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EUROSYSTEM

Session 2. Quality and Confidentiality of data / Data science techniques for the collection and analysis of financial information

Stefan Bender, Head of Research Data and Service Center (RDSC), Deutsche Bundesbank

Financial Information Forum
of Latin American and the Caribbean Central Banks
VI Meeting – virtual format
Mexico City, 27 - 29 May 2020

Based on a joint project with and contributions from:
Stefan Bender, Jannick Blaschke, Tobias Cagala, Hendrik Doll, Christian Hirsch, Christian Resch, Christopher-Johannes Schild, John Chase, Christian Herzog, Frauke Kreuter, Jonathan Morgan, Ian Mulvaney, Andrew Gordon and Julia Lane

Research Data and
Service Centre

(The views expressed here do not necessarily reflect the opinion of the Deutsche Bundesbank or the Eurosystem.)

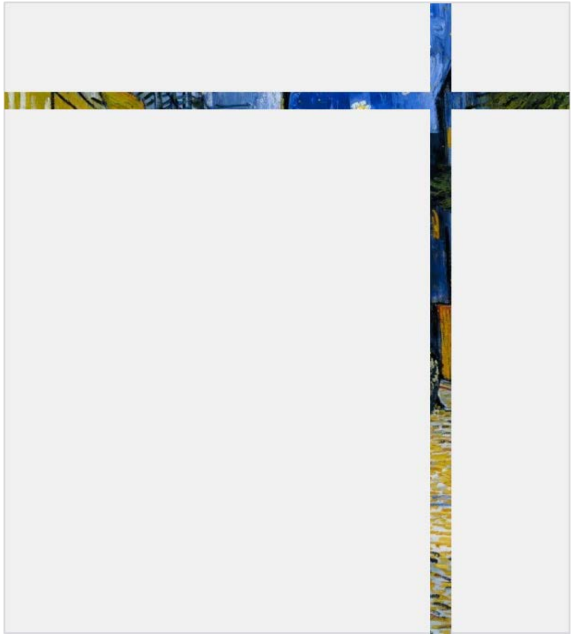
Data in Dutch Painting (1|2)

Credit: Ralph Klüber, p3 Insights

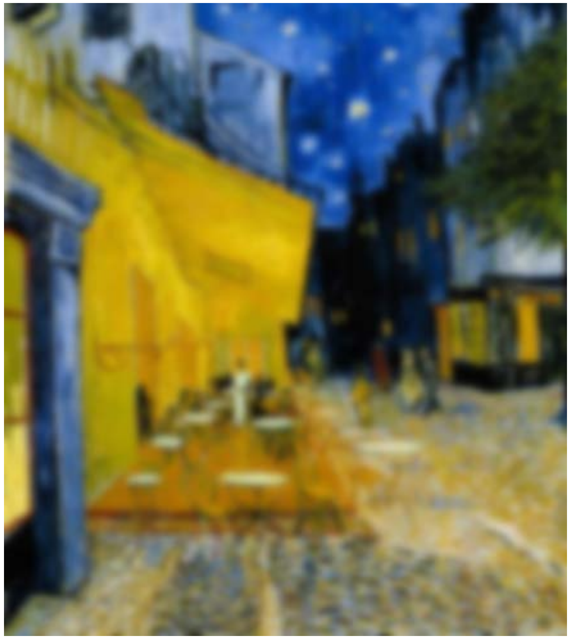
Café Terrace at Night is an 1888 oil painting by the Dutch artist Vincent van Gogh.
Van Gogh painted *Café Terrace at Night* in Arles, France.

(a) **Original Painting**

(b) **Bundesbank Data**



(c) **Big Data**

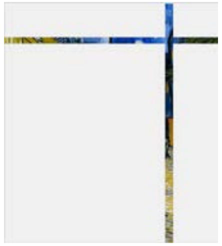


Data in Dutch Painting (2|2)
Credit: Ralph Klüber, p3 Insights

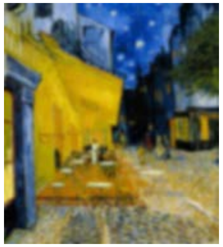
Café Terrace at Night is an 1888 oil painting by the Dutch artist Vincent van Gogh.
Van Gogh painted *Café Terrace at Night* in Arles, France.

(a) Original Painting

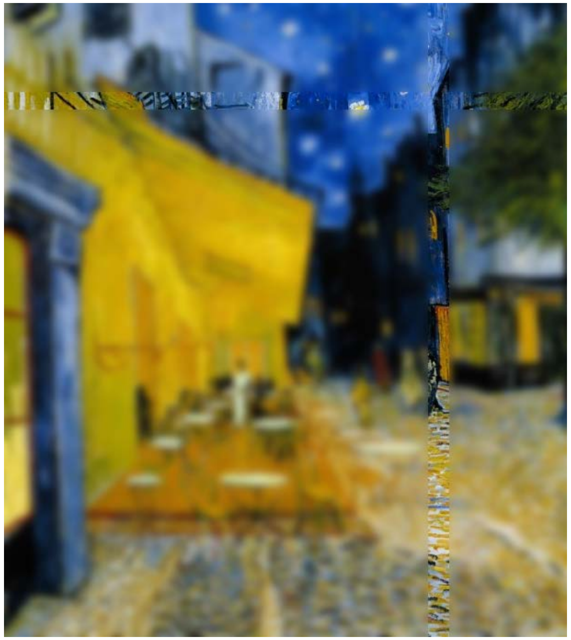
(b) BBk Data



(c) Big data



(d) Designed Product



Overview

- (Motivation)
- **Data Science for the Collection of Financial Information**
  - ✓ The Research Data and Service Center of Bundesbank (RDSC)
  - ✓ New Sources and Techniques
  - ✓ Reproducibility
  - ✓ FAIR Data, Annodata Schema
- **Data Science for the Analysis of Financial Information**
  - ✓ Enhance Data Services for Users
  - ✓ Justify added Value of Microdata for Research (and beyond)
- **Conclusion**

THX to the INEXDA members for their discussions and work on some of the topics, which will be presented!

Motivation

- **Aggregate datasets** are important for **monitoring macroeconomic developments** and **macroeconomic policy**
- **Granular data** is necessary to understand **global developments** and in particular **differences across countries**
- Combining datasets and looking beyond aggregate statistics into heterogeneous developments require the **transformation** of **“data“** into **“knowledge“**
- **Local constraints** make it difficult, or often impossible, to link micro datasets from different jurisdictions, even for research and financial stability analysis
- **Better accessibility** and **sharing of granular data** would open up **new possibilities** for analysis by providing new **insights into the effect of policies**

What can we do from the statistical side to support this process?

What’s new in (central bank) statistics?

- Micro data overhaul the traditional value-added chain in central banking statistics.
  - Traditional central banking statistics are collected for a **specific purpose**.
  - Micro data are collected only once and can be used for **multiple purposes**: The statistical reporting burden declines.
  - **Data protection** becomes more challenging.
- **Technological innovations** have revolutionized the infrastructure for collecting, storing, and using micro-data.
  - Advanced knowledge in storage and organization of large (integrated) micro-data.
  - Improved tools for analyzing and processing microdata.
  - Cheaper storage technologies.
  - Standardization.
- Official statistics has **lost the monopoly** in providing information to society.

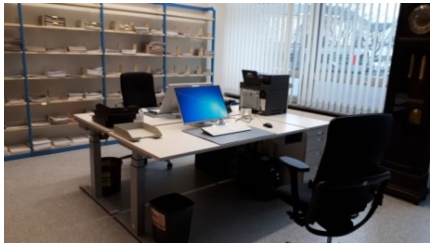
Tasks of the Research Data and Service Center (RDSC)

The RDSC offers access for non-commercial research to (highly sensitive) micro data of the Bundesbank. Microdata for banks, companies, securities and households are available:

- Generate (linked) micro data
- Offer advisory service on data selection and data access (data handling, research potential, scope and validity of data)
- Provide data access and data protection
- Document data and methodological aspects of the data
- Work on own research projects (in close cooperation with the Bank's business areas and the Research Centre)
- Organize conferences and workshops.

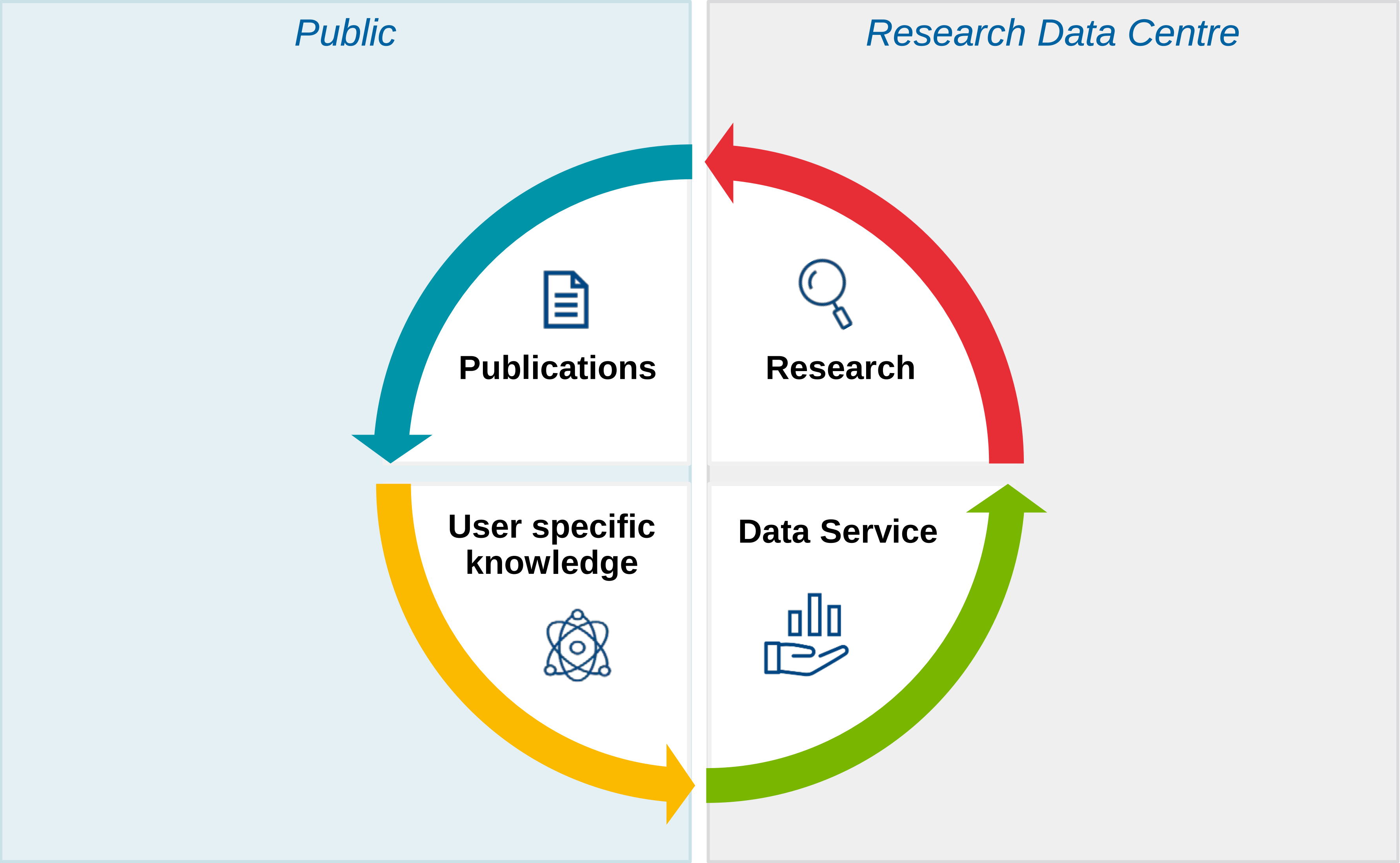
Factsheet on the RDSC

- 20 employees
- 12 working places for guest researchers in Frankfurt (fully booked several times).
- 2 working places in Düsseldorf

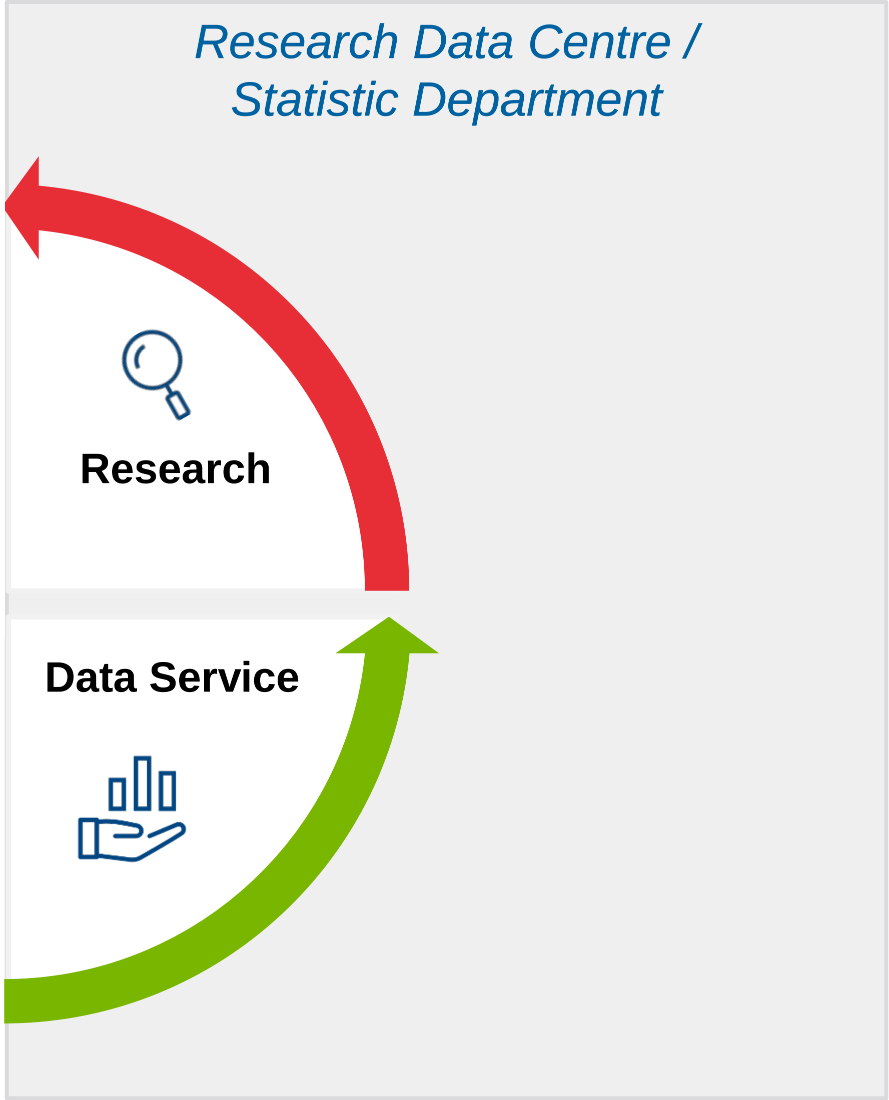


- In 2018:
  - Around 130 project applications, 73 were realized
  - Over 2,000 files (over 3.5 million lines) checked (output control)
  - Average of used data products per research project: 2.68
  - Papers of RDSC users are out
- In 2017 over 300 active projects, over 160 institutions involved (around 90 non-German).

