Do negative interest rate make banks less safe?

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Motivation

- Post-crisis, unprecedented effort by central banks to stimulate growth and to escape low-inflation regimes.
- Unconventional monetary policies (such as forward guidance, asset purchases) have become the new *norm*.
- Some central banks (e.g. Nationalbanken, Riksbank, SNB, ECB) in the industrialized world have gone further and introduced negative deposit rates.
- The financial stability impact of negative deposit rates is controversial/not yet fully understood. Good? Bad? For whom? Different from cuts during normal times?

Literature

- Hannoun (2015) critically evaluates the pros and cons of ultra-low or negative interest rates on financial stability and growth; Dombret (2017) focuses on their impact on banks, consumers and the economy.
- Haider et al. (2017) find that negative policy rates transmit to the real sector: Euro-area banks with more deposits lend less and to riskier borrowers.
- Brunnermeier and Koby (2017) study the reversal interest rate. This is the rate that reverses the effects of accommodative monetary policy and that makes it contractionary for lending.

Contribution

- We evaluate the impact of negative interest rates on banks' propensity to become undercapitalized in a financial crisis ("SRisk").
- Impact could be beneficial: E.g., fewer NPLs when economy picks up, higher recoveries.
- Impact could be adverse: E.g., via reduced bank profitability (tax), more aggressive risk taking/reach-for-yield.
- Banks are highly heterogenous. Which *type* of bank (business model group) becomes more/less risky?

Outline

1. We cluster European banks into business model groups based on a recent modeling framework.

2. For unlisted banks, we match SRisk (Engle and Brownlees, 2016) to similar listed banks based on observables.

3. We use Difference-in-Differences (DiD) panel regressions around: i) three successive deposit facility rate (DFR) cuts to study the impact of negative deposit rates; ii) a fourth cut from positive to zero.

4. Robustness.

Main empirical findings

- The cuts to negative values lower the average level of risk.
- On top of this overall effect, there are substantial, heterogeneous, business model-specific effects. In relative terms we find that:
  1. Large universal banks (a diversified business model) are perceived to be less risky.
  2. Smaller, traditional, banks (depending more on deposit funding) are perceived as more risky.
- The cut from positive territory triggers different risk responses than a cut from below zero.

Two steps

We identify bank business model groups in two steps:

1. Allocate *“clear-cut”* cases based on simple thresholding rules.

2. Use a sophisticated finite mixture model for multivariate panel data (Lucas, Schaumburg, Schwaab, 2016) to allocate the non-obvious cases.

Identification based on

- $N = 111$ euro-area banks.
- Quarterly accounting data from SNL Financial between 2012Q2 – 2014Q2. Sample is post-OMT, but pre-deposit rate cuts.
- Dimensions for distinguishing bank business models: size, complexity, activities, geographical reach, funding structure, ownership.
- 13 indicators are selected as clustering variables (next slide).

Indicator variables

Category	Variable	Transformation
Size	1. Total assets	$\ln(\text{Total Assets})$
	2. Leverage w.r.t. CET1 capital	$\ln\left(\frac{\text{Total Assets}}{\text{CET1 capital}}\right)$
Complexity/	3. Net loans to assets	$\Phi^{-1}\left(\frac{\text{Loans}}{\text{Assets}}\right)$
non-traditional	4. Risk mix	$\ln\left(\frac{\text{Market Risk+Operational Risk}}{\text{Credit Risk}}\right)$
activities	5. Assets held for trading	$\frac{\text{Assets in trading portfolios}}{\text{Total Assets}}$
”	6. Derivatives held for trading	$\frac{\text{Derivatives held for trading}}{\text{Total Assets}}$
”	7. Share of net interest income	$\frac{\text{Net interest income}}{\text{Operating revenue}}$
”	8. Share of net fees & commission income	$\frac{\text{Net fees and commissions}}{\text{Operating income}}$
”	9. Share of trading income	$\frac{\text{Trading income}}{\text{Operating income}}$
”	10. Retail loans	$\frac{\text{Retail loans}}{\text{Retail and corporate loans}}$
Geography	11. Domestic loans ratio	$\Phi^{-1}\left(\frac{\text{Domestic loans}}{\text{Total loans}}\right)$
Funding	12. Loan-to-deposits ratio	$\frac{\text{Total loans}}{\text{Total deposits}}$
Ownership	13. Ownership index	categorial, plus noise

