]		[0.091]
Firm Ebitda		0.682		0.652		0.575**		0.581**
		[0.734]		[0.736]		[0.270]		[0.269]
Firm Sales/TA		-0.538***		-0.534***		-0.160***		-0.168***
		[0.160]		[0.161]		[0.057]		[0.056]
MTB Assets		0.547		0.55		-0.171		-0.162
		[0.398]		[0.398]		[0.131]		[0.131]
Tang. Asset/TA		0.066		0.064		0.078***		0.078***
		[0.045]		[0.045]		[0.016]		[0.016]
Observations	6344	4879	6344	4879	8270	6181	8270	6181
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.26	0.27	0.26	0.27	0.35	0.36	0.35	0.36

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Impact of Capital Buffer on Firm Outcomes - COMPUSTAT

	Total debt				Investment				Employment			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Exposure	-0.754**	-0.329			-0.152	-0.05			-0.228**	0.034		
	[0.350]	[0.385]			[0.138]	[0.154]			[0.096]	[0.106]		
Exposure_12			-0.121	-0.088			0.14	0.121			-0.086	0.332*
			[0.615]	[0.730]			[0.236]	[0.276]			[0.157]	[0.178]
Exposure_13			-0.857	-0.756			-0.147	0.005			-0.176	0.111
			[0.637]	[0.700]			[0.230]	[0.248]			[0.159]	[0.180]
Exposure_14			-1.503**	-0.889			-0.142	0.072			-0.462***	-0.134
			[0.648]	[0.638]			[0.223]	[0.242]			[0.149]	[0.156]
Exposure_15			-0.583	-0.048			-0.390**	-0.360*			-0.155	-0.081
			[0.421]	[0.447]			[0.178]	[0.191]			[0.132]	[0.148]
Exposure_16			-1.306**	-0.094			-0.094	0.294			-0.430**	-0.069
			[0.551]	[0.625]			[0.257]	[0.289]			[0.189]	[0.200]
Firm size		-0.087***		-0.087***		-0.030***		-0.031***		-0.065***		-0.066***
		[0.026]		[0.026]		[0.011]		[0.011]		[0.008]		[0.008]
Firm Cash/TA		0.131		0.129		0.189***		0.190***		0.173***		0.174***
		[0.127]		[0.127]		[0.052]		[0.052]		[0.034]		[0.034]
Firm Leverage		-1.097***		-1.099***		-0.128***		-0.128***		-0.094***		-0.094***
		[0.084]		[0.084]		[0.036]		[0.036]		[0.025]		[0.025]
Firm Ebitda		-0.045		-0.051		0.585***		0.588***		0.233***		0.233***
		[0.236]		[0.236]		[0.123]		[0.122]		[0.061]		[0.061]
Firm Sales/TA		-0.103		-0.102		-0.008		-0.008		-0.013		-0.012
		[0.078]		[0.079]		[0.021]		[0.021]		[0.015]		[0.015]
MTB Assets		0.031		0.032		-0.187***		-0.186***		-0.051		-0.052
		[0.123]		[0.122]		[0.047]		[0.047]		[0.038]		[0.038]
Tang. Asset/TA		0.092***		0.092***		0.059***		0.059***		0.027***		0.027***
		[0.016]		[0.016]		[0.006]		[0.006]		[0.004]		[0.004]
Observations	7560	6077	7460	6077	7833	6442	7833	6442	7516	6230	7516	6230
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.32	0.39	0.32	0.39	0.51	0.56	0.51	0.56	0.56	0.6	0.56	0.6

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%