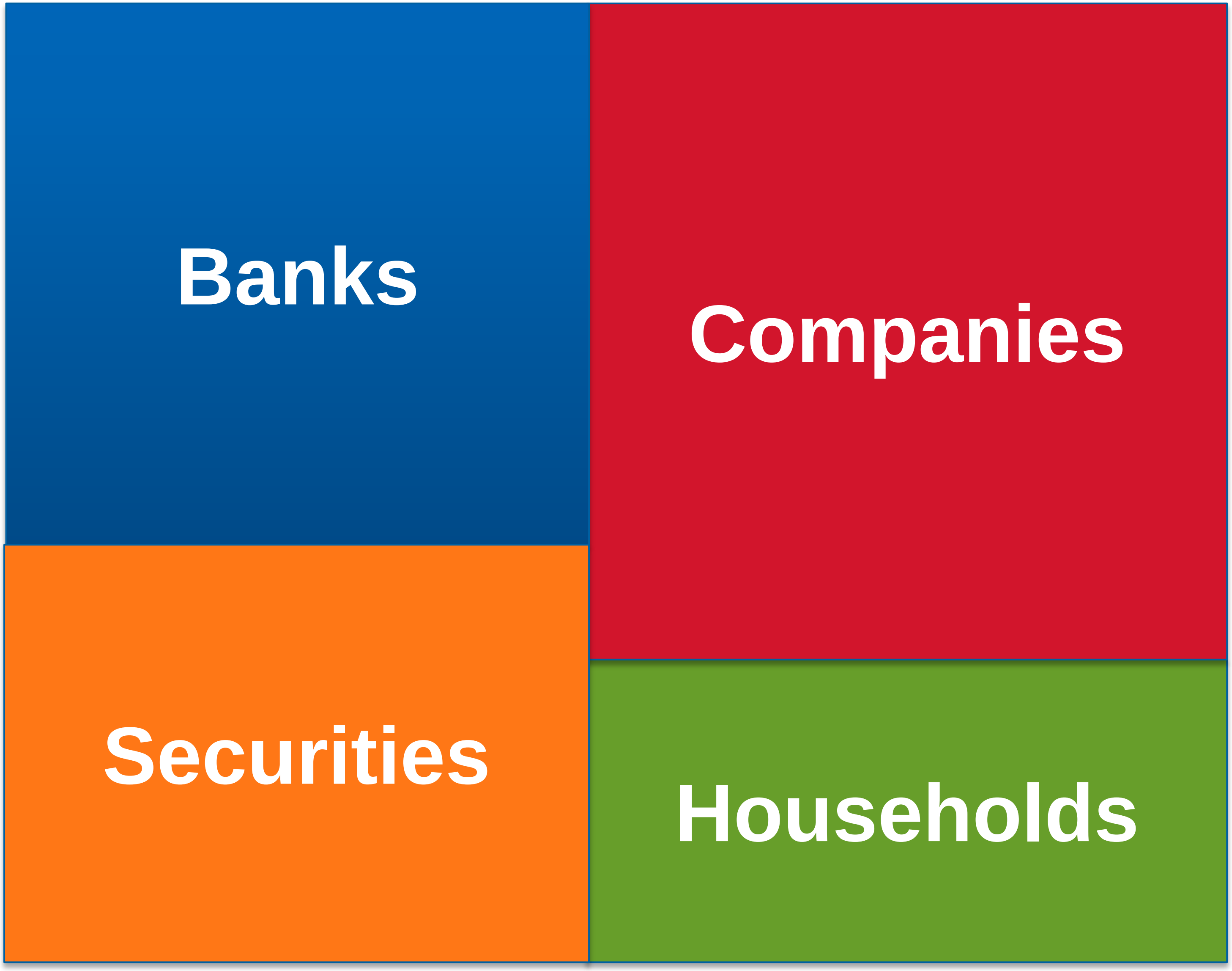
Information Life Cycle of the RDSC (but could be transformed)



Information Life Cycle of the RDSC: Part 1



Available microdata at the RDSC



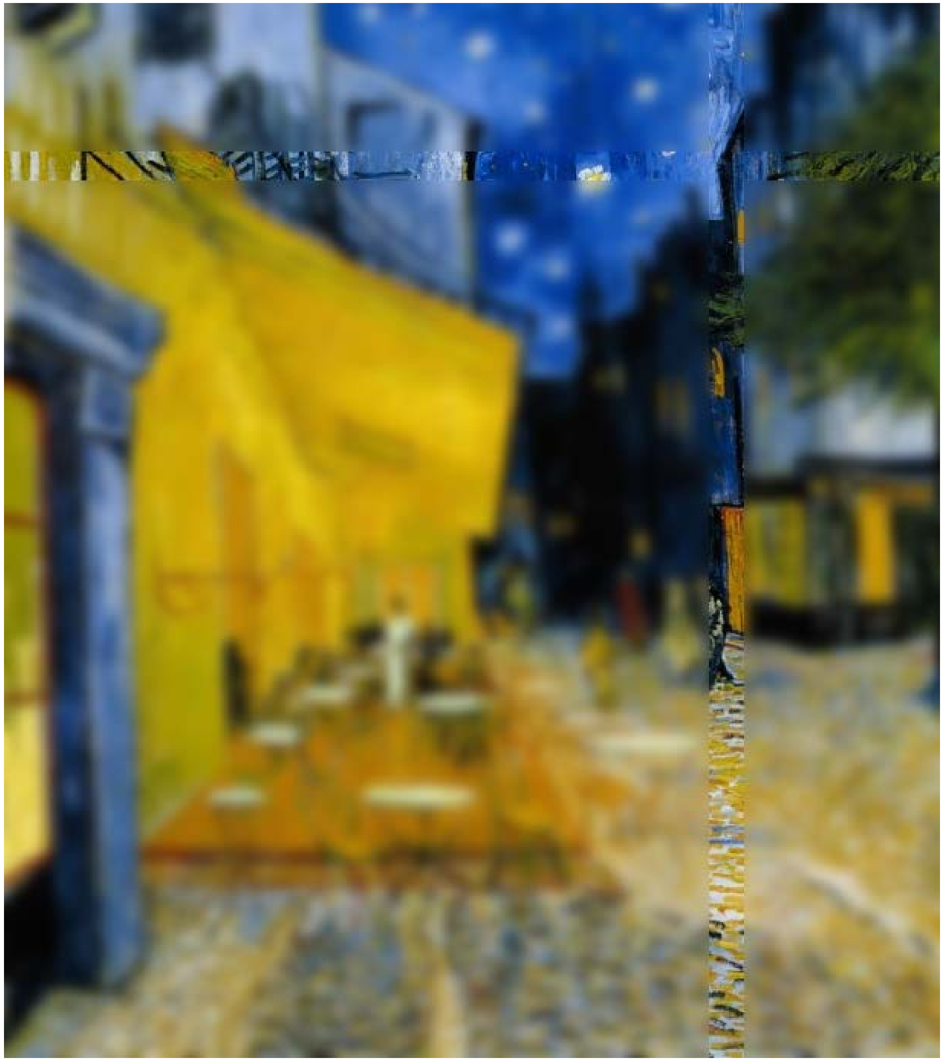
Banks

Companies

Securities

Households

Coming back to the Dutch Painting



New Data Sources

Bundesbank is collecting the needed data (for example by regulations), but for fulfilling the different purposes, Bundesbank is using more and more "additional data sources":

- Internet platform information like house prices
- Truck toll mileage (Destatis)
- Patent data
- Commercial Data
- Expectation Surveys, which will be combined with other data (informed consent)
- Unstructured Data (RDSC is offering speeches of the Governor Board)

Improving Data Quality with Machine Learning (Tobias Cagala, S5)

Securities Holdings Statistics

- German banks provide monthly reports of securities holdings (security-by-security)
- DQM with labor intensive manual case-by-case evaluations

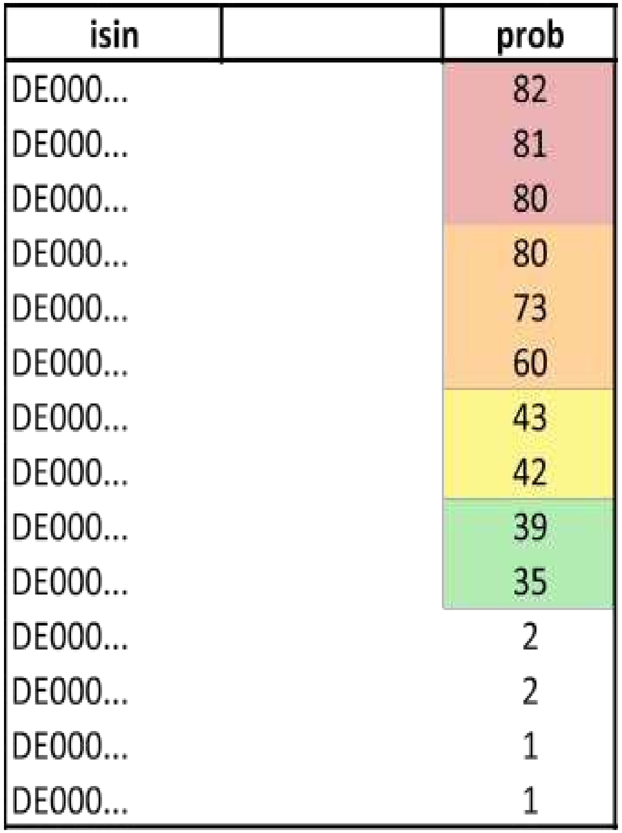
Goal:

- Support compilers by providing predictions of the result of manual checks with machine learning methods

Experience:

- 50% reduction in time for check and
- increased effectiveness of evaluations

Prediction allows for sorting



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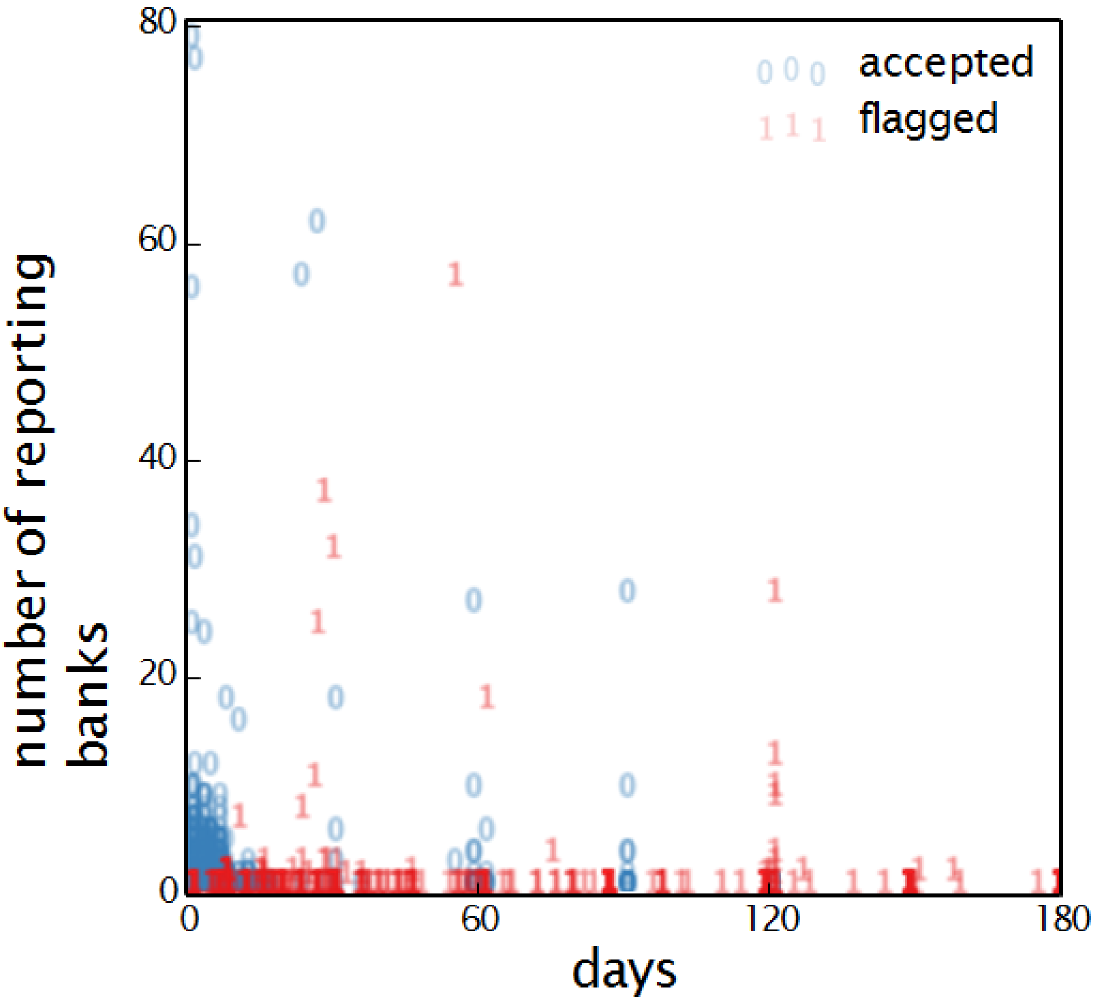
DE000...		1

