

# Bank manager sentiment, loan growth and bank risk

EEA Conference 2023

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However, little is known about how **banks' investment decisions** could be related with their **managers' sentiment**.

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Why is it important to study bank managers' sentiment?

- Overly optimistic managers ⇒ **Financial stability** implications
- Overly pessimistic managers ⇒ **Under-financing the economy**

**Research question:** Is there evidence for over-optimism/over-pessimism of bank managers and is it related to banks' lending policy?

Based on earnings press releases of more than 200 banks from developed European markets between 2006H1 and 2019H2 (source: S&P Capital IQ).

Example of press release

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## Two alternative approaches to calculate it:

- The dictionary (DICT) approach (Loughran and McDonald, 2011)  
⇒ Focus of this presentation
- The machine-learning (ML) approach (Yang et al., 2020)  
⇒ Skipped but similar results

Example of press release

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3. For each press release from bank  $i$  at time  $t$ , calculate the following **textual tone score**:

$$tone_{i,t} = \frac{(\# \text{ of positive words}_{i,t}) - (\# \text{ of negative words}_{i,t})}{\text{Total } \# \text{ of words}_{i,t}}$$

$$tone_{i,t} = pos_{i,t} - neg_{i,t}$$

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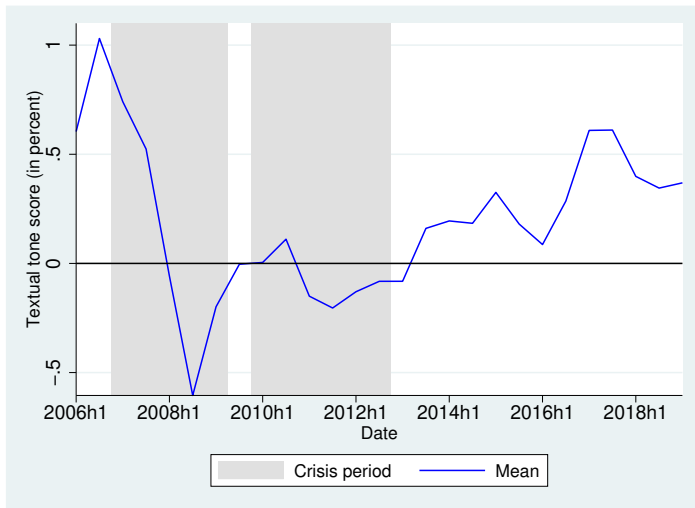
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4. In addition, we take **negations** into account.

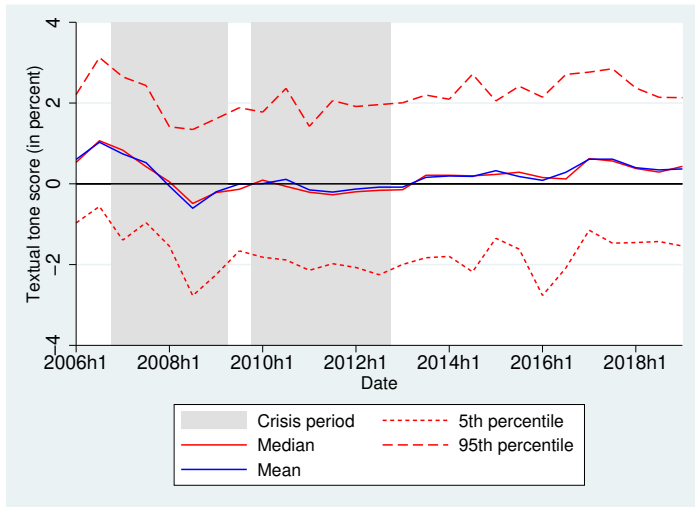
# Data - Textual tone score - DICT approach ii

