

How Do Global Systemically Important Banks Lower Capital Surcharges?

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Big-Picture Questions

- In recent years, many countries introduced capital surcharges on global systemically important banks (GSIBs)
- GSIB surcharges are a major innovation in bank capital regulation
 - Risk-based capital regulation incentivizes banks to reduce risk
 - Surcharges motivate banks to lower their systemic footprints
- GSIB surcharges
 - May promote financial stability because it requires GSIBs to hold more capital
 - But may also harm the economy because banks may constrain their activities

What We Do

- We examine how U.S. GSIBs adjust systemic importance indicators to lower surcharges
 - Surcharges increase with scores that are linear functions of indicators measured at year-end
 - Thus, GSIBs should lower indicators at year-end to reduce their surcharges
- We test whether GSIBs lower indicators in the fourth quarter
- Empirical strategy compares
 - GSIBs to non-GSIBs
 - fourth quarter to other quarters
 - before and after introduction of surcharges, in 2016

What We Do

- We also test also hypotheses based on characteristics of the U.S. rule
 - Substitutability indicators only determine whether a bank is a GSIB, not its surcharge
 - Bank size and short-term wholesale funding indicators are measured as annual and fourth-quarter averages, respectively
 - These indicators should less subject to window-dressing in the fourth quarter
- Our results confirm these hypotheses
 - Banks mainly adjust 1 indicator out of 13: the notional amount of OTC derivatives
 - Our findings differ sharply from Behn *et al.* (2019), who study EU banks



GSIBs Capital Surcharges

Slides in this section are borrowed from Favara, Ivanov, and Rezende (2019)

Capital Surcharges on GSIBs

Banks with Total Assets > \$100 Bn.



Method 1 Score_{t-1} = f(Systemic Importance Indicators_{t-1})

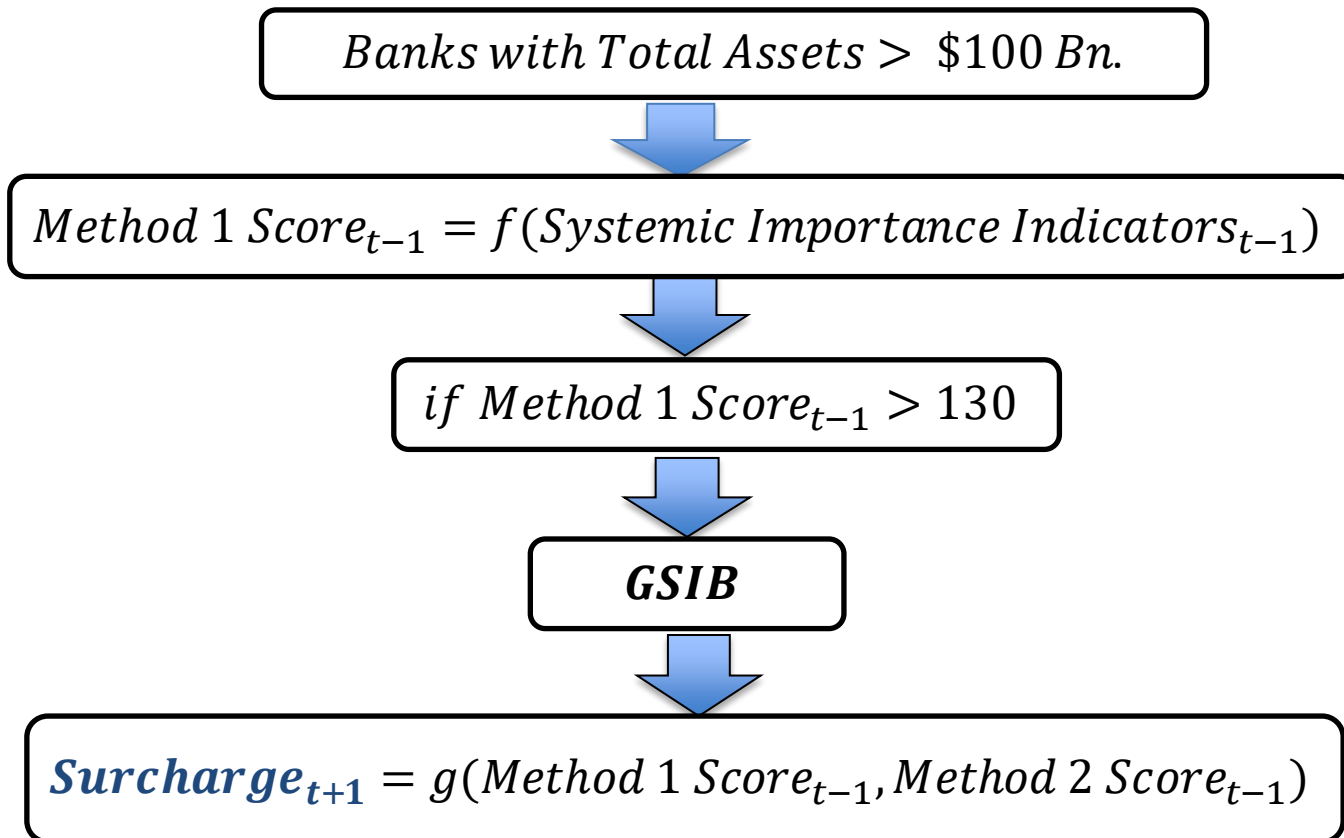
Systemic Importance Indicators and Weights