Business model labels

(A) **Large universal banks** (15.3% of firms)

(B) **Corporate/wholesale lenders** (19.8% of firms)

(C) **Fee-focused banks/asset managers** (16.2% of firms)

(D) **Small diversified lenders** (28.8% of firms)

(E) **Domestic retail lenders** (11.7% of firms)

(F) **Mutual/co-operative banks** (8.1% of firms)

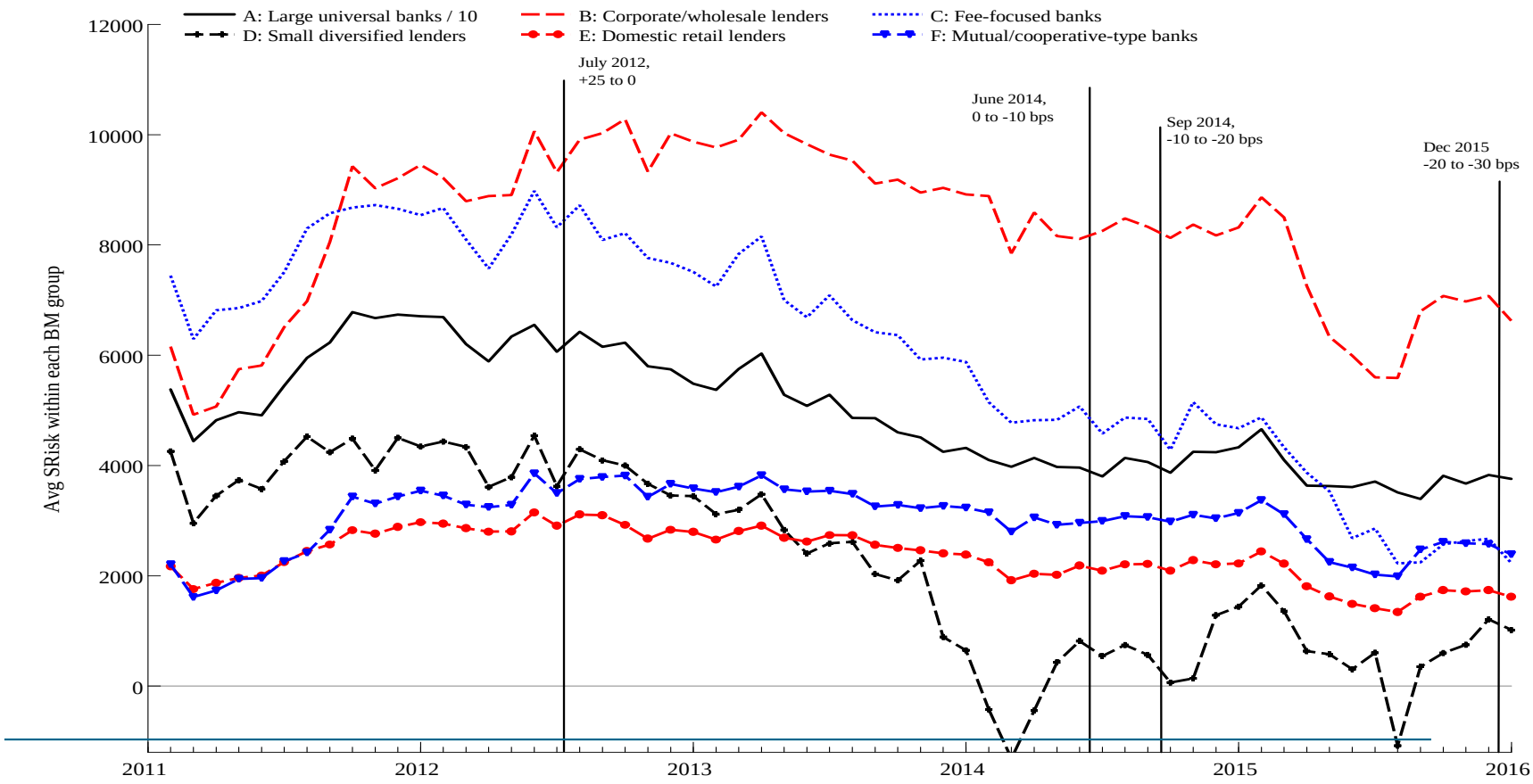
SRisk

- We consider banks' propensity to be undercapitalized in a crisis; see Engle and Brownlees (2016)
- SRisk := the capital shortfall of a bank conditional on a -40% drawdown in a world equity index over a six months horizon. Depends on bank size, leverage, and the expected equity loss conditional on the market decline.
- Publicly available at https://vlab.stern.nyu.edu/.

Matching

- A SRisk measurement is available only for 44 (of 111) euro area banks in our sample.
- We infer SRisk for the remaining 67 banks through matching on the same 13 indicators shown before.
- For each bank, we rank business model peers according to their Mahalanobis distance, $D_{x,y} = \sqrt{(x-y)^T S^{-1}(x-y)}$.
- For a non-listed firm, SRisk is a weighted average of its ranked neighbours in the same business model, $\text{SRisk}_{it} = \sum_{j=1}^{J_i} \text{SRisk}_{jt} \cdot \omega_j$ with $\omega_1 > \omega_2 > ... > \omega_{J_i}$.

Average SRisk per firm across business model groups



DiD around deposit rate cuts