Figure 1: Textual tone score averaged over time



# Data - Textual tone score - DICT approach iii

Figure 2: Textual tone score - distribution over time



## A clear link with bank & macro fundamentals

$$tone_{i,t} = X_{i,t}^{profit} \beta^{profit} + X_{i,t}^{bm} \beta^{bm} + X_{c(i),t}^{macro} \beta^{macro} + u_i + v_h + \epsilon_{i,t},$$

# A clear link with bank & macro fundamentals

$$tone_{i,t} = \chi_{i,t}^{profit} \beta^{profit} + \chi_{i,t}^{bm} \beta^{bm} + \chi_{c(i),t}^{macro} \beta^{macro} + u_i + v_h + \epsilon_{i,t},$$

	$tone_{i,t}$
$\left(\frac{\text{impairments}}{\text{assets}}\right)_{i,t}$	-0.12*** (0.02)
$\left(\frac{\text{operating income}}{\text{assets}}\right)_{i,t}$	0.10* (0.06)
$\left(\frac{\text{operating expenses}}{\text{assets}}\right)_{i,t}$	-0.02 (0.06)

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$\left(\frac{\text{operating expenses}}{\text{assets}}\right)_{i,t}$	-0.02 (0.06)
$\ln(\text{assets})_{i,t}$	0.29 (0.26)
$\text{loans}_{i,t}$	0.05 (0.07)
$\text{deposits}_{i,t}$	0.22** (0.09)
$\text{equity}_{i,t}$	0.10** (0.05)
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	$tone_{i,t}$		$tone_{i,t}$
$\left(\frac{\text{impairments}}{\text{assets}}\right)_{i,t}$	-0.12*** (0.02)	$\Delta GDP_{c(i),t}$	0.07*** (0.02)
$\left(\frac{\text{operating income}}{\text{assets}}\right)_{i,t}$	0.10* (0.06)	$\text{inflation}_{c(i),t}$	-0.00 (0.02)
$\left(\frac{\text{operating expenses}}{\text{assets}}\right)_{i,t}$	-0.02 (0.06)	$\text{interbank rate}_{c(i),t}$	0.13*** (0.04)
$\ln(\text{assets})_{i,t}$	0.29 (0.26)	$\text{term spread}_{c(i),t}$	-0.08** (0.03)
$\text{loans}_{i,t}$	0.05 (0.07)	$\text{OIS spread}_{c(i),t}$	-0.14*** (0.02)
$\text{deposits}_{i,t}$	0.22** (0.09)	$\text{imputed}$	0.05 (0.06)
$\text{equity}_{i,t}$	0.10** (0.05)	Constant	0.98*** (0.10)
$\left(\frac{\text{net interest income}}{\text{net operating income}}\right)_{i,t}$	-0.12*** (0.03)	Bank FE	Yes
		Season FE	Yes
		N	2,805
		$R^2$	0.59
		Adj. $R^2$	0.56

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$$tone_{i,t} = X_{i,t}^{profit} \beta^{profit} + X_{i,t}^{bm} \beta^{bm} + X_{c(i),t}^{macro} \beta^{macro} + u_i + v_h + \epsilon_{i,t}$$

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# The bank manager sentiment

In the next slides, we study the tone score while controlling for macroeconomic and banks' fundamentals  $\Rightarrow$  interpretation of the orthogonal part = **bank manager sentiment**.

We then focus on the bank manager sentiment and study:

- its **extrapolative structure**.
- its relationship with subsequent **loan growth**.
- its relationship with **systemic risk**.
- its relationship with **financial performance indicators**.