Category	Systemic Importance Indicator	Weight (%)
Size	Total Exposure	20.00
Interconnectedness	Intra-financial system assets	6.67
	Intra-financial system liabilities	6.67
	Securities outstanding	6.67
Substitutability	Payments activity	6.67
	Assets under custody	6.67
	Underwritten transactions in debt and equity markets	6.67
Complexity	Notional Amount of OTC derivatives	6.67
	Trading and AFS securities	6.67
	Level 3 assets	6.67
Cross-Jurisdiction Activity	Cross-jurisdictional claims	10.00
	Cross-jurisdictional liabilities	10.00

— **Method 1 score is the weighted sum of 12 indicators**

- Indicators depend on market prices that banks do not control

Capital Surcharges on GSIBs



Systemic Importance Indicators and Weights

Category	Systemic Indicator	Weight (%)
Size	Total Exposure	4.423
Interconnectedness	Intra-financial system assets	12.007
	Intra-financial system liabilities	12.490
	Securities outstanding	9.056
Short-term wholesale funding	Short-term wholesale funding score	1.000
Complexity	Notional Amount of OTC derivatives	0.155
	Trading and AFS securities	30.169
	Level 3 assets	16.1177
Cross-Jurisdiction Activity	Cross-jurisdictional claims	9.277
	Cross-jurisdictional liabilities	9.926

— **Method 2 replaces substitutability indicators with short-term wholesale funding**

— Coefficients are fixed

Method 1 Scores and Surcharges

Method 1 Score	Method 1 Surcharge (%)
130 or less	0.00
130-299	1.00
230-329	1.50
330-429	2.00
430-529	2.50
530 or more	3.5 + 1.0 for each 100bps above 530

— Step function of scores

Method 2 Scores and Surcharges

Method 2 Score	Method 2 Surcharge (%)
130 or less	0.00
130-299	1.00
230-329	1.50
330-429	2.00
430--529	2.50
530-629	3.00
630-729	3.50
730-829	4.00
830-929	4.50
930-1029	5.00
1030-1129	5.50
1130 or more	6.5 + 0.5 for each 100bps above 1130

- **Method 2 surcharges are at least as high as method 1 surcharges**
 - In practice, method 1 determines whether a bank is a GSIB, method 2 determines GSIB surcharges

Capital Surcharges on GSIBs

Banks with Total Assets > \$100 Bn.

Method 1 Score_{t-1} = f(Systemic Importance Indicators_{t-1})

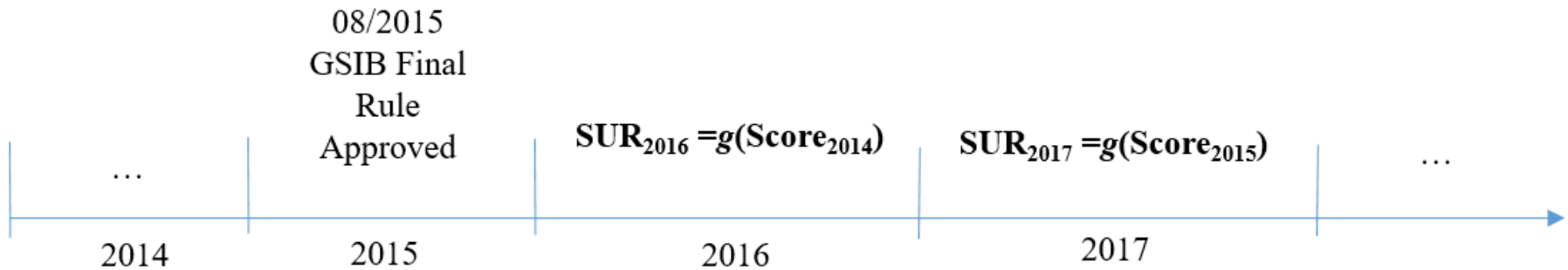
if Method 1 Score_{t-1} > 130

GSIB

Surcharge_{t+1} = g(Method 1 Score_{t-1}, Method 2 Score_{t-1})

$$\frac{E_{i,t+1}}{RWA_{t+1}} \geq k_i + \text{Surcharge}_{t+1}; E_i \in \{CET1, \text{Tier 1}, \text{Total Capital}\}; k_i \text{ min Basel III}$$

Timeline of GSIB Rule Implementation:



- **GSIB surcharges are a known function of predetermined $(t - 2)$ bank's systemic importance scores**
 - Surcharges in 2016 are functions of systemic importance scores determined before the introduction of the rule

How Can Banks Lower Scores?