Descriptive Analysis of Patterns
Number of Reporting Banks, Days since Maturity (Tobias Cagala, S5)



Machine Learning and data linkage (Christopher-Johannes Schild)

<u>**Company data (non financial institutions (NFI)):**</u>

There is **no common unique firm identifier** in Germany.
(Company business register-ID not stable)

We have to match firm data…

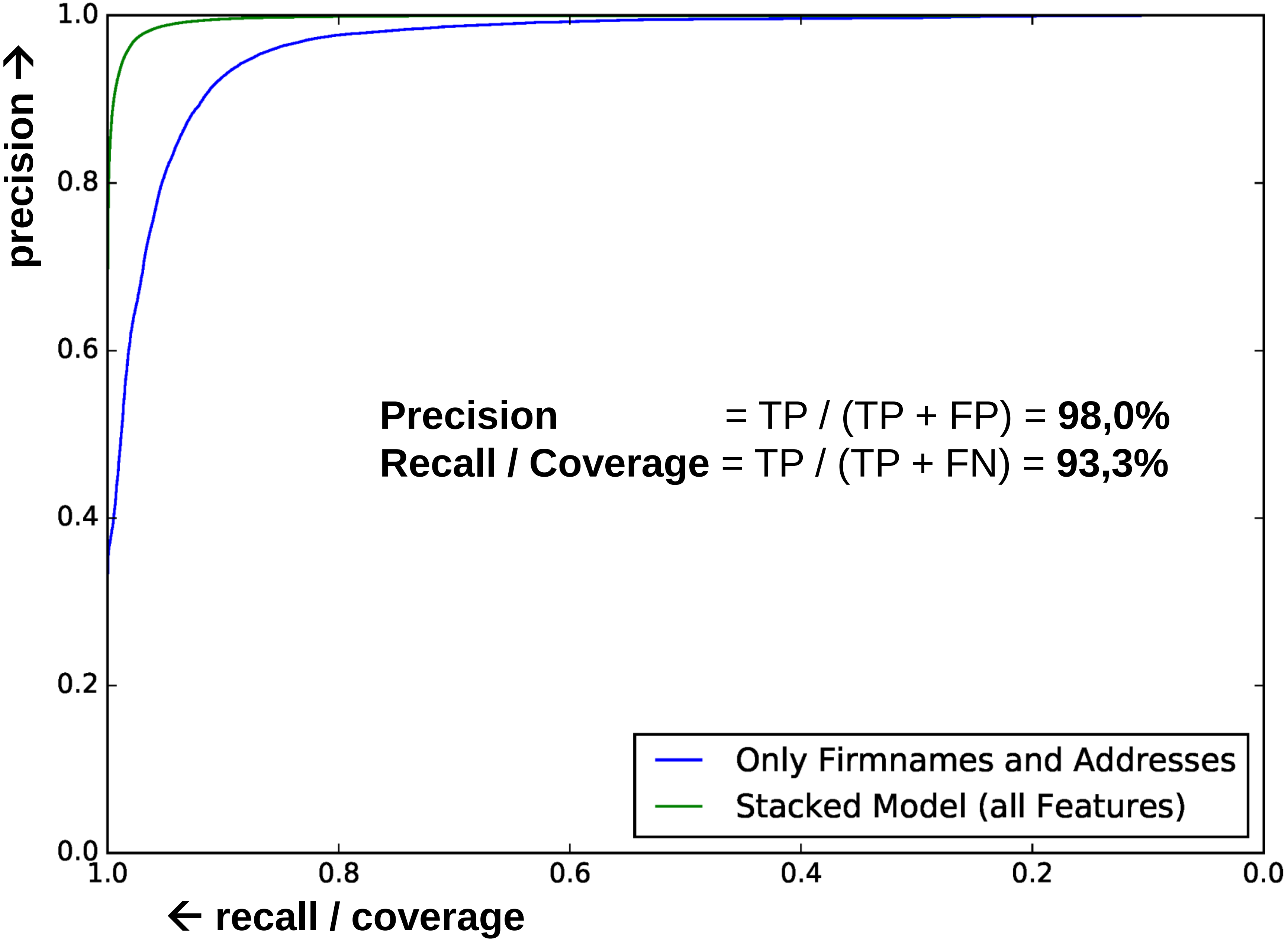
- … that do not have a common unique identifier / key
- … by using **alternative identifiers** (such as names, addresses, sectors, legal forms)

RDSC has matched several NFI-microdatasets (from Statistics, Banking Supervision and external data) with an advanced machine learning algorithm and generated a **matching table** (with probalistic matching scores)

Goal:

- Improve data quality, increase analytical value of data
- More general and flexible Record Linkage System
- Historicized matching tables

Evaluation: Record Linkage of NFI-Microdata (Christopher-Johannes Schild)



Precision = TP / (TP + FP) = **98,0%**
Recall / Coverage = TP / (TP + FN) = **93,3%**

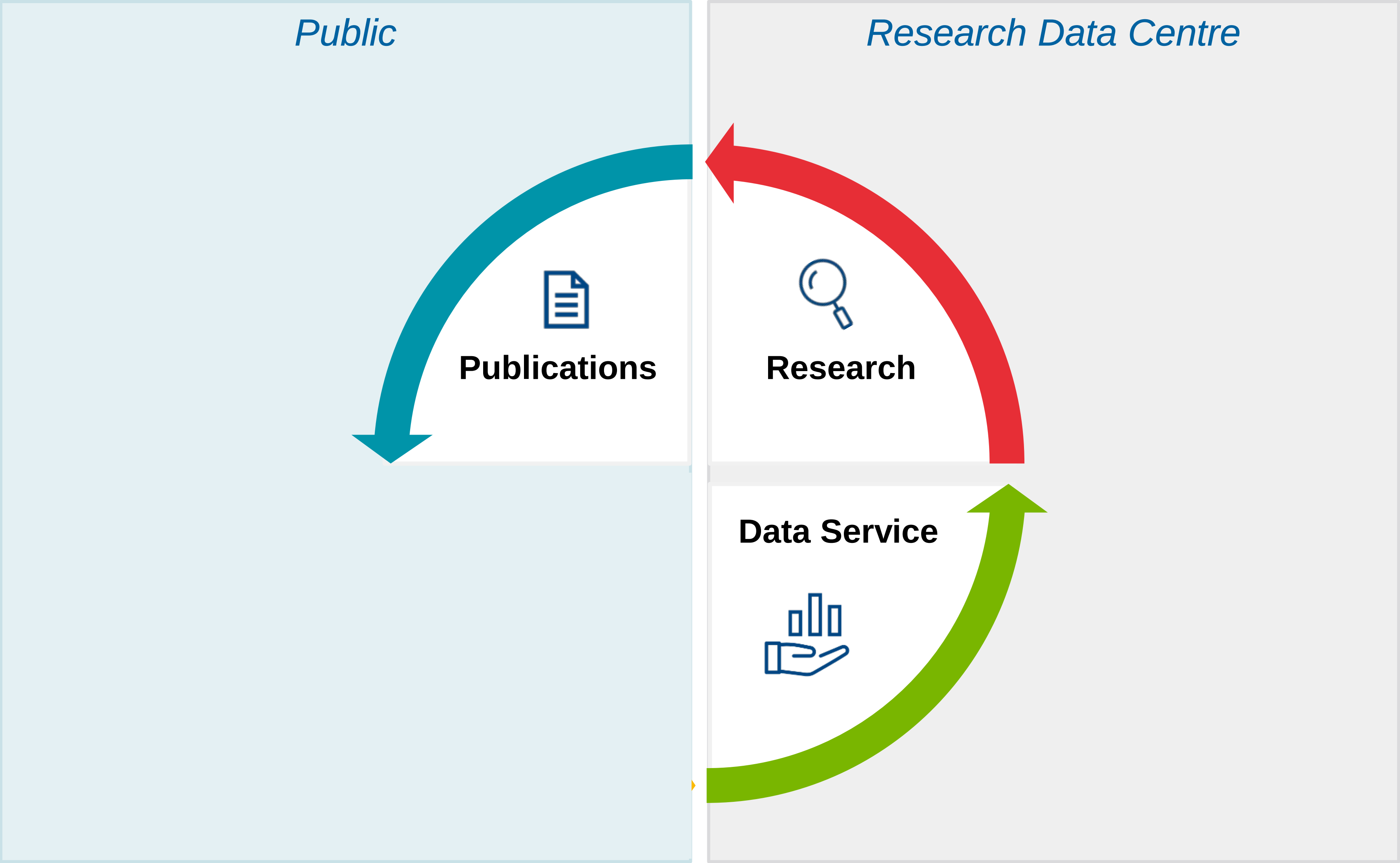
Data Generating Process

Until now (in many cases): ad hoc generation of data for research.

RDSC has started to/with:

- Establishing standardised data products.
- Implementing RDSC data quality procedures.
- Documentation of data.
- Harmonisation of data.
- Register data to get data identifiers (DOIs).