## Extrapolative structure of sentiment

$$tone_{i,t} = \alpha + \sum_{l=1}^L \beta_l tone_{i,t-l} + \sum_{l=0}^L \gamma_l X_{i,t-l} + u_i + v_h + \epsilon_{i,t}$$

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	t	t-1	t-2
$\left(\frac{\text{impairments}}{\text{assets}}\right)_{i,\dots}$	-0.14*** (0.04)	0.00 (0.02)	-0.03** (0.02)
$\left(\frac{\text{operating income}}{\text{assets}}\right)_{i,\dots}$	0.22*** (0.08)	-0.06 (0.05)	0.04 (0.04)
$\left(\frac{\text{operating expenses}}{\text{assets}}\right)_{i,\dots}$	-0.21** (0.09)	-0.04 (0.08)	-0.06 (0.07)
$\Delta GDP_{c(i),\dots}$	0.06** (0.03)	0.09*** (0.03)	0.04 (0.03)
interbank rate $_{c(i),\dots}$	-0.22** (0.11)	0.33*** (0.12)	-0.04 (0.11)
term spread $_{c(i),\dots}$	0.14** (0.06)	-0.03 (0.08)	0.02 (0.05)
OIS spread $_{c(i),\dots}$	-0.14*** (0.04)	-0.09 (0.06)	0.05 (0.04)
$tone_{i,\dots}$		0.10** (0.05)	0.13*** (0.04)
Constant			-0.05 (0.07)
N			1933
R <sup>2</sup>			0.68
Adj. R <sup>2</sup>			0.64

## Loan growth prediction of sentiment

$$\text{loan growth}_{i,t+1} = \alpha + \beta \text{tone}_{i,t} + \gamma X_{i,t} + u_i + w_c(i),t + \epsilon_{i,t}$$



# Loan growth prediction of sentiment

$$\text{loan growth}_{i,t+1} = \alpha + \beta \text{tone}_{i,t} + \gamma X_{i,t} + u_i + w_{c(i),t} + \epsilon_{i,t}$$

	<i>loan growth</i> <sub><i>i,t+1</i></sub>
<i>tone</i> <sub><i>i,t</i></sub>	0.0803** (0.0319)
<i>imputed</i>	-0.0315 (0.0845)
Constant	-5.0900 (9.0336)
Controls	Yes
Bank FE	Yes
Country-time FE	Yes
N	2208
<i>R</i> <sup>2</sup>	0.4508
Adj. <i>R</i> <sup>2</sup>	0.307

Measure used here (Brownlees and Engle, 2016):

$$SRISK_{i,t} = E_{i,t} [k * LVG_{i,t} + (1 - k) * LRMES_{i,t} - 1]$$

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- $E_{i,t}$  = Equity market value

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- $k$  = leverage ratio requirement (3%)

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With:

- $E_{i,t}$  = Equity market value
- $k$  = leverage ratio requirement (3%)
- $LVG_{i,t} = \frac{E_{i,t} + Debt_{i,t}}{E_{i,t}}$

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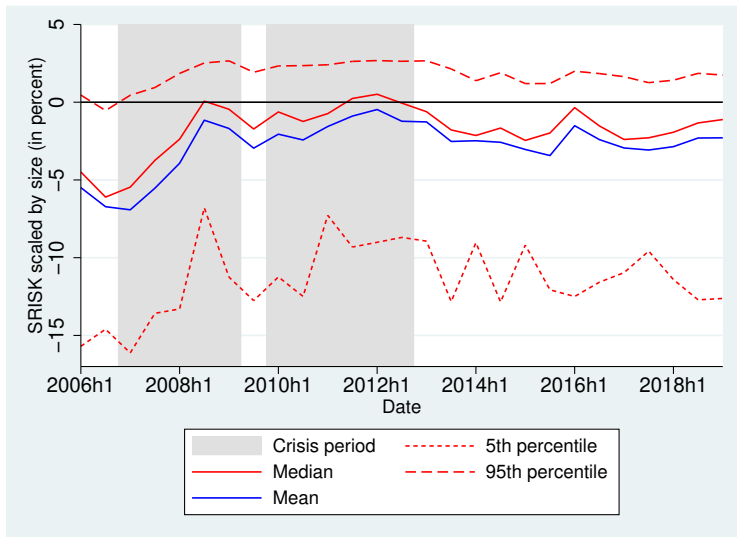
$$SRISK_{i,t} = E_{i,t} [k * LVG_{i,t} + (1 - k) * LRMES_{i,t} - 1]$$