OTC derivatives compression

- Counterparties substitute contracts with a new set of contracts that has the minimum notional amounts that to keep participants' net position unchanged.
- **Advantages**
 - Keeps net positions unchanged
 - Notional amount of OTC derivatives has a large weight on surcharges
 - Quick operation, can be made close to year-end

Repo Termination

- **Banks can stop repo-style transactions—borrowing short-term wholesale funds and lending those funds overnight**
- **Advantages**
 - Quick operation, can be reduced at year-end and resumed shortly after
 - Repo termination reduces four indicators: intra-financial system assets and liabilities and cross-jurisdictional assets and liabilities

How Can Banks Lower Scores?

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2. Repo termination

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- Advantages
 - Quick operation too
 - Repo termination reduces four indicators: intra-financial system assets and liabilities and cross-jurisdictional assets and liabilities.

Data and Empirical Framework

Data

1. **Bank-level data on banks' systemic importance (FR Y-15)**

- Systemic importance indicators
- Scores

2. **Bank characteristics (FR Y-9C)**

- Components of systemic importance indicators (longer time series)
- Capital ratios, profitability, loan performance

2. **We dropped banks**

- With less than \$100 billion of assets (Y-15 threshold change in 2018)
- That changed the reporting entity over time

GSIBs and Non-GSIBs (in Our Sample)

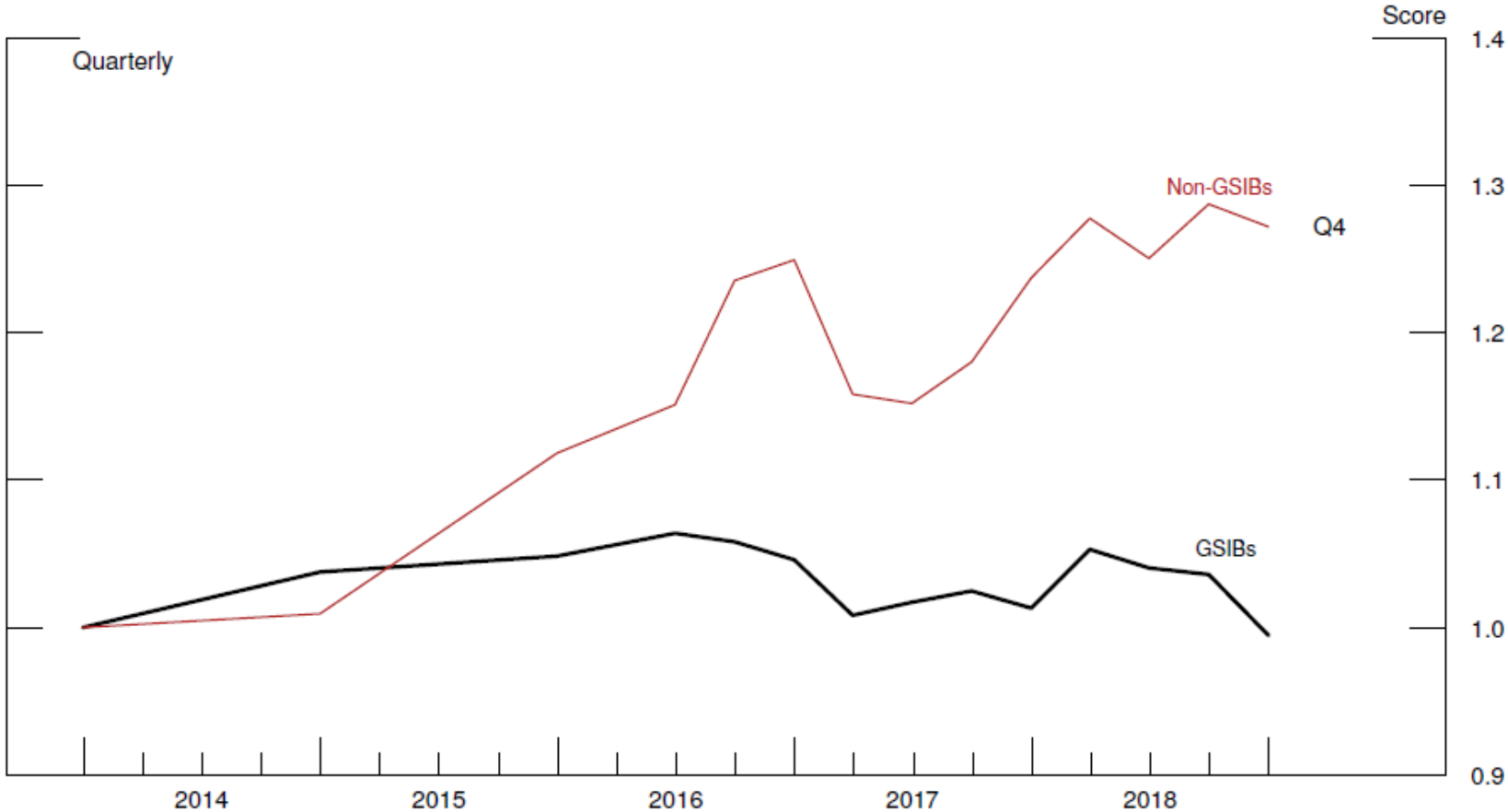
GSIBs (8)