Information Life Cycle of the RDSC: Part 2

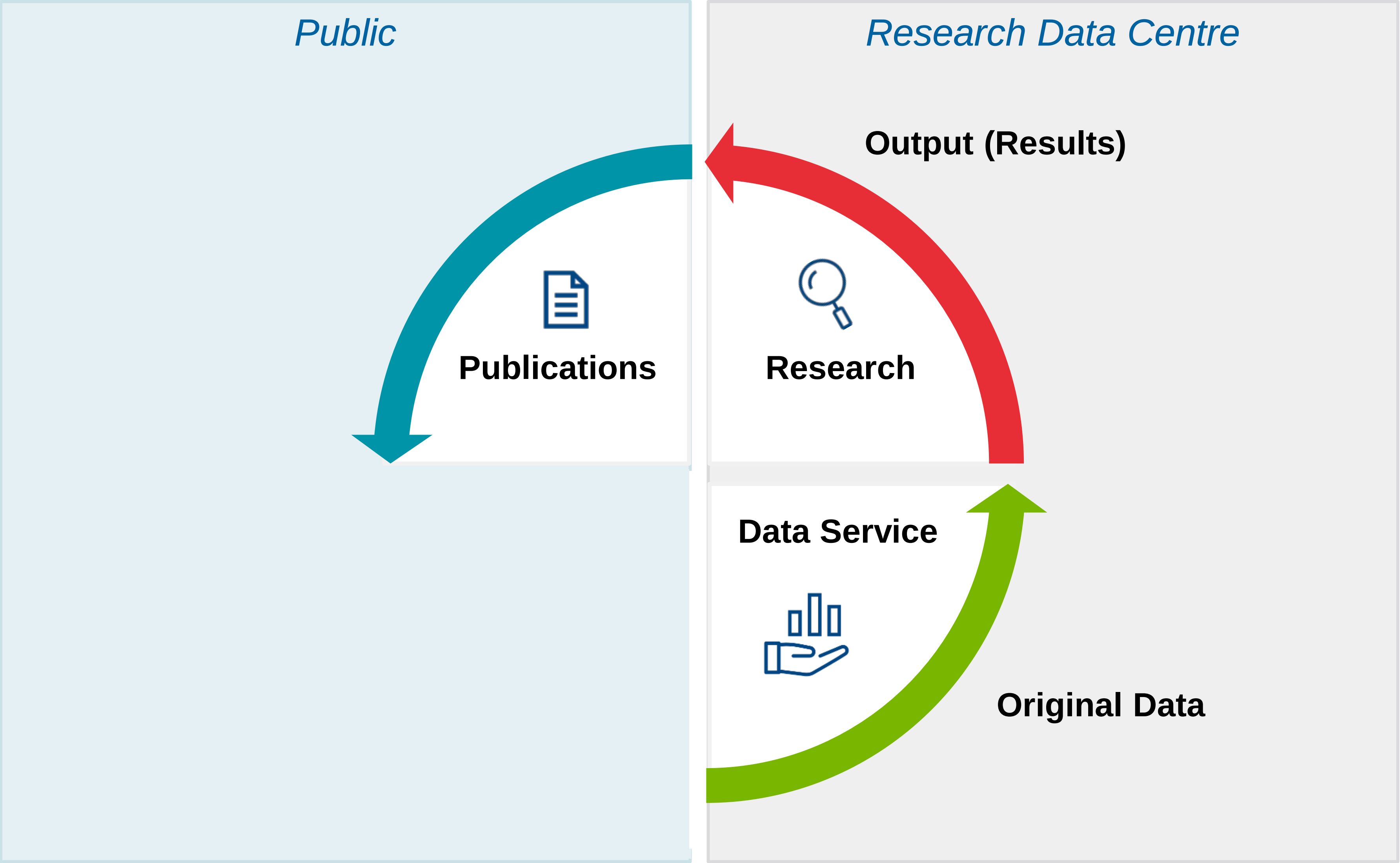


The 5 Safes in the RDSC

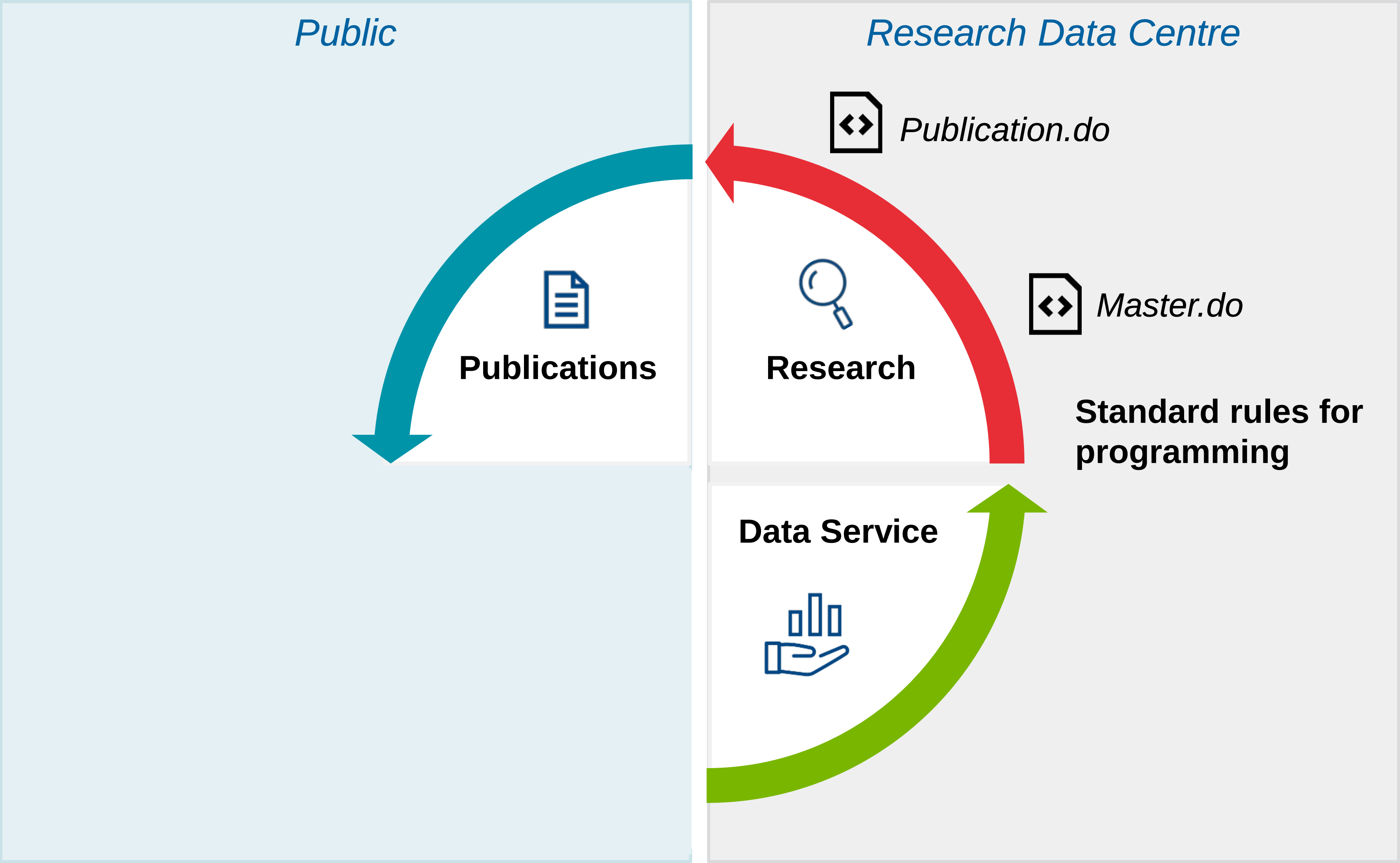
- **Safe people**: non-disclosure agreement, contract (with penalty up to 60,000 Euro, publishing the name, exclusion from access up to 2 years).
- **Safe projects**: non-commercial research, project description.
- **Safe environment**: working places without internet connection, (cell) phone, photo, printer and drive.
- **Safe data**: (weakly) anonymized data.
- **Safe results**: output control, papers/presentations are checked.

- **Access to real data**, anonymization is only one dimension, others have more effects on data protection.

A „New“ Challenge: Reproducibility



Reproducibility: Some First Steps of the RDSC



Public

Research Data Centre

Publication.do

Master.do

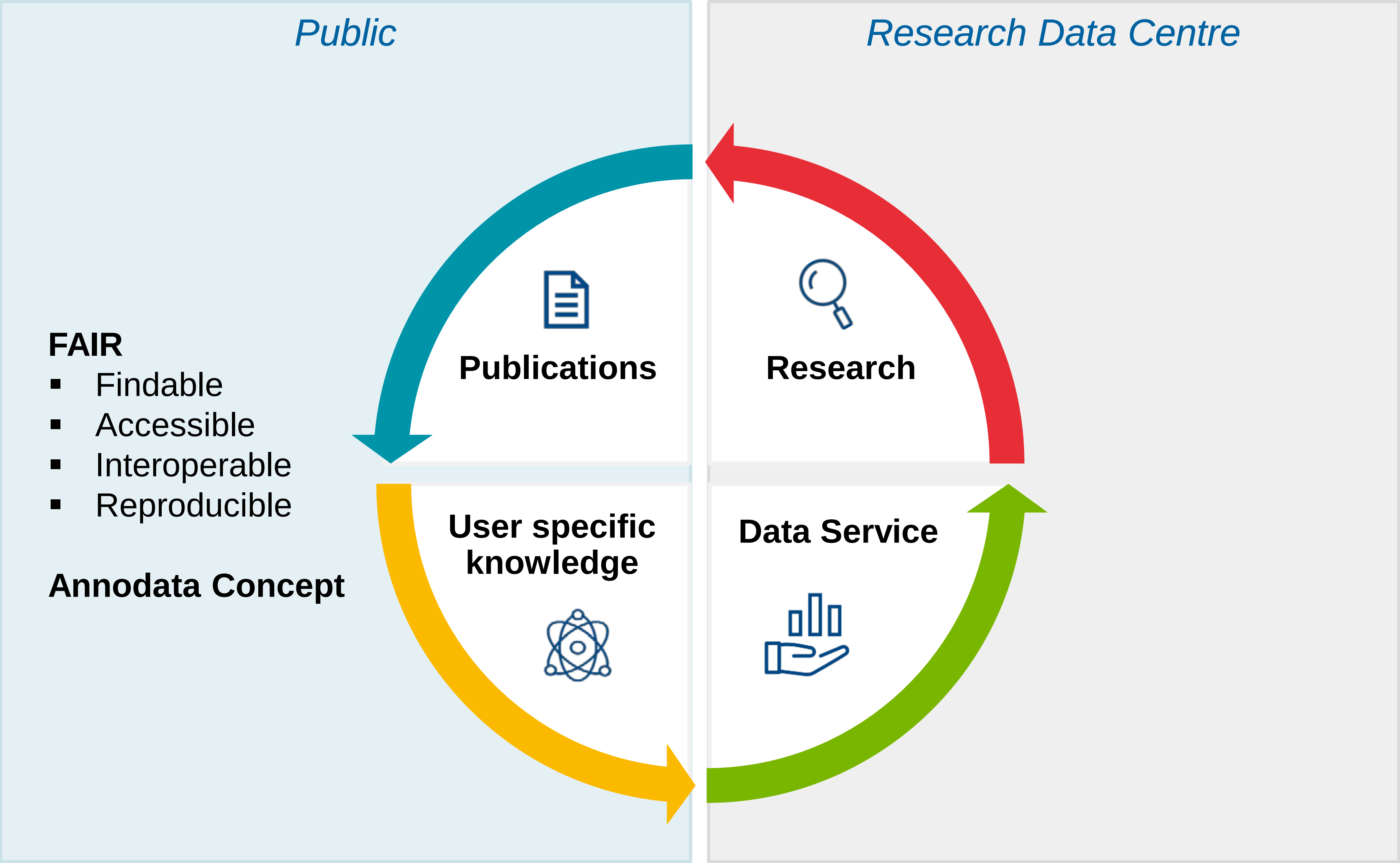
Standard rules for programming

FAIR Data and the Annodata Concept

FAIR

- Findable
- Accessible
- Interoperable
- Reproducible

Annodata Concept



Annodata-Schema

1 Access regime

2 Database

3 Dataset family

4 Record linkage

5 Combining restrictions

6 Global rules

7 Research projects

8 Researchers

1-3 on *dataset family* level

4-6 on *global* level (i.e. irrespective of researcher affiliation, research field, and access mode)

7-8 on *project* level

Summing Up the First Part

Public

FAIR

- Findable
- Accessible
- Interoperable
- Reproducible

Annodata Concept

Research Data Centre

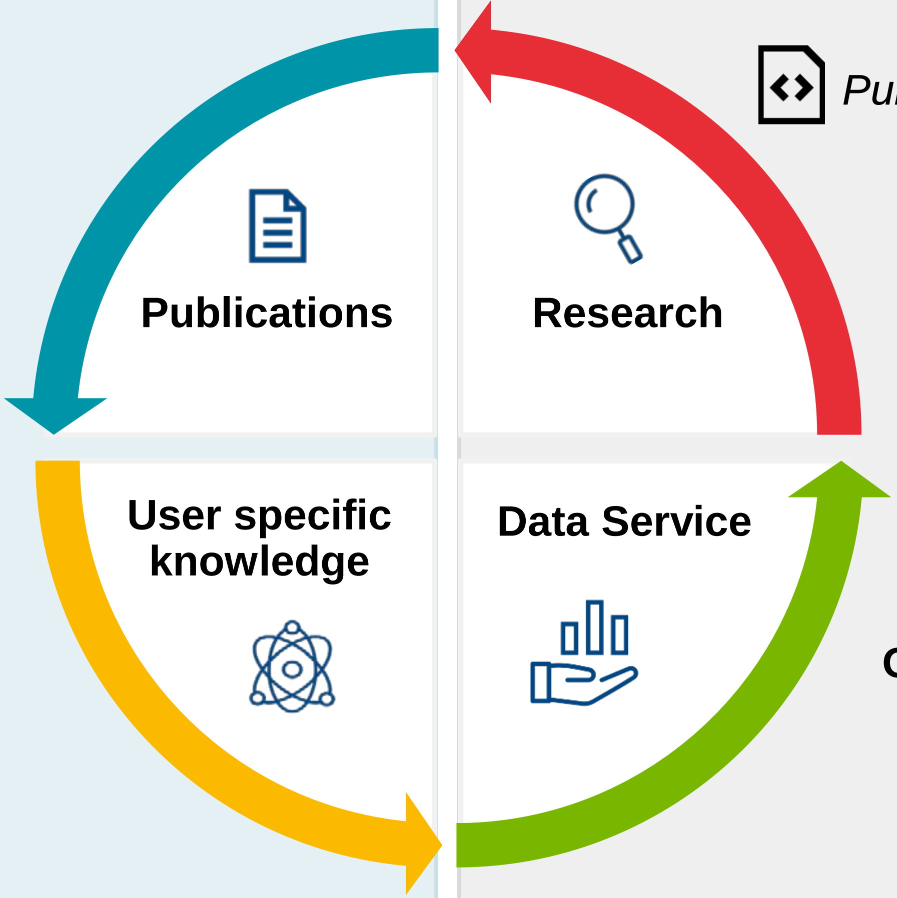
Output (Results)