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- $E_{i,t}$  = Equity market value
- $k$  = leverage ratio requirement (3%)
- $LVG_{i,t} = \frac{E_{i,t} + Debt_{i,t}}{E_{i,t}}$
- $LRMES_{i,t}$  = Long Run Marginal Expected Shortfall

# Systemic risk and sentiment

Figure 3: The distribution of SRISK over the sample period



$$\begin{aligned} SRISK_{i,t+1} = & \alpha + SRISK_{i,t} + \beta_1 \times loangrowth_{i,t} \\ & + \beta_2 \times tone_{i,t} + \beta_3 \times tone_{i,t} \times loangrowth_{i,t} \\ & + X_{i,t}\gamma + u_j + w_{c,t} + \epsilon_{i,t+1} \end{aligned}$$



# Systemic risk and sentiment

$$\begin{aligned}
 SRISK_{i,t+1} = & \alpha + SRISK_{i,t} + \beta_1 \times loangrowth_{i,t} \\
 & + \beta_2 \times tone_{i,t} + \beta_3 \times tone_{i,t} \times loangrowth_{i,t} \\
 & + X_{i,t}\gamma + u_i + w_{c,t} + \epsilon_{i,t+1}
 \end{aligned}$$

	(1)	(2)	(3)
	SRISK <sub>i,t+1</sub>	SRISK <sub>i,t+1</sub>	SRISK <sub>i,t+1</sub>
<i>loangrowth<sub>i,t</sub></i>	0.0013 (0.0101)	0.0019 (0.0101)	0.0040 (0.0099)
<i>tone<sub>i,t</sub></i>		-0.0272** (0.0132)	-0.0204* (0.0119)
<i>loangrowth<sub>i,t</sub> × tone<sub>i,t</sub></i>			-0.0254 (0.0185)
<i>SRISK<sub>i,t</sub></i>	0.4229*** (0.0596)	0.4207*** (0.0587)	0.4214*** (0.0560)
Constant	21.0017 (29.3188)	20.7769 (30.0985)	21.2870 (29.2500)
Controls	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes
Country-time fixed effects	Yes	Yes	Yes
N	1169	1169	1169
R <sup>2</sup>	NA	NA	NA
Adj. R <sup>2</sup>	NA	NA	NA

$$finperf_{i,t+2} = \alpha + \beta_1 tone_{i,t+1} + \beta_2 tone_{i,t} + \gamma_1 X_{i,t+1} + \gamma_2 X_{i,t} + u_i + w_{c(i),t} + \epsilon_{i,t+2}$$

# Financial performance prediction of sentiment

$$finperf_{i,t+2} = \alpha + \beta_1 tone_{i,t+1} + \beta_2 tone_{i,t} + \gamma_1 X_{i,t+1} + \gamma_2 X_{i,t} + u_i + w_{c(i),t} + \epsilon_{i,t+2}$$

	(1) $\left(\frac{\text{Loan Loss Reserves}}{\text{Gross Loans}}\right)_{i,t+2}$	(2) $\left(\frac{\text{Interest Income}}{\text{Total Assets}}\right)_{i,t+2}$	(3) $\left(\frac{\text{Interest Expenses}}{\text{Total Assets}}\right)_{i,t+2}$	(4) $ROAE_{i,t+2}$	(5) $ROAA_{i,t+2}$	(6) $EPS_{i,t+2}$
$tone_{i,t+1}$	-0.0204* (0.0116)	0.0139 (0.0137)	0.0037 (0.0159)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0210 (0.0427)
$tone_{i,t}$	0.0071 (0.0108)	-0.0211* (0.0123)	-0.0131 (0.0138)	-0.0000* (0.0000)	-0.0000 (0.0000)	-0.1252 (0.0814)
<i>imputed</i>	0.0060 (0.0270)	0.0593 (0.0384)	0.0410 (0.0454)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0240 (0.1009)
Constant	10.8417 (11.8348)	-8.6801 (15.8382)	18.7439 (16.5434)	-0.0931*** (0.0012)	-0.0922 (.)	-33.5003 (28.1969)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	1877	1817	1815	1891	1894	1458
$R^2$	0.8972	0.8787	0.8923	0.6584	0.7184	0.4808
Adj. $R^2$	0.866	0.840	0.858	0.555	0.634	0.270