BANK OF AMERICA
BANK OF NY MELLON
CITIGROUP
GOLDMAN SACHS
JPMORGAN CHASE
MORGAN STANLEY
STATE STREET
WELLS FARGO

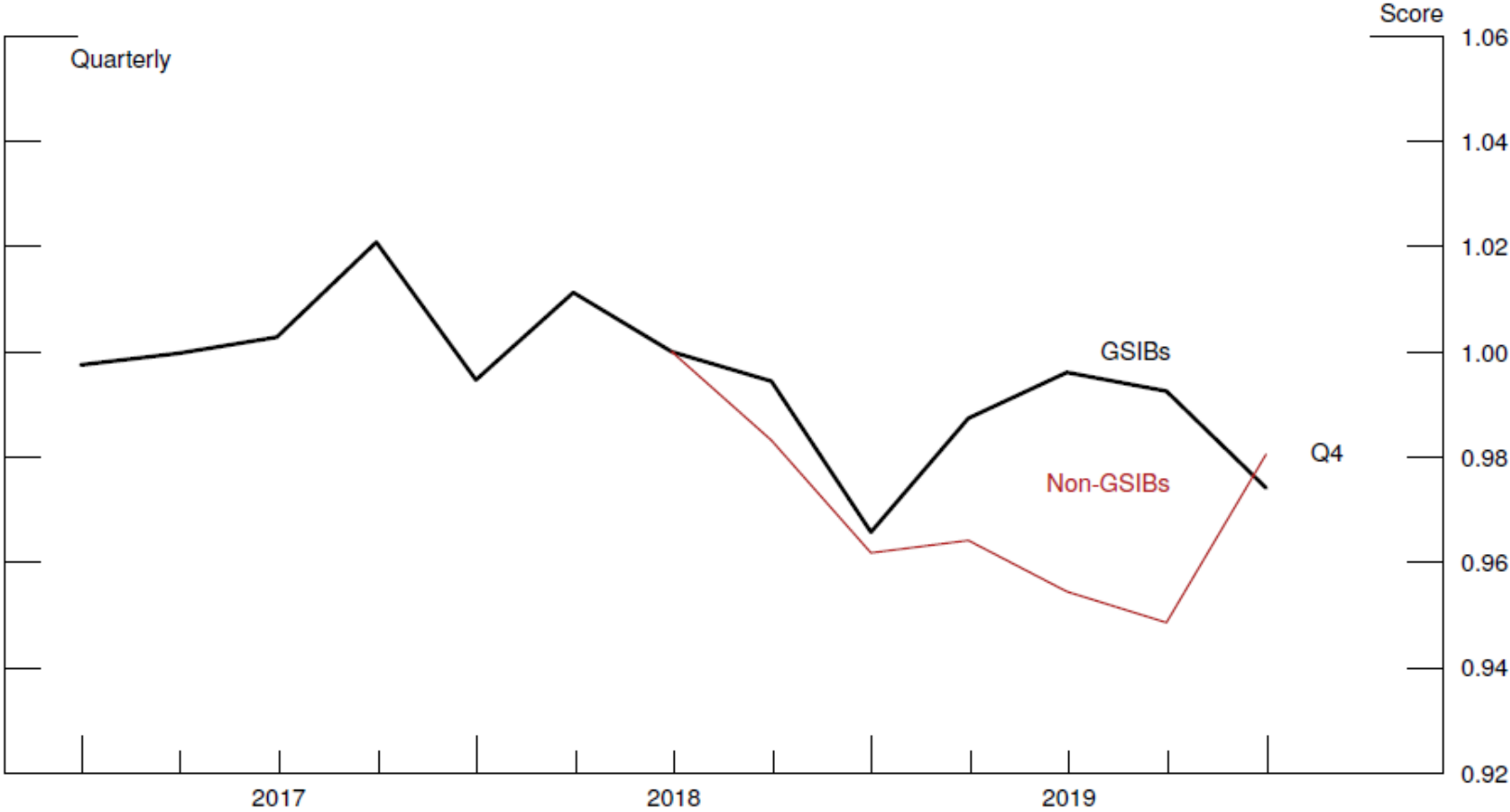
Non-GSIBs (20)

ALLY
AMERICAN EXPRESS
BB&T (now TRUIST)
BBVA
BMO
CAPITAL ONE
CITIZENS
DISCOVER
FIFTH THIRD
HSBC
HUNTINGTON
KEYCORP
M&T
MUFG
NORTHERN TRUST
PNC
REGIONS
SANTANDER
SUNTRUST (now TRUIST)
U.S. BANCORP