Publication.do

Master.do

Standard rules for programming

Original Data

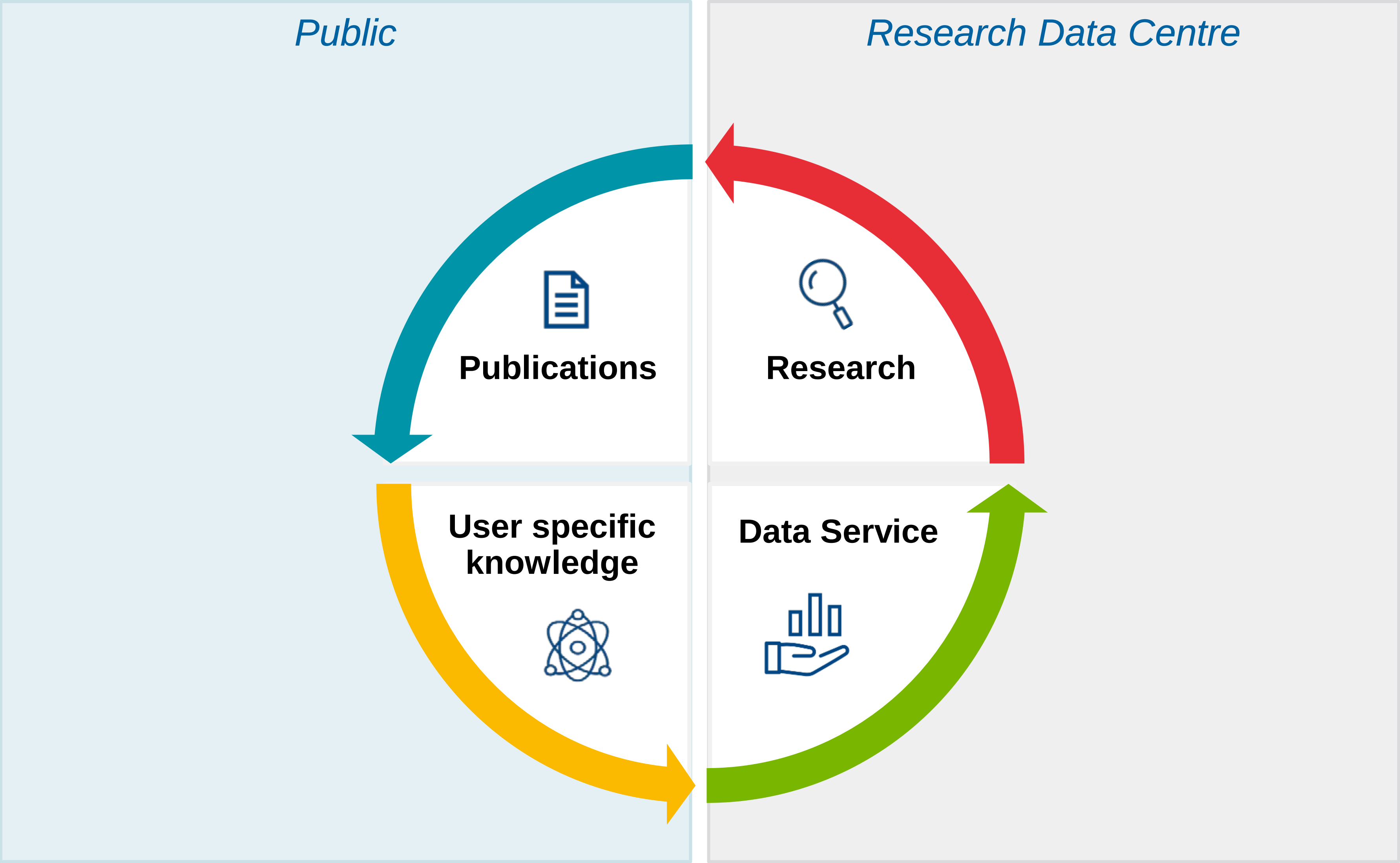


- ## Data Science for the Analysis of Financial Information

  ✓ Enhance Data Services for Users

  ✓ Justify added Value of Microdata for Research (and beyond)

Information Life Cycle of the RDSC (but could be transformed)



Motivation

1. Enhance data services for users

- ➢Build Amazon-style recommendation system
- ➢*What have others done with the data?*

2. Justify added value of microdata for research

- ➢Dataset impact factor

Data Sets in Publication: What has been done so far

1 Worldwide **competition*** with participants from all over the world and with New York University in the lead

- Meaningful solutions:

Allen AI *KAIST* *GESIS* *Paderborn University*

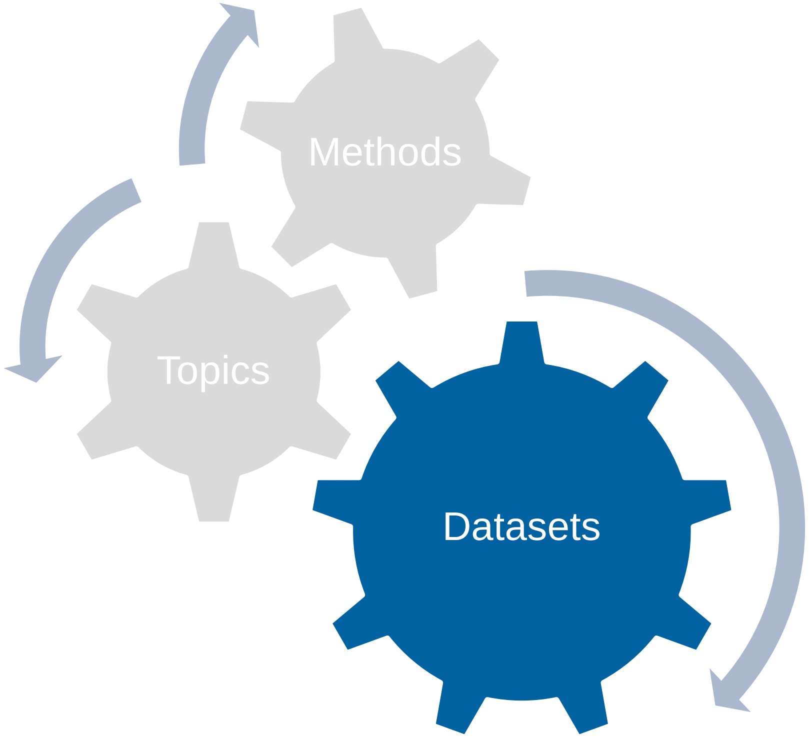
➡ First step for a systematic approach to find data sets in publications.

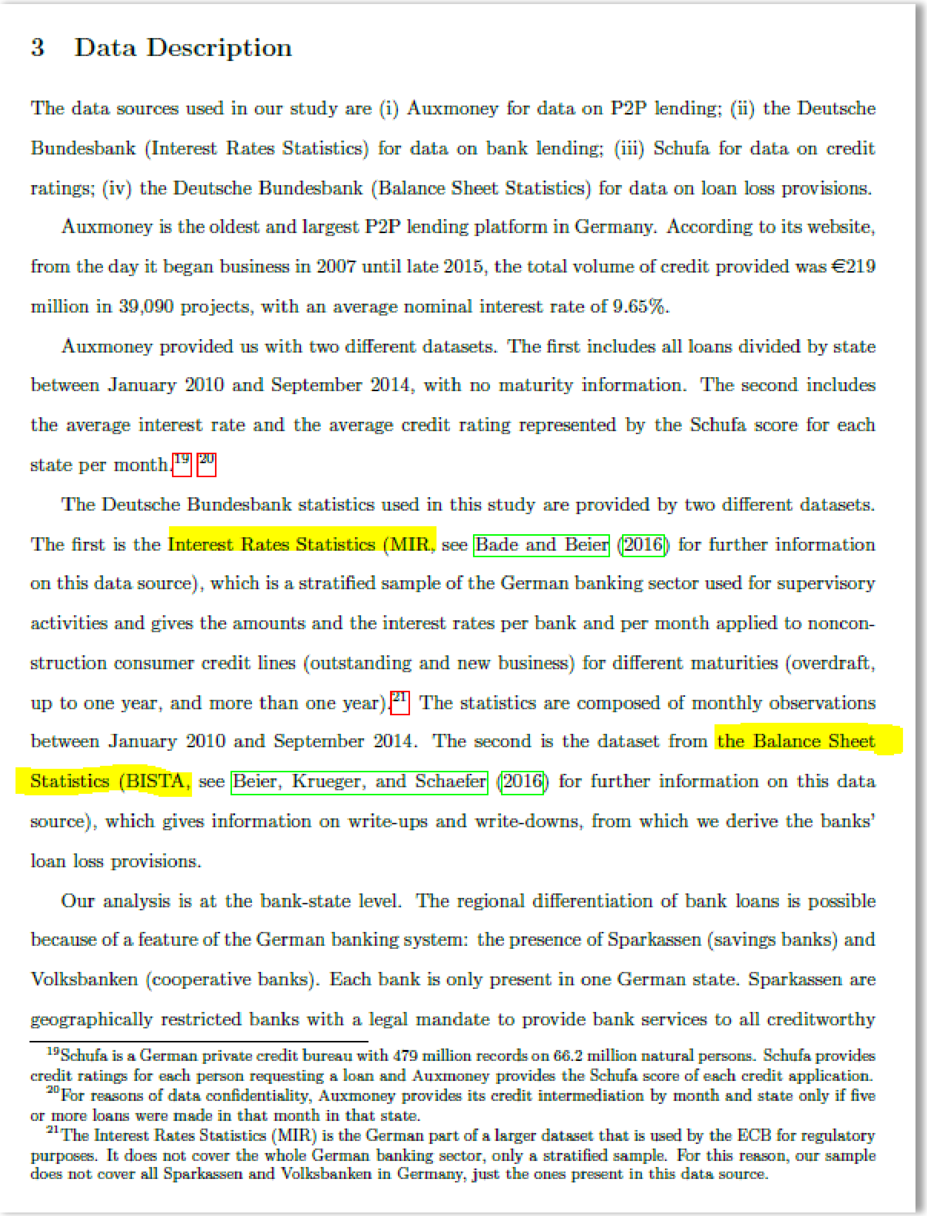
2 Contact with **RePEc** who think about including dataset mentions into their system

3 „**Rich Context Workshop**“ at National Press Club in Washington, DC to build a scientific basis for the empirical foundations of data science in government.

* For more information see https://coleridgeinitiative.org/richcontextcompetition/workshopagenda

How does articles look like?





3 Data Description

The data sources used in our study are (i) Auxmoney for data on P2P lending; (ii) the Deutsche Bundesbank (Interest Rates Statistics) for data on bank lending; (iii) Schufa for data on credit ratings; (iv) the Deutsche Bundesbank (Balance Sheet Statistics) for data on loan loss provisions.

Auxmoney is the oldest and largest P2P lending platform in Germany. According to its website, from the day it began business in 2007 until late 2015, the total volume of credit provided was €219 million in 39,090 projects, with an average nominal interest rate of 9.65%.

Auxmoney provided us with two different datasets. The first includes all loans divided by state between January 2010 and September 2014, with no maturity information. The second includes the average interest rate and the average credit rating represented by the Schufa score for each state per month.[19] [20]

The Deutsche Bundesbank statistics used in this study are provided by two different datasets. The first is the Interest Rates Statistics (MIR, see Bade and Beier (2016) for further information on this data source), which is a stratified sample of the German banking sector used for supervisory activities and gives the amounts and the interest rates per bank and per month applied to nonconstruction consumer credit lines (outstanding and new business) for different maturities (overdraft, up to one year, and more than one year).[21] The statistics are composed of monthly observations between January 2010 and September 2014. The second is the dataset from the Balance Sheet Statistics (BISTA, see Beier, Krueger, and Schaefer (2016) for further information on this data source), which gives information on write-ups and write-downs, from which we derive the banks' loan loss provisions.

Our analysis is at the bank-state level. The regional differentiation of bank loans is possible because of a feature of the German banking system: the presence of Sparkassen (savings banks) and Volksbanken (cooperative banks). Each bank is only present in one German state. Sparkassen are geographically restricted banks with a legal mandate to provide bank services to all creditworthy

[19] Schufa is a German private credit bureau with 479 million records on 66.2 million natural persons. Schufa provides credit ratings for each person requesting a loan and Auxmoney provides the Schufa score of each credit application.

[20] For reasons of data confidentiality, Auxmoney provides its credit intermediation by month and state only if five or more loans were made in that month in that state.

[21] The Interest Rates Statistics (MIR) is the German part of a larger dataset that is used by the ECB for regulatory purposes. It does not cover the whole German banking sector, only a stratified sample. For this reason, our sample does not cover all Sparkassen and Volksbanken in Germany, just the ones present in this data source.

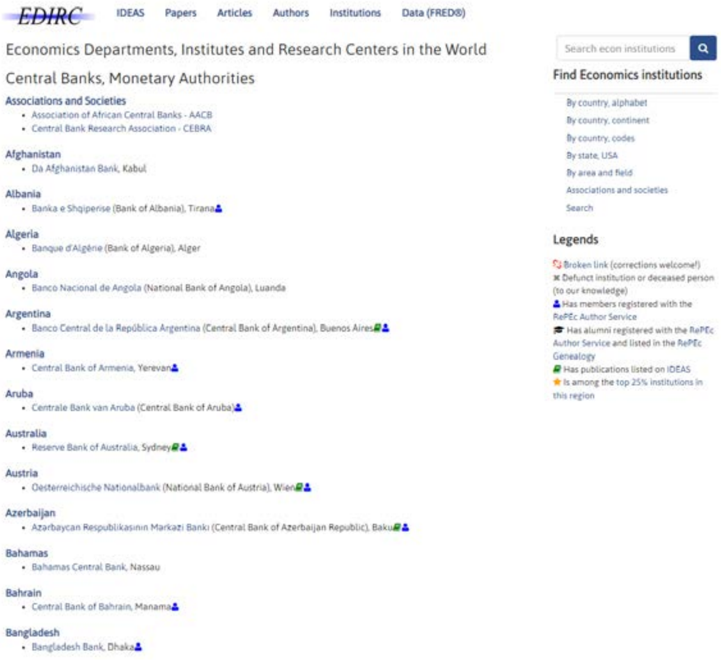
Calebe de Roure – Loriana Pelizzon – Anjan Thakor

P2P Lenders versus Banks:
Cream Skimming or Bottom Fishing?

