Parsing the Content of Bank Supervision

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FEDERAL RESERVE BANK *of* NEW YORK

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What is Bank Supervision?

- Much attention to bank supervision

- Most supervisory information is confidential

- Provide a "look behind the curtain":
  - What is the content of bank supervision? What drives it?

  - Association of issues with bank char. and other actions

  - Link b/w supervision and other Basel pillars

Data & Method

- Data on BHCs and state member banks (SMBs)
  - Supervisory findings, or issues (MRAs and MRIAs)

  - Ratings assigned by Fed supervisors

  - Bank characteristics from regulatory filings

- Content of supervisory issues is text

- Create a taxonomy of issues using an unsupervised machine learning method
  - Latent Dirichlet Allocation (LDA)

Latent Dirichlet Allocation

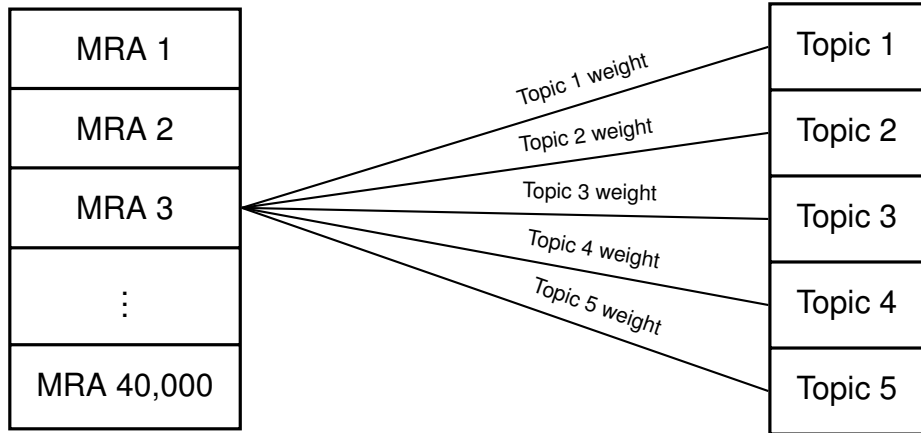| MRA 1 |
| :---: |
| MRA 2 |
| MRA 3 |
| ⋮ |
| MRA 40,000 |

- The text of each MRA is a distribution of words (unigrams)
- LDA uses word distributions to estimate underlying topic structure

Latent Dirichlet Allocation

MRA 1
MRA 2
MRA 3
⋮
MRA 40,000

Topic 1
Topic 2
Topic 3
Topic 4
Topic 5

Latent Dirichlet Allocation

MRA 1	Topic 1 weight	Topic 1
MRA 2	Topic 2 weight	Topic 2
MRA 3	Topic 3 weight	Topic 3
⋮	Topic 4 weight	Topic 4
MRA 40,000	Topic 5 weight	Topic 5

- Use topic weights on text of issues to determine salient words in each topic

Taxonomy of Issues

Topic	Label	Unigrams	Bigrams
1	**Compliance & Regulations**	regulation, account, bank, compliance, customer, violation, procedure, transaction	policy procedure, due diligence, suspicious activity, reserve bank, compliance regulation
2	**Internal Controls**	audit, internal, program, assessment, committee, IT, control, function	internal audit, policy procedure, audit committee, information security, operational risk
3	**Risk Modeling**	model, risk, firm, process, data, validation, loss, framework	stress testing, policy procedure, risk rating, risk model, model validation
4	**Loan Portfolio**	loan, credit, ALLL, appraisal, analysis, impairment, collateral, portfolio	credit risk, ALLL methodology, loan policy, real estate, loan review
5	**Capital & Liquidity**	capital, plan, liquidity, funding, limit, board, stress, contingency	capital plan, liquidity risk, interest rate, contingency funding, funding plan