## Main results

- Bank manager sentiment backward-looking.
- Bank manager sentiment positively associated with loan growth rates and negatively with SRISK over the subsequent six months.
- However, no clear link with subsequent financial performance of the bank over the next twelve months (even negative in some cases).
- Implications in terms of financial stability / economy financing.

# Example of earnings press release

 CRÉDIT AGRICOLE S.A.

## PRESS RELEASE

Montrouge, 14 February 2019

### Fourth quarter and full year 2018 results Very good results, solid and balanced

#### Crédit Agricole S.A.

Stated net income<sup>1</sup>

Q4: €1,008m

+2.6 Q4/Q4

2018: €4,400m

+20.6% 2018/2017

Stated net revenues

Q4: €4,853m

+4.3% Q4/Q4

2018: €19,736m

-5.9% 2018/2017

Fully loaded CET1 ratio

11.5%

stable in Q4, well above the MTP target (11%)

- Less favourable environment in Q4, primarily for activities related to financial markets
- High underlying net income<sup>2</sup> with further strong growth: Q4 €1,967m, +21.6% Q4/Q4, 2018: €4,405m, +12.2% 2018/2017
- 2018 ROTE<sup>3</sup>: 12.7%, earnings per share<sup>4</sup>: Q4 €0.33, +24.2% Q4/Q4, 2018 €1.39, +13.8% 2018/2017;
- Dividend proposed at the Shareholders' Meeting increased by +9.5% 2018/2017 to €0.89
- High level of activity and income for all the Group's business divisions in 2018, despite the unfavourable market impact in Q4 on asset management and market activities
- Good cost control: positive jaws effect excluding SRF<sup>5</sup> +1pp 2018/2017, in most business lines; Q4 ratio<sup>6</sup> improved by 0.7pp 2018/2017 to 62.1%
- Cost of credit risk still very low and declining: 23bp<sup>7</sup> (-8bp Q4/Q4), provision for non-specific legal risk of €75m in Q4
- 2019 MTP<sup>8</sup> objectives already reached for NI, ROTE and CET1, new 2022 MTP to be presented on 6 June 2019

#### Crédit Agricole Group<sup>9</sup>

Stated net income<sup>1</sup>

Q4: €1,571m

+70.3% Q4/Q4

2018: €6,844m

+4.7% 2018/2017

Stated net revenues

Q4: €8,110m

+0.8% Q4/Q4

2018: €32,839m

+2.3% 2018/2017

Fully loaded CET1 ratio

15.0%

up 10bp in Q4, 550bp above the PDR<sup>10</sup>

- Sharp increase in stated net income linked to a favourable base effect, in particular the tax surcharge in Q4-17
- 2018 underlying<sup>11</sup> net income<sup>2</sup>: €5,848m, -3.8% 2018/2017 after a sharp increase in the SRF<sup>5</sup>, a negative scope effect and a slight increase in the cost of risk: Q4 -€1,528m, -3.9% Q4/Q4
- Cost of risk still at a very low level, at 18bp<sup>7</sup>
- Regional Banks (FRS): negative impact of portfolio valuations in Q4 and a sharp rise in the cost of risk due to collective provision write-backs in 2017, but increase in business revenues and stabilisation of interest revenues

<sup>9</sup>Crédit Agricole S.A. and Regional banks at 100%

This press release comments on the results of Crédit Agricole S.A. and those of Crédit Agricole Group, which comprises the Crédit Agricole S.A. entities and the Crédit Agricole Regional banks, which own 56.3% of Crédit Agricole S.A. Please see from p. 16 onwards for details of specific items which, after restatement for the various related items but before taxes, are used to calculate underlying results. A reconciliation between the stated income statement and the underlying income statement can be found from p. 21 onwards for Crédit Agricole Group and from p. 18 onwards for Crédit Agricole S.A.