SAFE Working Paper No. 206

Getting the data: Scraping central bank publications

RePEc



EDIRC IDEAS Papers Articles Authors Institutions Data (FRED®)

Economics Departments, Institutes and Research Centers in the World

Central Banks, Monetary Authorities

Associations and Societies
- Association of African Central Banks - AACB
- Central Bank Research Association - CEBRA

Afghanistan
- Da Afghanistan Bank, Kabul

Albania
- Banka e Shqiperise (Bank of Albania), Tirana👤

Algeria
- Banque d'Algérie (Bank of Algeria), Alger

Angola
- Banco Nacional de Angola (National Bank of Angola), Luanda

Argentina
- Banco Central de la República Argentina (Central Bank of Argentina), Buenos Aires📗👤

Armenia
- Central Bank of Armenia, Yerevan👤

Aruba
- Centrale Bank van Aruba (Central Bank of Aruba)👤

Australia
- Reserve Bank of Australia, Sydney📗👤

Austria
- Oesterreichische Nationalbank (National Bank of Austria), Wien📗👤

Azerbaijan
- Azarbaycan Respublikasının Markazi Bankı (Central Bank of Azerbaijan Republic), Baku📗👤

Bahamas
- Bahamas Central Bank, Nassau

Bahrain
- Central Bank of Bahrain, Manama👤

Bangladesh
- Bangladesh Bank, Dhaka👤

Search econ institutions

Find Economics institutions

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Associations and societies
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Legends

Broken link (corrections welcome!)
✖ Defunct institution or deceased person (to our knowledge)
👤 Has members registered with the RePEc Author Service
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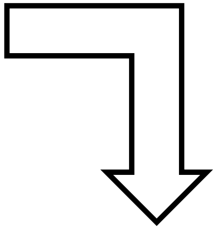
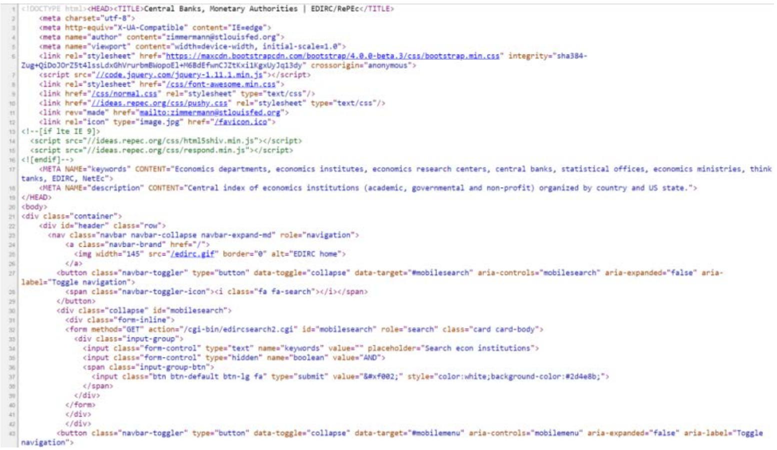
📗 Has publications listed on IDEAS
★ Is among the top 25% institutions in this region

