Business models and bank performance

A long-term perspective

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The financial crisis and its response

- The financial crisis showed some banks to be more resilient
  - Retail-oriented banks (Ayadi et al. 2011, 2012)
  - Banks that rely more on deposits (Beltratti and Stulz, 2012)
- New layers of regulation: Basel III
  - More stringent capital requirements
  - Stable funding requirements (NSFR)
- Supervisory Review and Evaluation Process (SREP) includes business model analysis

$\Rightarrow$ **Which business models are sustainable?**

Contribution of this paper

- Study the impact of bank business model characteristics on performance
  - Identification of business models
  - Effect of business model on bank performance
- Data
  - 513 banks from 30 European countries
  - 16 years of data: 1998-2013
  - About 6300 observations used in estimation
  - Exclusion of domestic subsidiary banks

Definition

- Business model is bank's long-term strategy
- Space of possible strategies is spanned by strategic characteristics
  - Asset structure
  - Liability structure
  - Capital structure
  - Income structure

Variables

- Asset structure
  - Loan ratio, loan quality and size
- Liability structure
  - Reliance on customer deposits, funding risk
- Income structure
  - Income diversification
- Capital structure
  - Capital ratio

Classification

- Allocation of banks to specific, discrete groups
- Directly observed groups
  - Qualitative
  - Institutional structure, Bankscope specialization, ...
- Groups constructed using data analysis
  - Cluster analysis: groups that are as homogeneous as possible
  - Ayadi et al. (2011, 2012), Ayadi and De Groen (2014)

Classification

- Assumes unavailability of intermediate strategies
  - Discontinuous space of possible strategies
  - Especially difficult in European banking sector
  - Separates very similar banks into different categories
- Alternative: continuous spectrum of available strategies

Direct approach

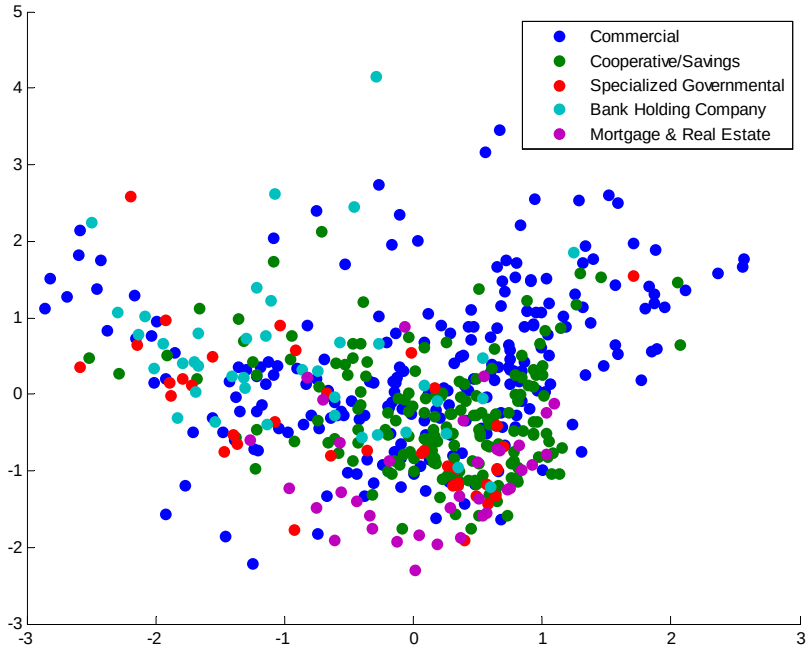


Figure: Bankscope specialization

Cluster analysis

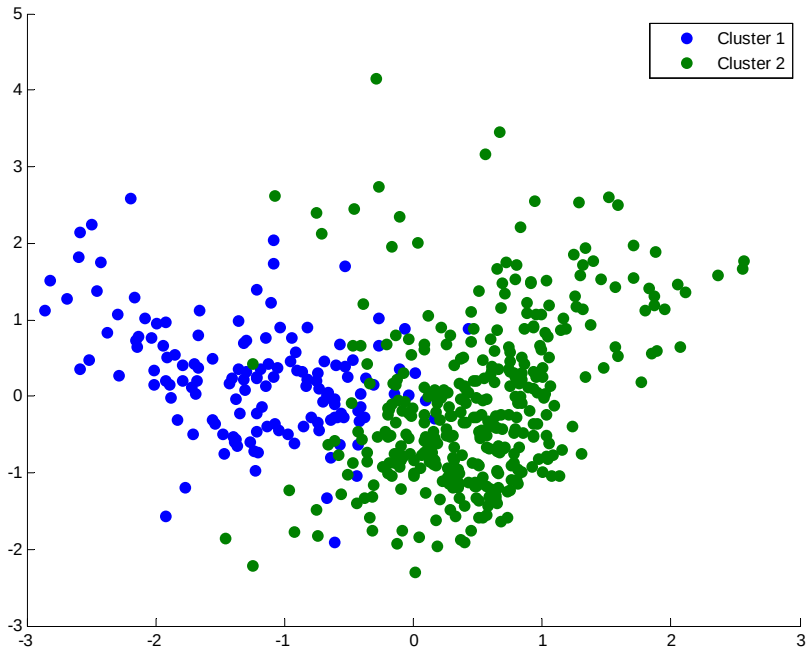


Figure: Cluster analysis

Individual characteristics

- Separate variables capture business models
  - Small set of variables
    - Demirgüç-Kunt and Huizinga (2010), Köhler (2015)
  - Large set of variables
    - Altunbas et al. (2011)
- Can identify specific features of business model that improve performance