- We estimate

$$\text{SRisk}_{it} = \alpha + \beta \text{P}_t + \sum_{k=1}^{K-1} \gamma_k \text{BM}_{ik} + \sum_{k=1}^{K-1} \delta_k \text{P}_t \cdot \text{BM}_{ik} + \epsilon_{it}$$

  where $\mathbf{P_t}$ is 1 after a ECB DFR cut, and $\mathbf{BM}_i$ is a set of dummy variables indicating the business model.
- Short window: -1,+1 month around a ECB DFR cut.
- Reference group is the business model the least dependent on interest rate spread, i.e., Fee-focused banks/asset managers .

Estimation results

	cut 1	cut 2	cut 3	cut +
Date	Jun 5, 2014	Sep 4, 2014	Dec 3, 2015	Jul 5, 2012
Cut in bps	0 → -10	-10 → -20	-20 → -30	+25 → 0
P_t	**-378.93**	**-592.41**	**-353.53**	**968.05**
	(-4.19)	(-6.50)	(-2.76)	(5.81)
const.	**9226.90**	**9328.24**	**8447.32**	**14152.36**
	(5.19)	(5.21)	(5.09)	(5.91)
R-squared	<0.01	<0.01	<0.01	<0.01
Obs	222	222	222	222
$P_t \cdot$ A	**-1078.08**	**-1375.45**	-280.34	**3179.24**
	(-2.34)	(-4.44)	(-0.53)	(5.90)
$P_t \cdot$ B	**636.53**	353.48	-13.09	191.91
	(2.91)	(1.41)	(-0.05)	(0.81)
$P_t \cdot$ D	220.52	52.84	255.50	267.03
	(1.00)	(0.21)	(0.61)	(0.65)
$P_t \cdot$ E	399.25	**434.24**	319.55	-197.15
	(1.72)	(2.02)	(1.31)	(-0.88)
$P_t \cdot$ F	**523.87**	**474.53**	255.22	-145.33
	(2.48)	(2.33)	(1.06)	(-0.65)
P_t	**-492.79**	**-556.38**	-439.78	401.00
	(-2.34)	(-2.73)	(-1.82)	(1.81)
R-squared	0.50	0.52	0.56	0.64
Obs	222	222	222	222