Method 1 Scores



Method 2 Scores



Empirical Strategy

1. Differences in differences

- (i) GSIBs vs. non-GSIBs and (ii) fourth quarter vs. other quarters
- Dependent variables are scores and systemic importance indicators (Y-15 data)

2. Triple differences

- (i) GSIBs vs. non-GSIBs, (ii) fourth quarter vs. other quarters, (iii) before and after surcharges were introduced
- Dependent variables are components of systemic importance indicators (Y-9C data)



Regression Framework

- DD analysis with bank (i) and year-quarter(t) data

$$Y_{it} = \gamma GSIB_i \times Post_t + \delta GSIB_i \times t + \sum_{s=2}^4 \beta_s GSIB_i \times I\{s = q(t)\} + \Psi X_{it} + v_i + \varphi_t + \epsilon_{it}$$

- Y_{it} is a bank score or systemic importance indicator
- $\gamma GSIB_i \times Post_t$ is a change in level for GSIBs after introduction of surcharges
- $\delta GSIB_i \times t$ is a different trend for GSIBs
- $\sum_{s=2}^4 \beta_s GSIB_i \times I\{s = q(t)\}$ is a vector of quarterly jumps for GSIBs
- ΨX_{it} are time-varying bank characteristics
- v_i and φ_t are bank and time fixed effects
- Standard errors clustered at the bank level



Hypotheses

$$Y_{it} = \gamma GSIB_i \times Post_t + \delta GSIB_i \times t + \sum_{s=2}^4 \beta_s GSIB_i \times I\{s = q(t)\} + \Psi X_{it} + v_i + \varphi_t + \epsilon_{it}$$

- H1: $\beta_4 < 0$
 - Because surcharges are determined by scores measured in the fourth quarter, GSIBs have a stronger incentive to lower their scores and indicators in those quarters to avoid or reduce GSIB surcharges.



Hypotheses

$$Y_{it} = \gamma GSIB_i \times Post_t + \delta GSIB_i \times t + \sum_{s=2}^4 \beta_s GSIB_i \times I\{s = q(t)\} + \Psi X_{it} + v_i + \varphi_t + \epsilon_{it}$$

- H2: β_4 should be higher (that is, closer to zero) when the dependent variable is a systemic importance indicator that affects only the method 1 score than when the dependent variable is an indicator that affects the method 2 score.
 - Even though the method 1 score alone determines whether a bank is a GSIB, the method 2 surcharge has always been higher than or equal to the method 1 surcharge for all GSIBs, implying that the method 2 score has determined the surcharge that GSIBs are actually subject to.



Hypotheses

$$Y_{it} = \gamma GSIB_i \times Post_t + \delta GSIB_i \times t + \sum_{s=2}^4 \beta_s GSIB_i \times I\{s = q(t)\} + \Psi X_{it} + v_i + \varphi_t + \epsilon_{it}$$

- H3: β_4 should be higher (that is, closer to zero) when the dependent variable is a systemic importance indicator measured as an average over the quarter (total exposures) and over the year (short-term wholesale funding) compared with indicators measured at the end of the year (all other indicators).
 - All else equal banks should incur in higher costs when adjusting indicators measured as an average over the quarter and over the year as opposed to indicators measured at year-end because the latter would require banks to lower indicators for a shorter period of time.

Part I

- **Scores**
 - Method 1 and 2 scores
- **Systemic Importance Indicators**
 - 13 indicators that compose method 1 and 2 scores

GSIB Surcharges and Scores

Table 3: Effects of GSIB Status on Systemic Importance Scores

	Method 1 score						Method 2 score					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GSIB × post	0.004 (0.030)	0.002 (0.030)	-0.009 (0.031)	0.003 (0.029)	-0.035 (0.031)	-0.038 (0.032)						
GSIB × time trend	-0.031* (0.012)	-0.031* (0.012)	-0.029* (0.012)	-0.031* (0.012)	-0.028* (0.012)	-0.027* (0.012)	-0.049* (0.022)	-0.048* (0.022)	-0.049* (0.022)	-0.049* (0.022)	-0.055* (0.022)	-0.053* (0.022)
GSIB × 1st quarter		0.014 (0.010)						0.021 (0.014)				
GSIB × 2nd quarter			0.027 (0.015)			0.008 (0.012)			-0.003 (0.010)			-0.018 (0.016)
GSIB × 3rd quarter				0.004 (0.010)		-0.009 (0.013)				0.001 (0.006)		-0.015 (0.014)
GSIB × 4th quarter					-0.043** (0.014)	-0.043** (0.015)					-0.021* (0.010)	-0.032* (0.015)
Bank controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	392	392	392	392	392	392	228	228	228	228	228	228
Banks	28	28	28	28	28	28	28	28	28	28	28	28
R-squared	0.36	0.36	0.36	0.36	0.37	0.37	0.28	0.29	0.28	0.28	0.28	0.29

NOTE: This table presents estimates of equation (2). Each observation is a bank-time pair. In columns 1 to 6 and 7 to 12, the dependent variable is the natural logarithm of the method 1 and of the method 2 score, respectively. In columns 1 to 6, the data range from the fourth quarter of 2013 to the fourth quarter of 2018. In columns 7 to 12, the data range from the fourth quarter of 2016 to the third quarter of 2019. The frequency of the data is annual from 2013 to 2015 (collected in the fourth quarter) and quarterly from the second quarter of 2016 on. All specifications include as independent variables total assets, total capital ratio, tier-1 capital ratio, leverage ratio, return on assets, return on equity, net interest margin, delinquency ratio, and charge off ratio. All specifications also include bank and time fixed effects. Standard errors are clustered at the bank level.

