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Capturing depositors' expectations with Google data[1]

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[1] This presentation was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

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Capturing depositors' expectations with Google Data

Falko Fecht, Stefan Thum and Patrick Weber

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1. Motivation
Strategic complementarities and financial crises

Motivation

Can Google searches be used as a predictor for a deposit run on banks (time series and cross section)?

Many financial institutions exposed to self-fulfilling liquidity crises

- Financial institutions performing liquidity transformation are exposed to runs by depositors
- Worries that others excessively withdraw induce investors to withdraw
- Some empirical evidence…
  - ➢ Mutual funds: Chen, Goldstein, & Jiang (JFE 2010)
  - ➢ Open end real estate funds: Fecht & Wedow (JFI 2014)

2. Contribution
Capturing depositor‘s expectations

How to measure investors’ expectations?

- Google searches might serve as a proxy for investors' worries
- Searches serve as an early warning indicator for liquidity crises

Exploit particularities of German banking system

- Savings banks de facto government-guaranteed
- Suitable reference group: Credit cooperative banks

Natural experiment: Blanket guarantee for German banks’ liabilities

- Public announcement on 5 October 2008 by Chancellor Merkel
- All retail deposits are safe: deposit insurance scheme
- Intention was to avoid possible bank run

3. Data
Google data are obtained via Google Trends

We obtain Google Trends Data via *www.google.com/trends*

- **Relevant data:**
  Relative search interest in search terms related to **deposit insurance** in Germany at the local level

- **Breakdowns:**
  Web searches by federal state

3. Data
Augment the Google data set with central bank data sources

We **augment Google** data with…

1. Bundesbank Balance Sheet Items statistics

- **Outstanding Euro amounts of overnight deposits** at a monthly frequency at bank level (census approach)

2. Bundesbank MFI Interest Rate statistic

- **Interest rates on outstanding amounts of overnight deposits** at a monthly frequency at bank level for roughly 230 German banks (sample approach)

4. Key variables
Measuring deposit flows

Deposit shift variable

$$\text{Deposit Shift}_{j,t} = \frac{\text{Volume Savings Banks}_{j,t}}{\text{Volume Cooperative Banks}_{j,t}}$$

$$\Delta\text{Deposit Shift}_{j,t} = \text{Deposit Shift}_{j,t} - \text{Deposit Shift}_{j,t-6}$$

j Federal State

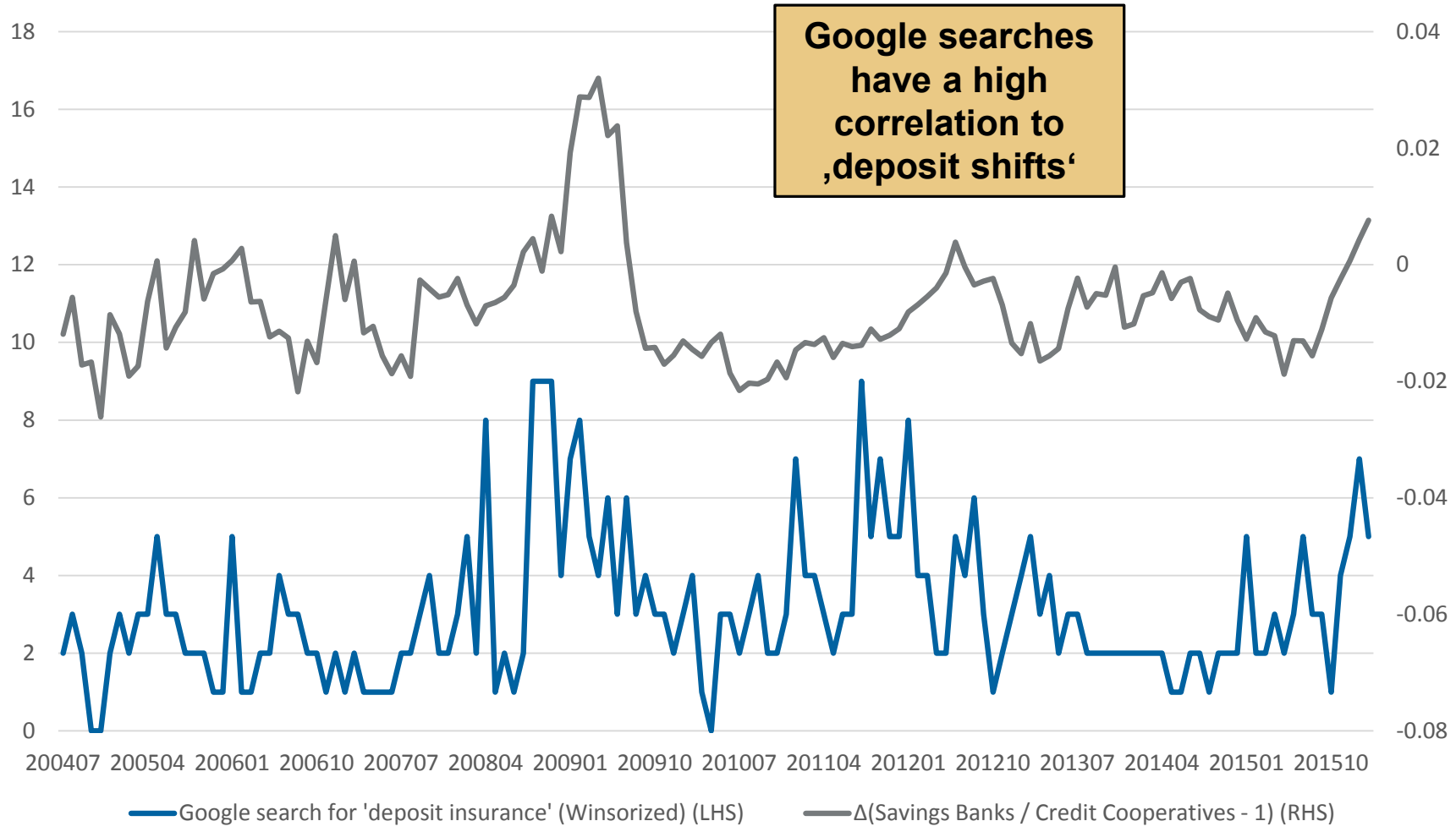
t Month

Control variable: Interest rate margin

$$\text{Interest Margin}_{j,t} = \text{Interest Rate Savings Banks}_{j,t} - \text{Interest Rate Coop. Banks}_{j,t}$$

$$\Delta\text{Interest Margin}_{j,t} = \text{Interest Margin}_{j,t-1} - \text{Interest Margin}_{j,t-7}$$