<sup>1</sup> Net income Group share  
<sup>2</sup> Underlying, excluding specific items, see p. 16 and following pages for more details on specific items and p. 26 for the ROTE calculation  
<sup>3</sup> Contribution to the Single Resolution Fund (SRF)  
<sup>4</sup> Average over last four rolling quarters, annualised  
<sup>5</sup> Shadow Term Plan: the MTP 2020 was published in March 2016 and set financial targets until 2019  
<sup>6</sup> According to pro forma PDR for 2019 of 9.5% as notified by the ECB (see: countercyclical buffers)

## Example:

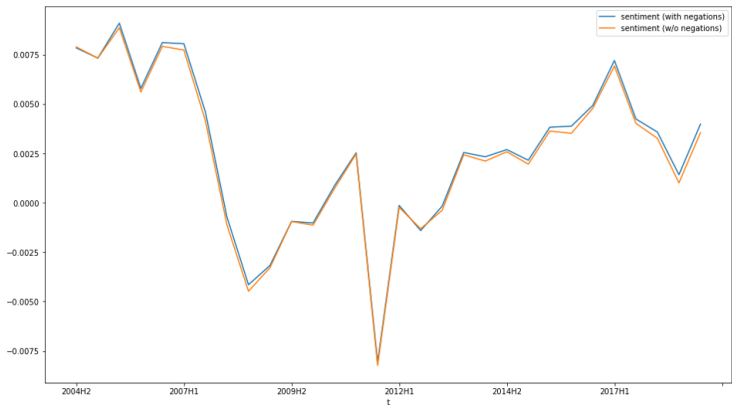
Overall, the first quarter was a **good** start to the year **but** we **caution** **not** to extrapolate this result as is traditionally the **best** quarter of the year.

Negations	Conjunctions
Positive words	Negative words
Positive words negated	Negative words negated

In the example above,  $N_{i,t}^{pos} = 1$ ,  $N_{i,t}^{neg} = 2$ , and  $N_{i,t} = 28$ . Hence,  
 $tone_{i,t} = -\frac{1}{28}$ .

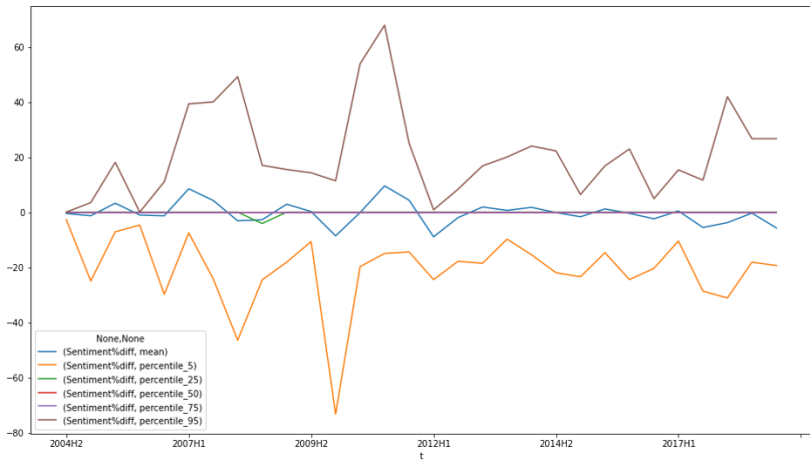
[Back to DICT approach](#)