Source: https://edirc.repec.org/central.html



Retrieve information from HTML with web scraper



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navigation">
```

➢ **Over 57,000 central bank publications downloaded**

Thanks to GALILEO-Team

Model evaluation with central bank sample

Two algorithms to find data sets in publications:

- Allen AI
- KAISI

Experiences:

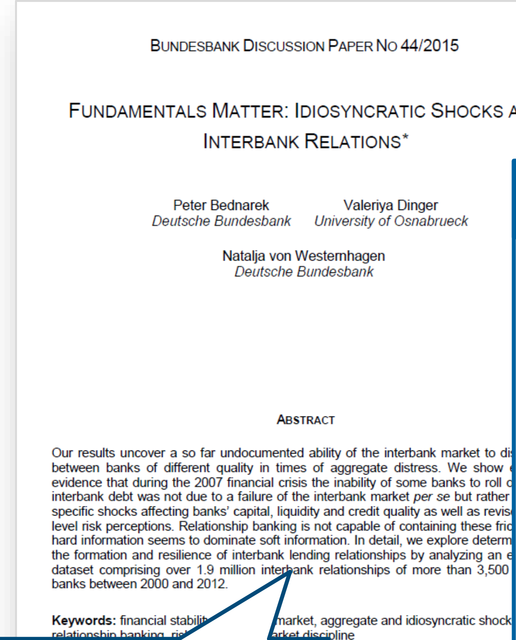
- Allen AI only finds what it is trained on
- KAIST also finds unknown datasets
- Yet, KAIST is very noisy

Model evaluation: Example

Title	KAIST	Allen AI
The PHF: A comprehensive panel survey on household finances and wealth in Germany	PHF	PHF, Panel on Household Finances
Saving and learning: Theory and evidence from saving for child's college	PSID s family data, PSID, Panel Study of Income Dynamics, Data, rst surveyed in the spring of, CDS TA	Panel Study of Income Dynamics (PSID)
Monetary policy and the oil futures market	commodity prices, VAR, JEL Classication	- / -
Is the willingness to take financial risk a sex-linked trait? Evidence from national surveys of household finance	DNB Household Survey, BIS Papers	- / -
China's role in global inflation dynamics	WEO, UN Comtrade database, Journal of Econometrics, OECD s Main Economic Indicators	- / -

From “unrelated” articles to data network

Example: BBk’s monthly Balance Sheet Statistics (BISTA)



BUNDESBANK DISCUSSION PAPER NO 44/2015

FUNDAMENTALS MATTER: IDIOSYNCRATIC SHOCKS AND INTERBANK RELATIONS*

Peter Bednarek
Deutsche Bundesbank

Valeriya Dinger
University of Osnabrueck

Natalja von Westernhagen
Deutsche Bundesbank

ABSTRACT

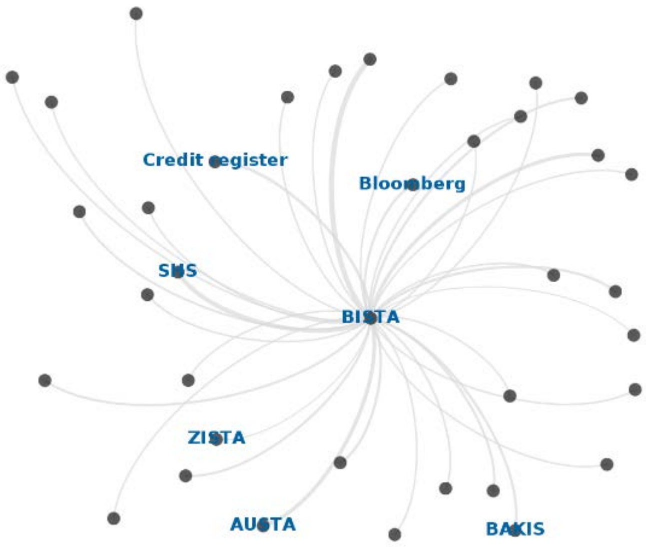
Our results uncover a so far undocumented ability of the interbank market to di
between banks of different quality in times of aggregate distress. We show
evidence that during the 2007 financial crisis the inability of some banks to roll o
interbank debt was not due to a failure of the interbank market *per se* but rather
specific shocks affecting banks’ capital, liquidity and credit quality as well as revis
level risk perceptions. Relationship banking is not capable of containing these fric
hard information seems to dominate soft information. In detail, we explore determ
the formation and resilience of interbank lending relationships by analyzing an e
dataset comprising over 1.9 million interbank relationships of more than 3,500
banks between 2000 and 2012.

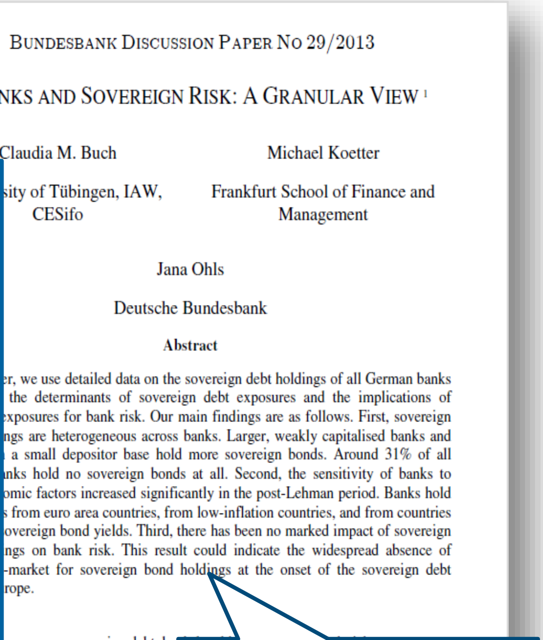
Keywords: financial stabilit market, aggregate and idiosyncratic shock
relationship banking, ris arket discipline

BISTA MIO-E.[1]

BISTA ego-network

Joint dataset usage in publications





BUNDESBANK DISCUSSION PAPER NO 29/2013

BANKS AND SOVEREIGN RISK: A GRANULAR VIEW [1]

Claudia M. Buch
sity of Tübingen, IAW,
CESifo

Michael Koetter
Frankfurt School of Finance and
Management

Jana Ohls
Deutsche Bundesbank

Abstract

er, we use detailed data on the sovereign debt holdings of all German banks
the determinants of sovereign debt exposures and the implications of
xposures for bank risk. Our main findings are as follows. First, sovereign
ngs are heterogeneous across banks. Larger, weakly capitalised banks and
a small depositor base hold more sovereign bonds. Around 31% of all
nks hold no sovereign bonds at all. Second, the sensitivity of banks to
omic factors increased significantly in the post-Lehman period. Banks hold
s from euro area countries, from low-inflation countries, and from countries
overeign bond yields. Third, there has been no marked impact of sovereign
ngs on bank risk. This result could indicate the widespread absence of
-market for sovereign bond holdings at the onset of the sovereign debt
rope.

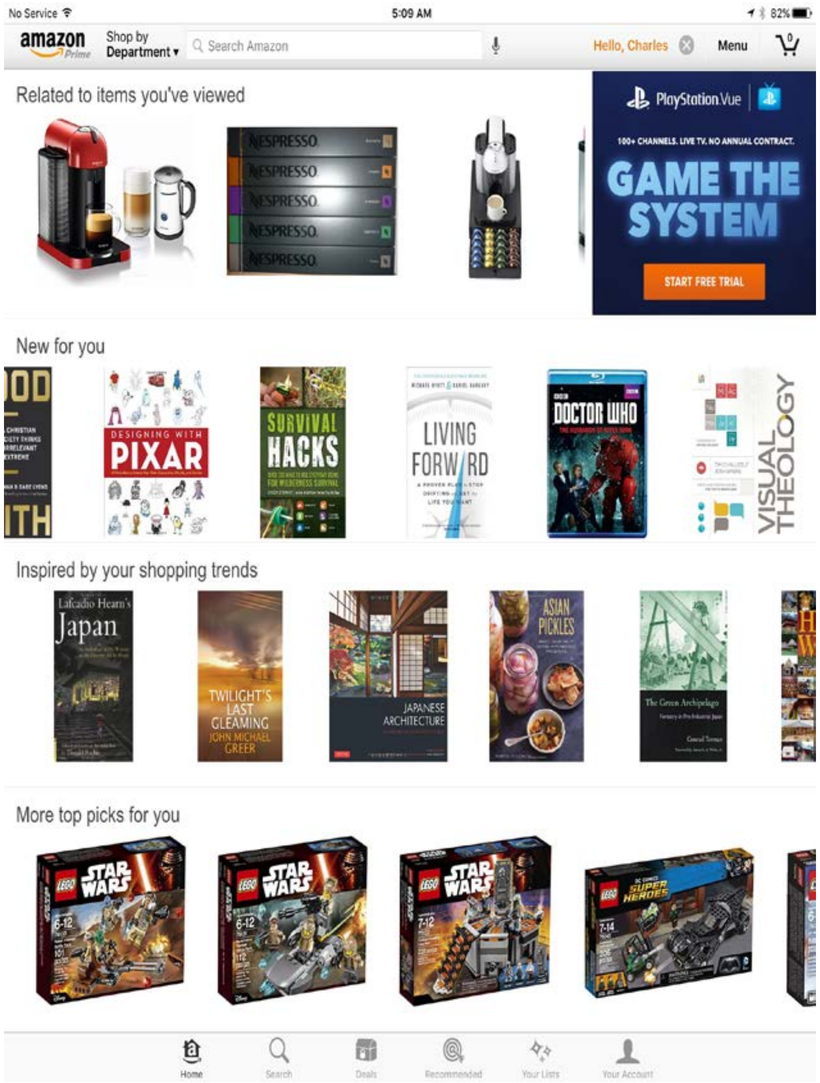
sovereign debt, ba
ication: G11, G18, G21, G

BISTA SHS[2]

[1] BBk credit register

[2] Data on securities

From dataset network to recommendations

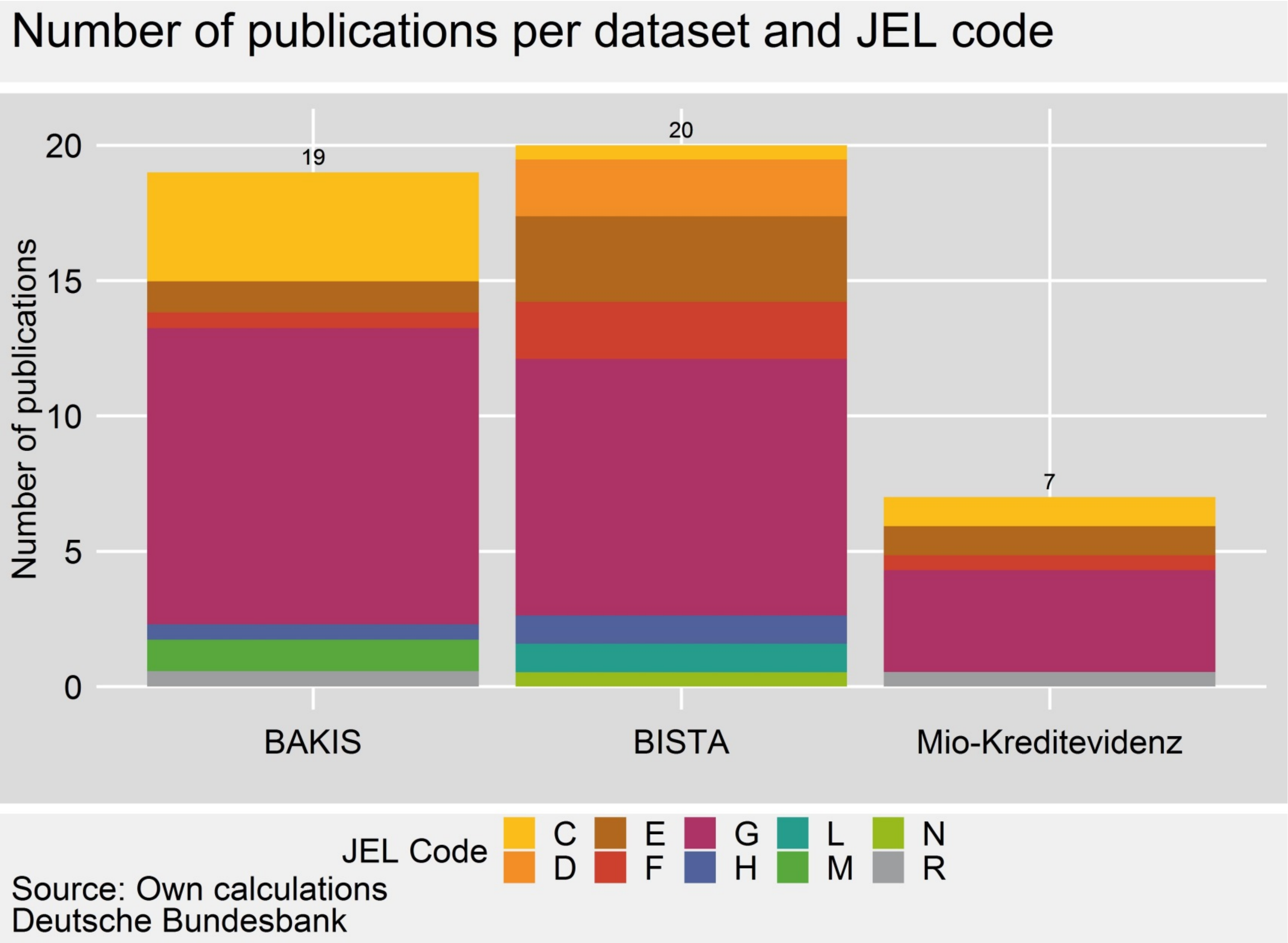


Related to data you've viewed:

1. Jointly used datasets
2. Publications
3. Similar data
4. …

Thanks to Julia Lane

From dataset network to dataset impact factor



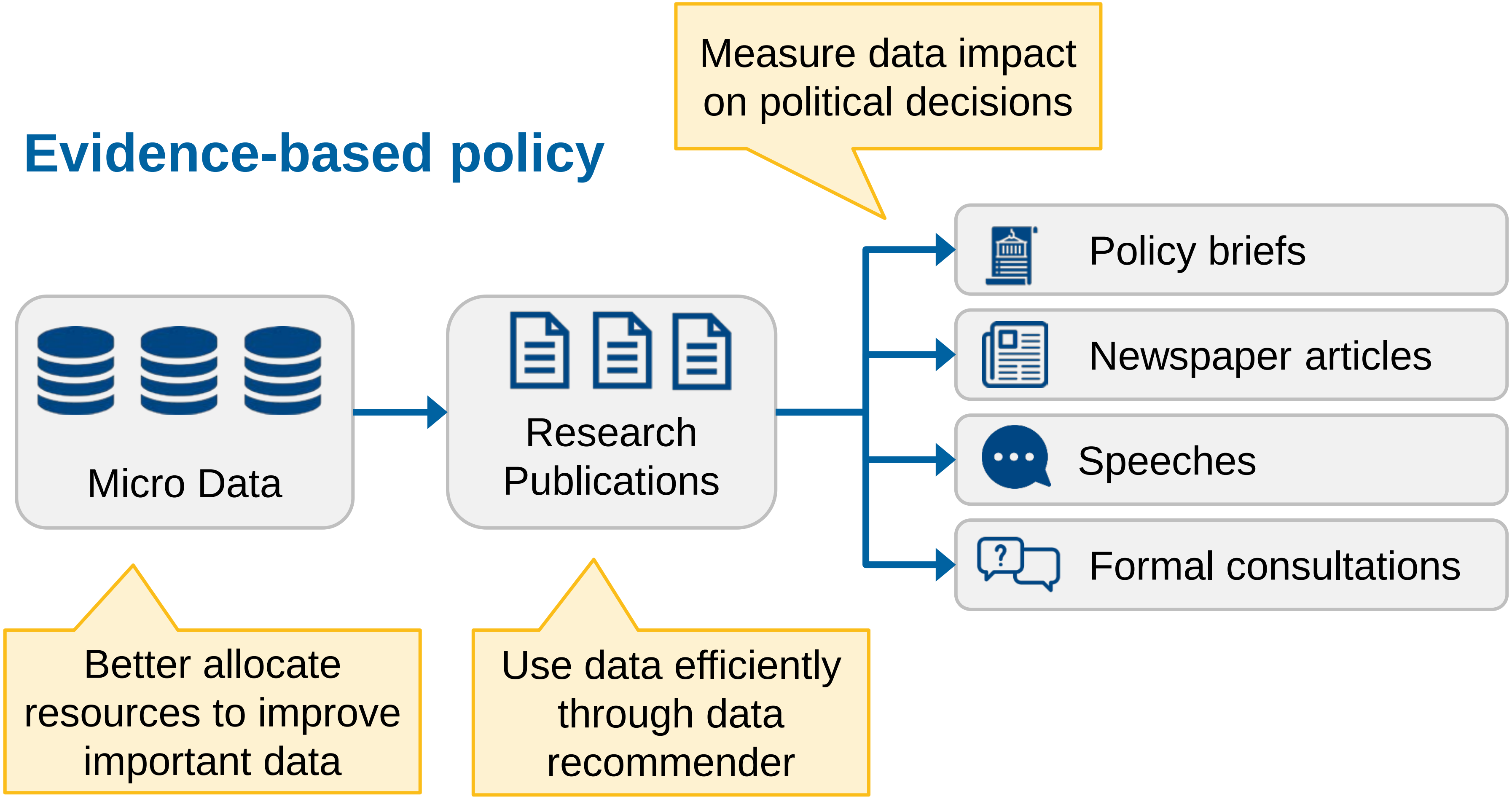
Source: Own calculations
Deutsche Bundesbank

Dataset impact factor: Our axioms

- ✓ More publications using dataset are better
- ✓ Broader usage is better
- ▪ More links to other datasets are better
- ▪ More recent usage is better
- ▪ Higher impact factor of publications is better
- ▪ Dataset is better when it sparks new research

Implications

Evidence-based policy

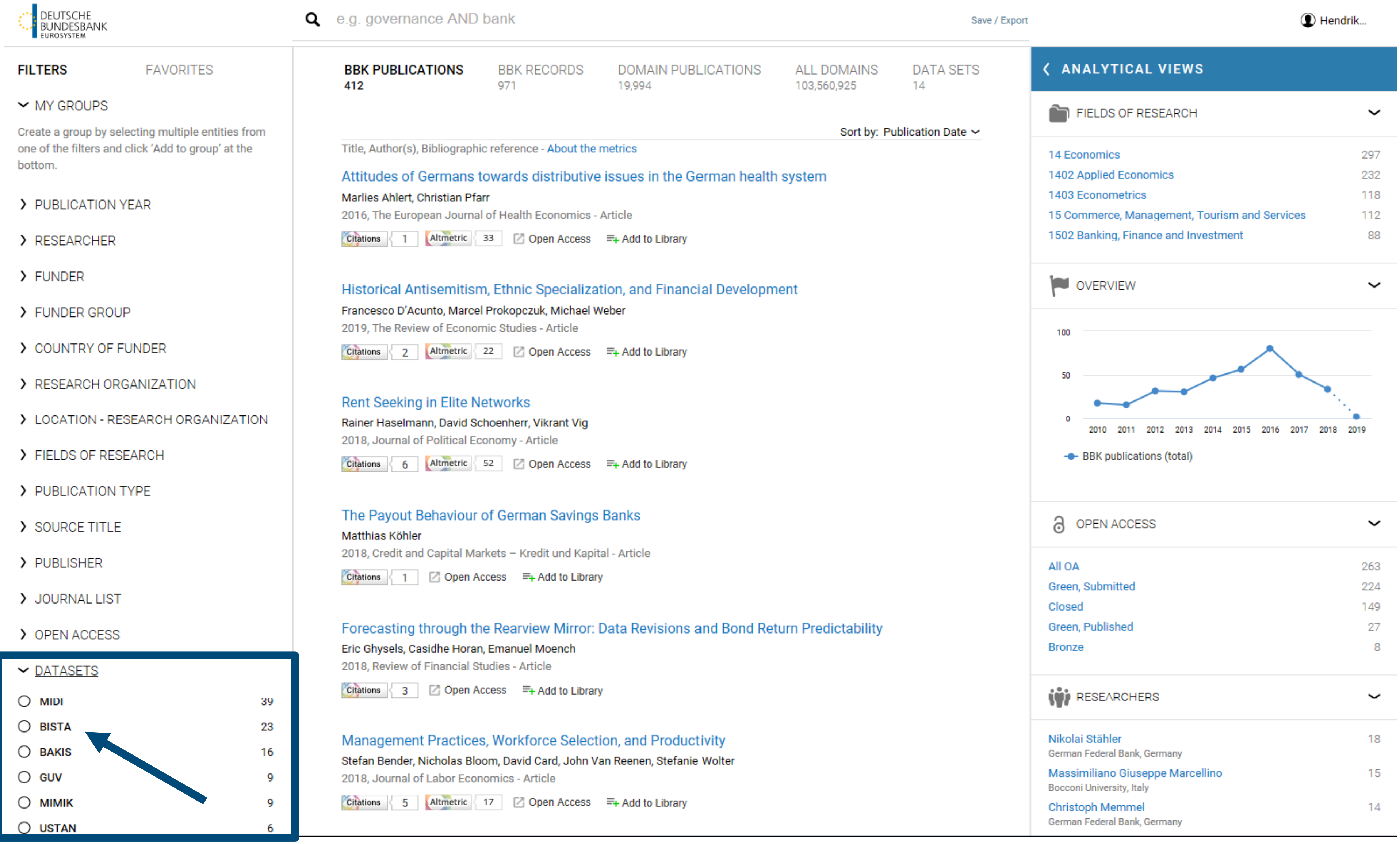


Measure data impact on political decisions

Better allocate resources to improve important data

Use data efficiently through data recommender

User interface to explore micro data usage



FILTERS FAVORITES

MY GROUPS

Create a group by selecting multiple entities from one of the filters and click 'Add to group' at the bottom.

○	MIDI	39
○	BISTA	23
○	BAKIS	16
○	GUV	9
○	MIMIK	9
○	USTAN	6

BBK PUBLICATIONS	BBK RECORDS	DOMAIN PUBLICATIONS	ALL DOMAINS	DATA SETS
412	971	19,994	103,560,925	14

Sort by: Publication Date

Title, Author(s), Bibliographic reference - About the metrics

Attitudes of Germans towards distributive issues in the German health system
Marlies Ahlert, Christian Pfarr
2016, The European Journal of Health Economics - Article
Citations 1 Altmetric 33 Open Access Add to Library

Historical Antisemitism, Ethnic Specialization, and Financial Development
Francesco D'Acunto, Marcel Prokopczuk, Michael Weber
2019, The Review of Economic Studies - Article
Citations 2 Altmetric 22 Open Access Add to Library

Rent Seeking in Elite Networks
Rainer Haselmann, David Schoenherr, Vikrant Vig
2018, Journal of Political Economy - Article
Citations 6 Altmetric 52 Open Access Add to Library

The Payout Behaviour of German Savings Banks
Matthias Köhler
2018, Credit and Capital Markets – Kredit und Kapital - Article
Citations 1 Open Access Add to Library