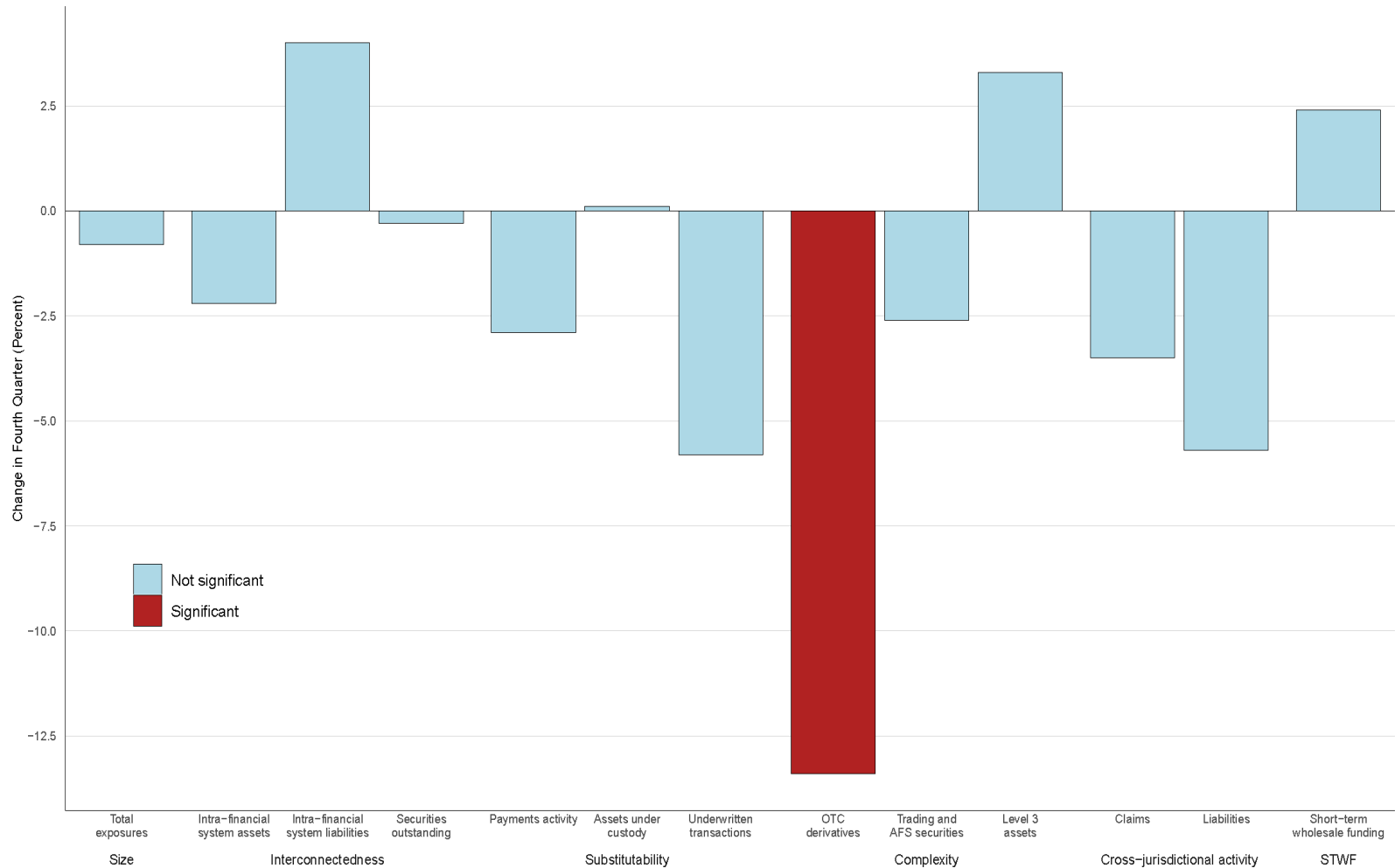
GSIB Surcharges and Systemic Importance Indicators