Figure 4: Average textual tone score taking or not into account negations



# Textual tone score - DICT approach

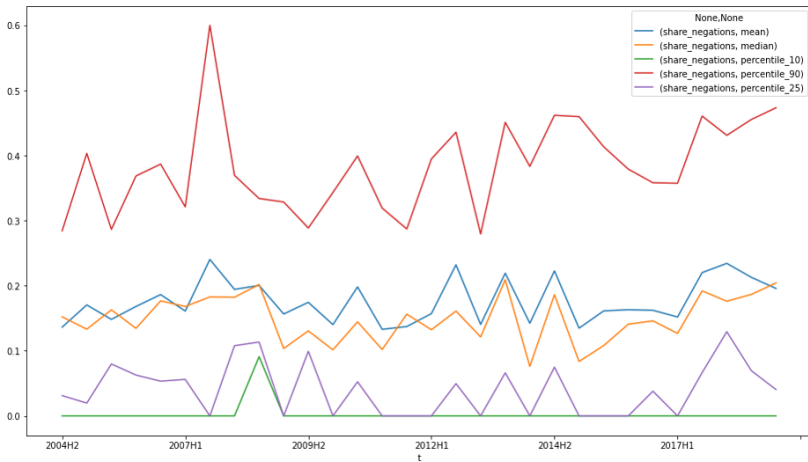
Figure 5: Textual tone score: effect of taking negations into account at the micro-level





# Textual tone score - DICT approach

Figure 6: Distribution of the share of negations in the press release documents



# Textual tone score - DICT vs ML approach

Figure 7: Textual tone score averaged over time (DICT approach)

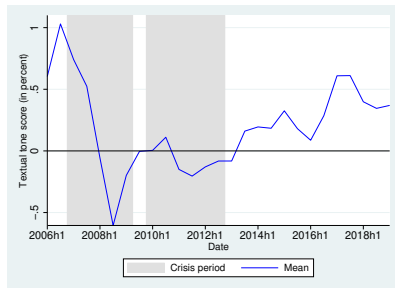
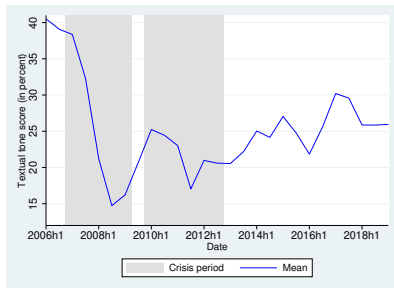


Figure 8: Textual tone score averaged over time (ML approach)



[Back to tone score distribution](#)

# Textual tone score - DICT vs ML approach

Figure 9: Textual tone score distribution over time (DICT approach)

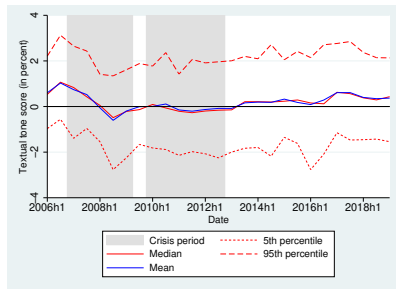
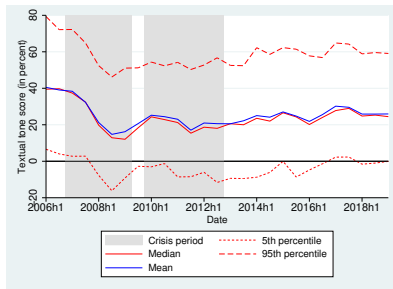


Figure 10: Textual tone score distribution over time (ML approach)



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# Textual tone score - DICT vs ML approach

**Table 1:** Regression of the tone score (machine learning approach) over the tone score (dictionary approach)

	$tone_t(ML)$	$tone_t(ML)$	$tone_t(ML)$
$tone_t(DICT)$	11.19*** (0.20)	10.23*** (0.24)	8.96*** (0.25)
Constant	0.23*** (0.00)	0.38*** (0.09)	0.53*** (0.09)
Bank fixed effects	No	Yes	Yes
Time fixed effects	No	No	Yes
N	3316	3316	3316
$R^2$	0.50	0.64	0.67
Adjusted $R^2$	0.49	0.61	0.64

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# Textual tone score - DICT vs ML approach