Forecasting through the Rearview Mirror: Data Revisions and Bond Return Predictability
Eric Ghysels, Casidhe Horan, Emanuel Moench
2018, Review of Financial Studies - Article
Citations 3 Open Access Add to Library

Management Practices, Workforce Selection, and Productivity
Stefan Bender, Nicholas Bloom, David Card, John Van Reenen, Stefanie Wolter
2018, Journal of Labor Economics - Article
Citations 5 Altmetric 17 Open Access Add to Library

ANALYTICAL VIEWS

FIELDS OF RESEARCH

14 Economics	297
1402 Applied Economics	232
1403 Econometrics	118
15 Commerce, Management, Tourism and Services	112
1502 Banking, Finance and Investment	88

OVERVIEW

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All OA	263
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Closed	149
Green, Published	27
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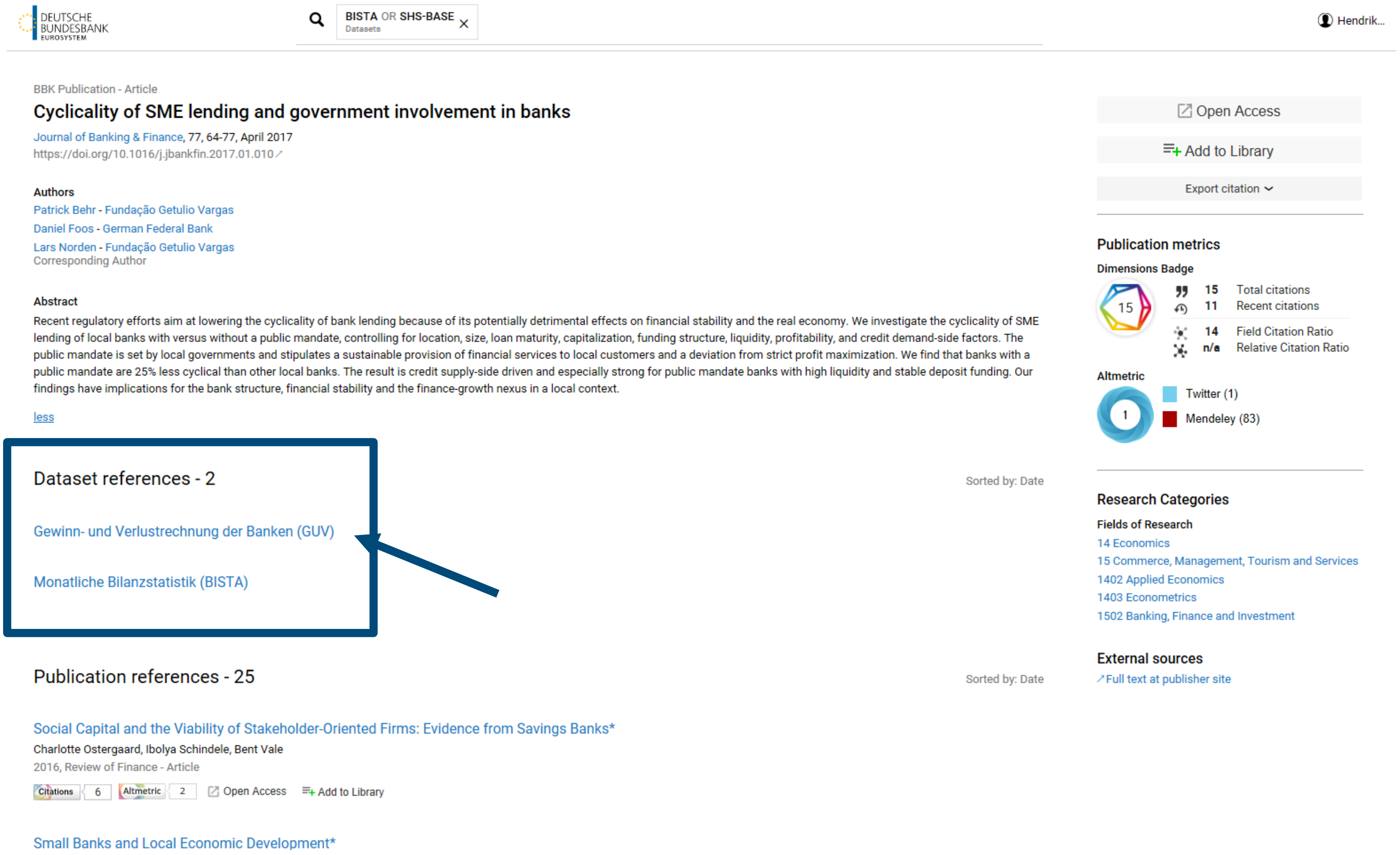
RESEARCHERS

Nikolai Stähler German Federal Bank, Germany	18
Massimiliano Giuseppe Marcellino Bocconi University, Italy	15
Christoph Memmel German Federal Bank, Germany	14

Research Data and Service Centre

Find publications using your dataset



DEUTSCHE BUNDESBANK EUROSYSTEM

BISTA OR SHS-BASE ×
Datasets

Hendrik...

BBK Publication - Article

Cyclicality of SME lending and government involvement in banks

Journal of Banking & Finance, 77, 64-77, April 2017
https://doi.org/10.1016/j.jbankfin.2017.01.010

Authors

Patrick Behr - Fundação Getulio Vargas
Daniel Foos - German Federal Bank
Lars Norden - Fundação Getulio Vargas
Corresponding Author

Abstract

Recent regulatory efforts aim at lowering the cyclicality of bank lending because of its potentially detrimental effects on financial stability and the real economy. We investigate the cyclicality of SME lending of local banks with versus without a public mandate, controlling for location, size, loan maturity, capitalization, funding structure, liquidity, profitability, and credit demand-side factors. The public mandate is set by local governments and stipulates a sustainable provision of financial services to local customers and a deviation from strict profit maximization. We find that banks with a public mandate are 25% less cyclical than other local banks. The result is credit supply-side driven and especially strong for public mandate banks with high liquidity and stable deposit funding. Our findings have implications for the bank structure, financial stability and the finance-growth nexus in a local context.

less

Dataset references - 2

Sorted by: Date

Gewinn- und Verlustrechnung der Banken (GUV)

Monatliche Bilanzstatistik (BISTA)

Publication references - 25

Sorted by: Date

Social Capital and the Viability of Stakeholder-Oriented Firms: Evidence from Savings Banks*
Charlotte Ostergaard, Ibolya Schindele, Bent Vale
2016, Review of Finance - Article
Citations 6 Altmetric 2 Open Access Add to Library

Small Banks and Local Economic Development*

Open Access

Add to Library

Export citation

Publication metrics

Dimensions Badge

15

15	Total citations
11	Recent citations
14	Field Citation Ratio
n/a	Relative Citation Ratio

Altmetric

1

Twitter (1)
Mendeley (83)

Research Categories

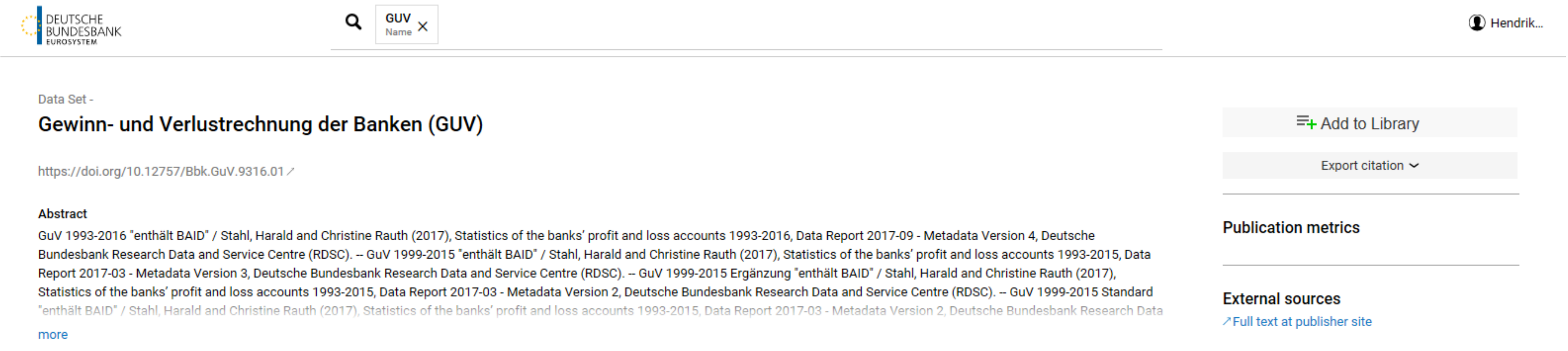
Fields of Research

14 Economics
15 Commerce, Management, Tourism and Services
1402 Applied Economics
1403 Econometrics
1502 Banking, Finance and Investment

External sources

Full text at publisher site

Get dataset information and inspiration



Data Set -

Gewinn- und Verlustrechnung der Banken (GUV)

https://doi.org/10.12757/Bbk.GuV.9316.01

Abstract

GuV 1993-2016 "enthält BAID" / Stahl, Harald and Christine Rauth (2017), Statistics of the banks' profit and loss accounts 1993-2016, Data Report 2017-09 - Metadata Version 4, Deutsche Bundesbank Research Data and Service Centre (RDSC). -- GuV 1999-2015 "enthält BAID" / Stahl, Harald and Christine Rauth (2017), Statistics of the banks' profit and loss accounts 1993-2015, Data Report 2017-03 - Metadata Version 3, Deutsche Bundesbank Research Data and Service Centre (RDSC). -- GuV 1999-2015 Ergänzung "enthält BAID" / Stahl, Harald and Christine Rauth (2017), Statistics of the banks' profit and loss accounts 1993-2015, Data Report 2017-03 - Metadata Version 2, Deutsche Bundesbank Research Data and Service Centre (RDSC). -- GuV 1999-2015 Standard "enthält BAID" / Stahl, Harald and Christine Rauth (2017), Statistics of the banks' profit and loss accounts 1993-2015, Data Report 2017-03 - Metadata Version 2, Deutsche Bundesbank Research Data

more

Publication metrics

External sources

Full text at publisher site

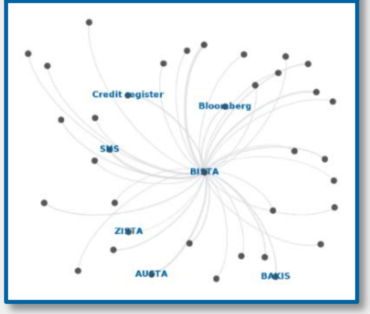
Summing Up I: General

- **Developments** for RDSC(s) and INEXDA was/are fast, but **incremental**: trust building, growing data complexity, learning process …
- (New) **skills** for researchers / data producers.
- **Engagement** of researchers (value of data work, data impact factor).
- **Efficiency**: access system in a RDC, metadata/recommendation system project management in a RDC, …
- **Knowledge exchange**: Financial Big Data Cluster, Tech Campus, GAIA-X.
- **Harmonization/Internationalization**: G20 initiative on data sharing and data access of central banks, INEXDA.

Knowledge Life Cycle in RDSC (Bundesbank)

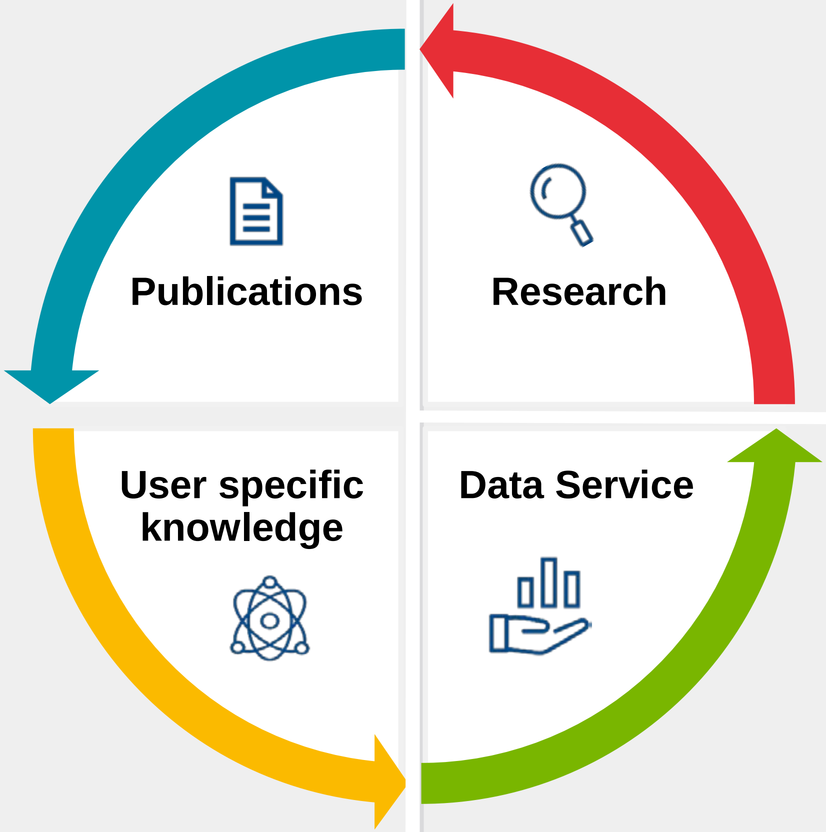
Measure data impact on political decisions.

Ego-network*



*__Example__: Joint dataset usage in publications for the BBk's monthly Balance Sheet Statistics (BISTA)

- Policy briefs
- Newspaper articles
- Speeches
- Formal consultations



Use data efficiently through data recommender (from ego-network).

Collaboration

- Knowledge sharing
- Metadata

Secure workspace

- Services and Tools

Better allocate resources to improve data quality and service.

Data Stewardship

- Approval
- Monitoring
- Reporting

Thank you !

- **Website**: www.bundesbank.de\fdsz
- **Contact**: fdsz@bundesbank.de