Table 4: Effects of GSIB Status on Systemic Importance Indicators

	Size	Interconnectedness			Substitutability			Complexity			Cross-jur. activ.		STWF
	Total exposures	Intra-fin. system assets	Intra-fin. system liabilities	Securities outstand.	Payments activity	Assets under custody	Underwr. debt and equity	Notional OTC der. amount	Trading and AFS securities	Level 3 assets	Cross-jur. claims	Cross-jur. liabilities	Short-term wholesale funding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
GSIB × post	-0.031 (0.033)	0.084 (0.087)	-0.039 (0.110)	0.070 (0.089)	0.090 (0.159)	-0.058 (0.062)	0.059 (0.134)	-0.190* (0.071)	-0.086 (0.167)	-0.193 (0.143)	-0.004 (0.086)	0.184 (0.149)	
GSIB × time tr.	-0.033** (0.007)	-0.081* (0.034)	-0.087* (0.036)	-0.008 (0.023)	-0.031 (0.043)	0.046 (0.034)	-0.113* (0.048)	-0.075 (0.040)	-0.055 (0.067)	-0.109 (0.064)	0.029 (0.020)	-0.031 (0.037)	-0.067 (0.034)
GSIB × 2nd qtr.	0.003 (0.005)	-0.007 (0.031)	0.055 (0.046)	-0.013 (0.013)	-0.009 (0.024)	0.005 (0.014)	-0.011 (0.045)	-0.021 (0.027)	0.029 (0.045)	0.019 (0.065)	-0.003 (0.022)	0.027 (0.036)	-0.031 (0.026)
GSIB × 3rd qtr.	-0.002 (0.004)	-0.003 (0.043)	0.038 (0.050)	-0.003 (0.012)	-0.005 (0.021)	-0.001 (0.019)	-0.053 (0.053)	-0.045 (0.025)	-0.009 (0.040)	0.042 (0.062)	-0.014 (0.022)	-0.056 (0.046)	-0.015 (0.027)
GSIB × 4th qtr.	-0.008 (0.006)	-0.022 (0.033)	0.040 (0.060)	-0.003 (0.013)	-0.029 (0.023)	0.001 (0.016)	-0.058 (0.057)	-0.134** (0.038)	-0.026 (0.045)	0.033 (0.074)	-0.035 (0.030)	-0.057 (0.052)	-0.024 (0.023)
Bank controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank f.e.?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time f.e.?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	476	476	425	459	442	374	306	476	459	357	476	392	228
Banks	28	28	25	27	26	22	18	28	27	21	28	27	28
R-squared	0.50	0.15	0.11	0.41	0.31	0.22	0.31	0.43	0.23	0.28	0.21	0.25	0.29

NOTE: This table presents estimates of equation (2). Each observation is a bank-time pair. In each column, the dependent variable is the natural logarithm of the dollar amount of a systemic importance indicator. In columns 1 to 12, the data range from the fourth quarter of 2013 to the third quarter of 2019. In column 13, the data range from the fourth quarter of 2016 to the third quarter of 2019. The frequency of the data is annual from 2013 to 2015 (collected in the fourth quarter) and quarterly from the second quarter of 2016 on. All specifications include as independent variables total assets, total capital ratio, tier-1 capital ratio, leverage ratio, return on assets, return on equity, net interest margin, delinquency ratio, and charge off ratio. All specifications also include bank and time fixed effects. Standard errors are clustered at the bank level.

GSIB Surcharges and Systemic Importance Indicators



Part II

- **More evidence on notional amount of OTC derivatives**
 - Y-9C data separated by types of derivatives
 - Y-9C data start earlier than surcharges and allow us to
 - Examine the change in seasonality
 - Check pre-trends



New Hypothesis

$$Y_{it} = \gamma GSIB_i \times Post_t + \delta GSIB_i \times t + \sum_{s=2}^4 \beta_s GSIB_i \times I\{s = q(t)\} \\ + \sum_{s=2}^4 \theta_s GSIB_i \times I\{s = q(t)\} \times Post_t + \Psi X_{it} + v_i + \varphi_t + \epsilon_{it}$$

- H4: $\theta_4 < 0$
 - Because surcharges are determined by scores measured in the fourth quarter, GSIBs have a stronger incentive to lower their scores and indicators in those quarters to avoid or reduce GSIB surcharges **once surcharges are introduced**.