**Table 2:** Spearman's rank correlation ( $\rho$ ) between the tone score from the dictionary and from the machine learning approaches

Time window	$\rho$	N	Time window	$\rho$	N
Full period	0.7242***	3316	2012h2	0.7228***	129
2006h1	0.5971***	83	2013h1	0.6862***	127
2006h2	0.7447***	97	2013h2	0.7281***	137
2007h1	0.6444***	101	2014h1	0.7713***	131
2007h2	0.7465***	112	2014h2	0.7510***	131
2008h1	0.6541***	112	2015h1	0.6739***	114
2008h2	0.6613***	123	2015h2	0.6948***	131
2009h1	0.7641***	122	2016h1	0.7757***	127
2009h2	0.6742***	141	2016h2	0.7454***	123
2010h1	0.5848***	127	2017h1	0.7781***	128
2010h2	0.7345***	144	2017h2	0.7124***	129
2011h1	0.6301***	133	2018h1	0.7077***	129
2011h2	0.6090***	142	2018h2	0.8184***	115
2012h1	0.6964***	117	2019h1	0.6265***	109

## Table 3: Summary statistics

Variables	Textual tone score sample						No textual tone score available					
	N	mean	std	p5	p50	p95	N	mean	std	p5	p50	p95
<b>Panel A: Bank-level</b>												
<i>1) Balance sheet and income</i>												
<i>ta</i> (in billion Euros)	3,033	228.26	428.94	1.45	45.33	1275.13	3,922	48.06	155.43	0.37	10.71	176.67
<i>loans</i> (in %)	3,022	59.38	18.21	23.71	62.03	84.17	3,896	65.22	20.11	19.44	69.80	87.40
<i>cash</i> (in %)	3,027	4.45	5.59	0.09	2.35	15.391	3,841	5.41	9.54	0.13	1.92	18.71
<i>secs</i> (in %)	3,006	22.29	14.15	4.93	19.33	51.40	3,867	17.70	13.48	1.24	14.88	40.73
<i>deposits</i> (in %)	3,021	51.16	19.39	18.55	51.84	81.96	3,892	50.72	24.16	0.00	55.95	82.27
<i>equity</i> (in %)	3,031	7.05	3.89	2.60	6.46	14.08	3,908	6 8.53	6.15	2.12	7.71	16.47
<i>intinc</i> (in %)	3,033	60.54	21.96	21.14	60.42	100.00	3,922	66.44	21.10	27.03	67.58	100.00
<i>loangrowth</i> (in %)	2,792	2.32	13.06	-7.82	1.39	15.19	3,393	2.63	16.79	-8.22	1.65	13.47
<i>2) Profitability</i>												
<i>opinc</i> (in %)	3,016	1.33	0.88	0.34	1.23	2.64	3,815	1.45	1.44	0.15	1.19	3.21
<i>opexp</i> (in %)	3,020	0.85	0.55	0.21	0.76	1.71	3,812	0.92	1.20	0.07	0.70	2.06
<i>impair</i> (in %)	3,006	0.30	0.75	-0.02	0.11	1.15	3,839	0.27	0.67	-0.04	0.11	1.04
<b>Panel B: Macro-level</b>												
<i>gdp</i> (in %)	3,033	1.22	1.92	-2.08	1.33	3.77	3,886	1.28	1.93	-2.04	1.39	3.82
<i>infl</i> (in %)	3,033	0.71	0.80	-0.40	0.61	2.08	3,886	0.75	0.79	-0.39	0.65	2.21
<i>interbank</i> (in %)	3,033	1.07	1.65	-0.33	0.53	4.67	3,886	1.05	1.61	-0.50	0.52	4.67
<i>term</i> (in %)	3,031	1.71	2.22	-0.46	1.18	4.96	3,884	1.30	1.66	-0.37	0.92	4.08
<i>ois</i> (in %)	2,852	0.26	0.30	0.02	0.14	0.76	3,753	0.27	0.30	0.01	0.20	0.84