5. Descriptive Statistics
Google search interest versus deposit shifts



6. Methodology
Model setup

Inter-temporal Analysis

1. VAR analysis and Granger causality (Perspective: Germany only)
2. Standard OLS Regression (Perspective: Germany only)

Panel Perspective

3. Analysis of impact of government guarantee (Perspective: State level)

$$\Delta\left(\text{Deposit Shift}_{j,t}\right) = \alpha_j + \alpha_t + \beta_1 \text{Guarantee}_t + \beta_2 \text{Google}_{f,j,t} + \beta_3 \text{Google}_{f,j,t} * \text{Guarantee}_t + \beta_4\left(\Delta\text{Interest Margin}_j\right) * \text{Guarantee}_t + \beta_5\left(\Delta\text{Interest Margin}_j\right) * \text{NoGuarantee}_t + u_{j,t}$$

α_j Fixed effect of state j

α_t Monthly time fixed effect

4. Bank-level panel analysis (Perspective: Individual banks)

7. Results
Granger Causality

Ordering: *Google, Interest Spread, Deposit shift*

Equation		*Factor*	*Chi2*	*df (lags)*	*p-value*
Google	=	Interest Spread	1.9922	2	0.369
Google	=	Deposit shift	0.40469	2	0.817
Interest Spread	=	Google	10.967	2	**0.004**
Interest Spread	=	Deposit shift	2.9827	2	0.225
Deposit shift	=	Google	7.5309	2	**0.023**
Deposit shift	=	Interest Spread	13.643	2	**0.001**

*Google searches Granger cause the **Interest Spread** and **Deposit Shifts***

*Alternative Google searches also Granger cause the **Interest Spread** and, for most of the time, **Deposit Shifts***

*The results hold **independent of the ordering***

English translation of search term	Correlation
banks deposit insurance	90%
deposit insurance banks	90%
how safe is my money	83%
secure banks	78%
state guarantee	63%
bank bankruptcy	60%
deposit insurance savings banks	55%
dexia communal bank	49%
money market saving	49%
statutory deposit insurance	37%

7. Results
Standard Panel Regression (Perspective: State level)

Table 1: Main Models I(quarterTFE) - Monthly differences of the ratio savings/cooperative banks ($\Delta(SPK/GEN)$ for households and corporates)

	RE	FE	RE, G	FE, G	RE, G, T	FE, G, T	RE, G, T, G	FE, G, T, G	RE, G, T, G	FE, G, T, G
	b/t	b/t	b/t	b/t	b/t	b/t	b/t	b/t	b/t	b/t
G.w3.fObs.ST1	0.001***	0.001**	0.001***	0.001***	0.001***	0.001**	0.001***	0.001**	0.002***	0.002**
	(2.99)	(3.13)	(4.32)	(4.77)	(3.19)	(2.87)	(3.95)	(3.45)	(2.89)	(2.54)
Diff_InRateDiff_Spk_Gen			0.107***	0.106**	0.089***	0.089***				
			(3.51)	(3.49)	(5.76)	(5.73)				
Guarantee=0xDiff_InRateDiff_Spk_Gen							0.037	0.035	0.029	0.023
							(1.38)	(1.27)	(1.15)	(0.73)
Guarantee=1xDiff_InRateDiff_Spk_Gen							0.093***	0.094***	0.093***	0.093***
							(5.17)	(5.11)	(5.23)	(5.09)
Guarantee=1									0.022***	0.021***
									(3.92)	(3.92)
Guarantee=1xG.w3.fObs.ST1									-0.001	-0.001
									(-1.63)	(-1.30)
Constant	-0.014***	-0.014***	-0.014***	-0.014***	-0.014**	-0.014	-0.014***	-0.014*	-0.019***	-0.019**
	(-4.85)	(-7.85)	(-5.17)	(-11.19)	(-2.04)	(-1.81)	(-2.76)	(-2.33)	(-4.12)	(-3.14)
N	693.000	693.000	686.000	686.000	686.000	686.000	686.000	686.000	686.000	686.000
r2		0.027		0.213		0.482		0.486		0.487
r2_w	0.027	0.027	0.213	0.213	0.482	0.482	0.486	0.486	0.487	0.487
r2_b	0.037	0.037	0.028	0.029	0.025	0.028	0.069	0.075	0.019	0.042
r2_o	0.017	0.017	0.200	0.199	0.462	0.461	0.463	0.463	0.466	0.465

Includes monthly time fixed effects

8. Conclusions

Google searches are a valuable measure for depositors' expectations

Google searches can indeed be used as a measure for the concern of depositors

- Indication of run-type phenomena in local deposit markets
- Effect is more pronounced for private households than for non-financial corporations

Blanket guarantee during the crisis led to a level playing field between private and public banks

- Deposit flows became more sensitive to interest rate spreads
- Fiercer competition in the deposit market
- Potentially more excessive risk-taking

Next step: Augment our analysis by Twitter data