GSIB Surcharges and Interest Rate OTC Derivatives

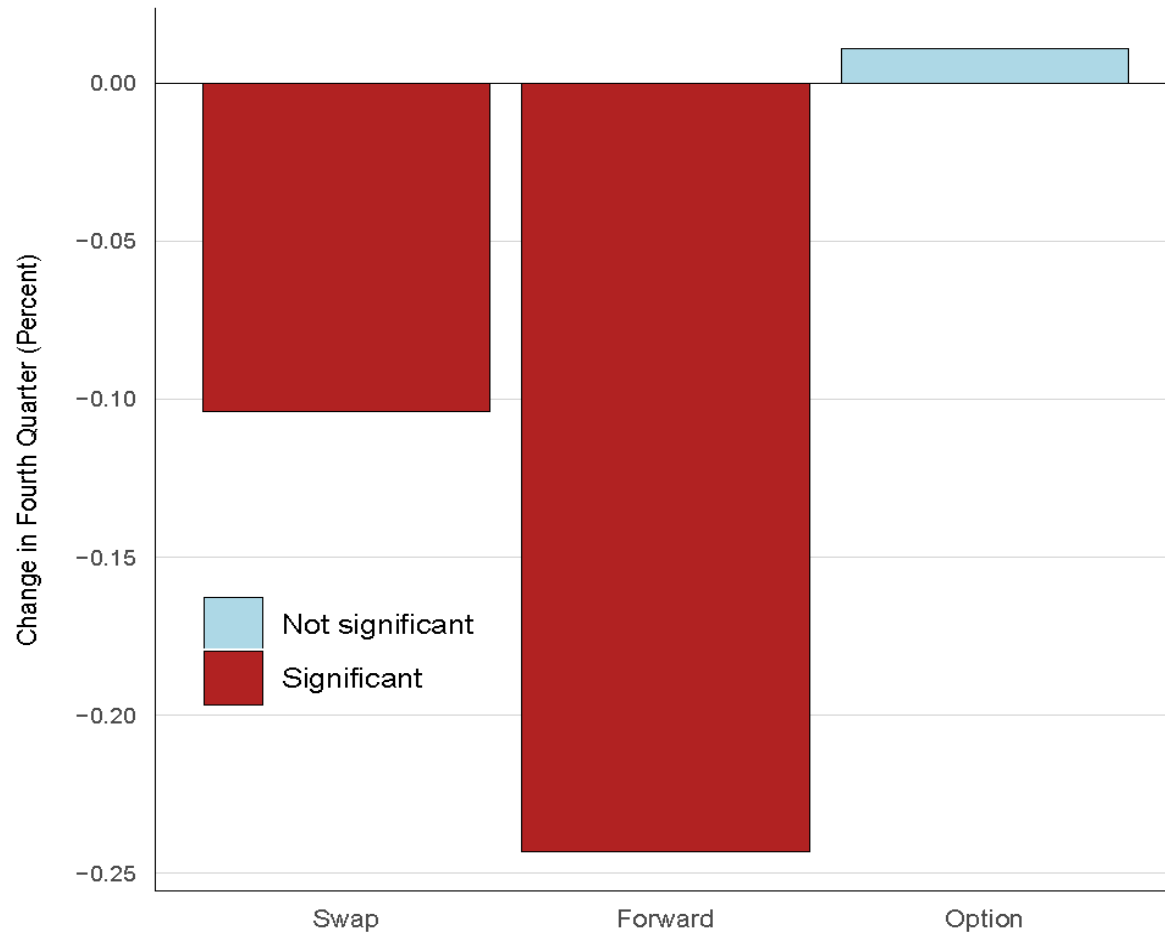
Table 6: Effects of GSIB Status on Interest Rate OTC Derivatives

	Forwards	Options	Swaps
	(1)	(2)	(3)
GSIB × post	-0.435 (0.403)	-0.891 (0.552)	-0.802** (0.218)
GSIB × time tr.	0.018 (0.031)	0.016 (0.050)	0.022 (0.037)
GSIB × 2nd qtr.	-0.053 (0.060)	-0.101 (0.058)	-0.044* (0.021)
GSIB × 3rd qtr.	-0.126 (0.068)	-0.047 (0.045)	-0.040 (0.022)
GSIB × 4th qtr.	-0.018 (0.066)	-0.012 (0.066)	-0.008 (0.022)
GSIB × 2nd qtr. × post	-0.015 (0.135)	0.108 (0.070)	0.024 (0.023)
GSIB × 3rd qtr. × post	-0.208* (0.087)	0.046 (0.071)	-0.060 (0.040)
GSIB × 4th qtr. × post	-0.243* (0.094)	0.011 (0.078)	-0.104* (0.041)
Bank controls?	Yes	Yes	Yes
Bank f.e.?	Yes	Yes	Yes
Time f.e.?	Yes	Yes	Yes
Observations	1,787	2,004	2,124
Banks	27	27	28
R-squared	0.42	0.33	0.69

NOTE: This table presents estimates of equation (2). Each observation is a bank-time pair. In columns 1 to 3, the dependent variable is the natural logarithm of the notional amount of forward, option, and swap interest rate OTC derivatives, respectively. The data are quarterly and range from the fourth quarter of 1996 to the third quarter of 2019. All specifications include as independent variables total assets, total capital ratio, tier-1 capital ratio, leverage ratio, return on assets, return on equity, net interest margin, delinquency ratio, and charge off ratio. All specifications also include bank and time fixed effects. Standard errors are clustered at the bank level.

- **GSIB surcharges reduce the notional amounts of interest rate forwards and swaps**

GSIB Surcharges and Interest Rate OTC Derivatives



Conclusion

- **GSIBs lower scores in the fourth quarter to reduce surcharges**
- **The effect is concentrated in one indicator: the notional amount of OTC derivatives**
- **Takeaway:**
 - In line with the objective of surcharges, banks respond to incentives to reduce systemic footprint
 - Response is unevenly distributed across indicators
 - Banks appear to avoid disruptions to their activities

Thank you!