- **A=Large universal banks, B=Corporate/wholesale lenders, D=Small diversified lenders, E=Domestic retail lenders, F=Mutual/co-operative banks, Reference group=Fee-focused banks/asset managers.**

Robustness (2): Placebo tests

Window	April/May 2014	July/Aug 2014	Oct/Nov 2015	May/Jun 2012
P_t	145.29	**-203.88**	**400.91**	**-1322.53**
	(1.08)	(-2.31)	(3.99)	(-7.42)
const.	**9081.61**	**9532.12**	**8046.40**	**15474.89**
	(5.14)	(5.21)	(4.99)	(6.16)
R-squared	<0.01	<0.01	<0.01	<0.01
Obs	222	222	222	222
$P_t \cdot$ A	-356.35	-742.22	**1545.63**	**-4213.74**
	(-0.46)	(-1.91)	(4.02)	(-8.35)
$P_t \cdot$ B	-293.44	-121.37	58.72	-86.24
	(-1.37)	(-0.43)	(0.35)	(-0.41)
$P_t \cdot$ D	146.63	-150.44	404.47	-257.48
	(0.62)	(-1.19)	(1.90)	(-0.87)
$P_t \cdot$ E	-72.58	33.72	-19.62	**414.28**
	(-0.45)	(0.40)	(-0.30)	(2.21)
$P_t \cdot$ F	-203.08	10.11	-55.77	299.55
	(-1.42)	(0.14)	(-0.83)	(1.59)
P_t	240.72	-27.54	42.77	**-658.66**
	(1.74)	(-0.41)	(0.66)	(-3.57)
R-squared	0.51	0.52	0.54	0.64
Obs	222	222	222	222

- **A=Large universal banks, B=Corporate/wholesale lenders, D=Small diversified lenders, E=Domestic retail lenders, F=Mutual/co-operative banks, Reference group=Fee-focused banks/asset managers.**

Robustness (1): SRisk banks

	cut 1	cut 2	cut 3	cut +
Date	Jun 5, 2014	Sep 4, 2014	Dec 3, 2015	Jul 5, 2012
Cut in bps	0 → -10	-10 → -20	-20 → -30	+25 → 0
P_t	**-726.18**	**-861.79**	-406.79	**1236.86**
	(-3.71)	(-4.40)	(-1.26)	(3.34)
const.	**13394.86**	**13347.77**	**11921.34**	**20196.89**
	(3.29)	(3.25)	(3.18)	(3.92)
R-squared	<0.01	<0.01	<0.01	<0.01
Obs	88	88	88	88
$P_t \cdot$ A	-1424.90	**-1508.04**	-98.37	**3272.15**
	(-1.65)	(-2.52)	(-0.09)	(2.95)
$P_t \cdot$ B	283.59	-1150.04	-948.5	338.40
	(0.55)	(-0.97)	(-0.83)	(0.50)
$P_t \cdot$ D	325.42	-76.04	462.44	242.96
	(0.90)	(-0.17)	(0.62)	(0.34)
$P_t \cdot$ E	422.09	389.25	545.80	-448.29
	(1.00)	(1.01)	(1.34)	(-1.19)
P_t	-661.09	-548.45	-597.00	578.09
	(-1.91)	(-1.61)	(-1.49)	(1.59)
R-squared	0.56	0.57	0.60	0.65
Obs	88	88	88	88

- **No banks in F=Mutual/co-operative banks**
- **A=Large universal banks, B=Corporate/wholesale lenders, D=Small diversified lenders, E=Domestic retail lenders, Reference group=Fee-focused banks/asset managers.**

Conclusion

Negative deposit rates have a potential financial stability impact and impact is different across bank business models.

Overall, the cuts to negative values have reduced the average level of risk.

Relative to fee-focused banks, around cut dates, large universal banks have experienced a reduction in risk while smaller banks with more traditional business models have instead increased their risk.

Rate cuts to negative values lead to different responses than the July 2012 cut from positive to zero.