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Taxonomy of Issues

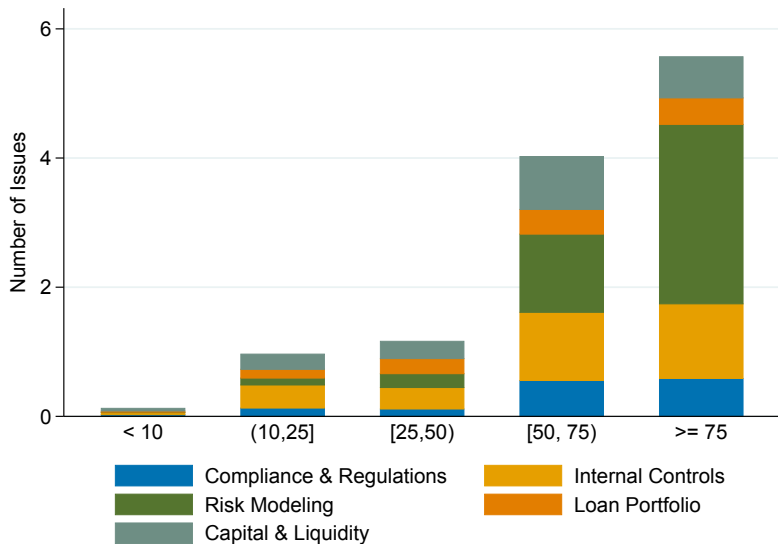| Topic	Label	Unigrams	Bigrams
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Quarterly Issue Openings by Bank Type
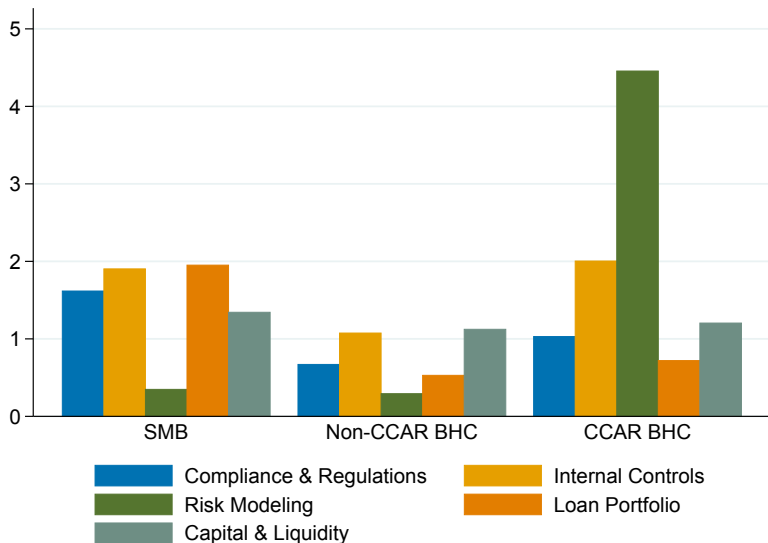
Concerns and Attention

- Concerns
  - Banks of concern (rating ≥ 3) have 0.35 more issues
  - Largely in Loan Portfolio and Capital & Liquidity topics

- Attention
  - Non-CCAR BHCs: 1.5 more issues during annual full scope exams
  - "CCAR" BHCs: 5.6 more issues (largely Risk Modelling)

Supervisory Issue Openings by Assets

Issues, Ratings and Bank Characteristics

- Regression of issue openings on ratings, bank char. and other controls

	1	2	3	4	5
Topic	Compliance & Reg.	Internal Cont.	Risk Modeling	Loan Portfolio	Capital & Liquidity
Rated 3,4,5	✓	✓		✓	✓
Characteristics			Tier 1 Cap.	Tier 1 Cap. ROA NPL	Tier 1 Cap. ROA NPL

Coefficients reported if significant at 5% level

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Soft Information ⏜   Hard Information ⏜

</div>

- Topic 4,5 related to Tier 1 Cap., ROA and NPL $\Rightarrow$ Hard Information

Issues and Other Supervisory Actions

- Regression of rating changes and formal actions on issue openings

Topic	1 Compliance & Reg.	2 Internal Ctrls.	3 Risk Model.	4 Loan Portfolio	5 Capital & Liquidity
Rating Downgrade				✓	✓
Formal Super. Actions	✓				✓

Coefficients reported if significant at 5% level

Interaction with the other Basel pillars

- Regulation:
    - 19% of issues related to compliance (topic 1) and 17% percent with capital & liquidity (topic 5)
    - Regulation distinct, but relies on supervision

- Market discipline:
    - Categorize analyst calls using supervisory topics
    - Correlation of analyst questions and Fed issues if related to hard information (topic 4 and 5) and risk modelling (topic 3)
    - Risk modelling issues include public supervisory assessment programs

Conclusion

- Construct a taxonomy of supervisory issues
  - Compliance & Regulation, Internal Controls, Risk Modelling, Loan Portfolio, Capital & Liquidity

- Hard information
  - Associated with measurable bank characteristics and rating downgrades
  - Correlated with analysts' questions

- Interaction between supervision and other two Basel pillars