Individual characteristics

- Bank-specific variation of business model variables
  - Not necessarily related to business models
- Even in long term: bank-specific drivers of differences
  - Fahlenbrach et al. (2012): persistent risk cultures

Overview

	Observed	**Analysis**
Classification	Legal Structure	Cluster analysis
Continuous	Separate characteristics	

Business model is latent strategy

- Observed characteristics reflect
  - common variation, i.e. a latent strategy
  - bank-specific variation
- Identification: factor analysis

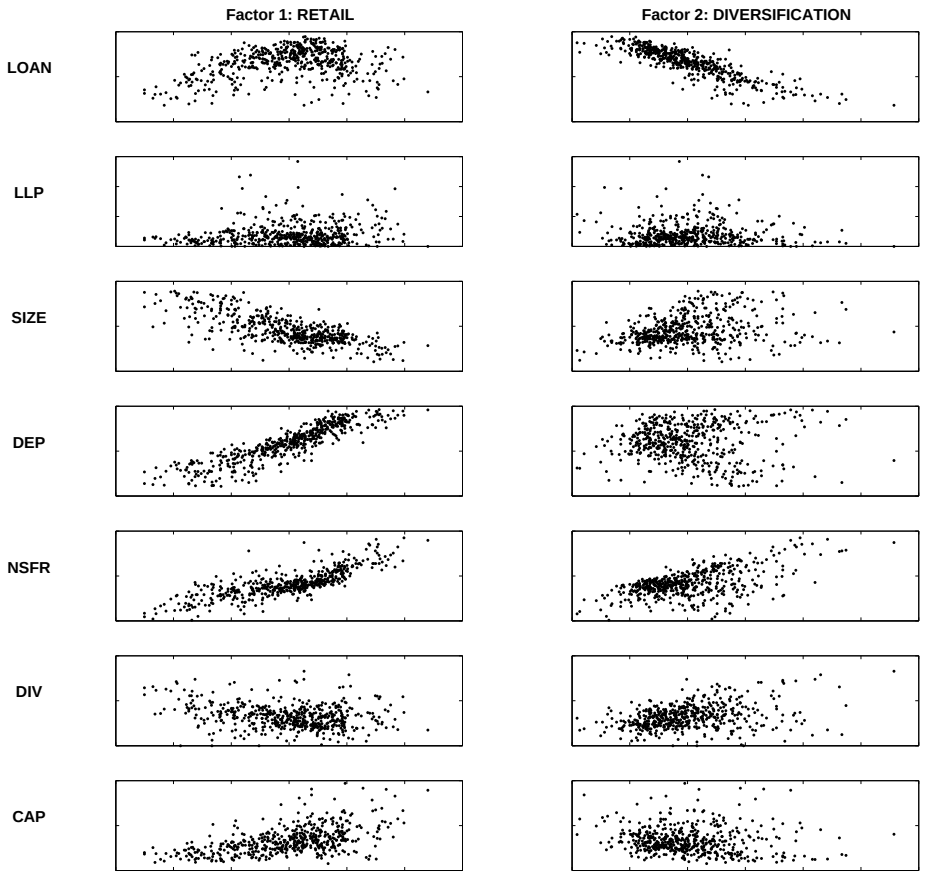
$$X_i = F_i\beta + \epsilon_i$$

- Factors load more heavily on variables that have more variation in common

Business model is latent strategy

Eigenvalues		Communality	
Factor 1	2.03	Loans to earning assets	58.6%
Factor 2	0.94	Loan loss provisions to loans	0.3%
Factor 3	0.59	Log assets	47.5%
Factor 4	0.21	Deposits to liabilities	69.9%
Factor 5	0.07	NSFR	82.7%
Factor 6	0.04	Income diversification	13.5%
Factor 7	-0.00	Equity to assets	24.3%

Business model is latent strategy



Bank performance

- Return on Equity
- Return on Assets
- Net interest margin
- Log Z-score
- Sub-components to investigate transmission
  - Interest income and expenses and net interest income
  - Non-interest income
  - Operating expenses
  - Log σ_{ROA}

Estimation

- Our model takes account of:
  - the changes over time *(within)*
  - the differences across banks *(between)*
- Mundlak (1978) estimator

$$y_{ict} = \underbrace{(x'_{ict} - \bar{x}'_{ic})\beta_W}_{within} + \underbrace{\bar{x}'_{ic}\beta_B}_{between} + \delta_{ct} + \varepsilon_{it}$$

- Interpretation (Baltagi and Griffin, 1984)
  - Within effects capture short-term impact
  - Between effects capture long-term impact

Estimation

	Within	*Between*	*Between/Within*
Loans to Earning Assets	8.97	15.96	1.78
Loan Loss Provisions to Loans	0.95	0.68	0.71
Log Assets	0.42	1.64	3.94
Deposits to Liabilities	8.47	20.10	2.37
Net Stable Funding Ratio	9.23	14.90	1.61
Income Diversification	9.23	13.10	1.42
Equity to Assets	1.77	2.93	1.65

Table: Variability of business models characteristics

General results

- Between effects jointly significant in all regressions
- Between variation is relatively well explained

	R^2	
	Within	Between
Return on equity	0.45	0.72
Return on assets	0.53	0.77
Net interest margin	0.58	0.79
Log Z-score	0.31	0.64

RETAIL

	Within	Between
Return on equity	4.208***	-0.322
Return on assets	0.330***	0.149***
Net interest income	*0.398****	*0.447****
Non-interest income	*0.176****	*0.092****
Operating expenses	*0.379****	*0.324****
Net interest margin	0.438***	0.487***
Log Z-score	0.391***	0.144***
σ_{ROA}	*-0.137*	*0.131****

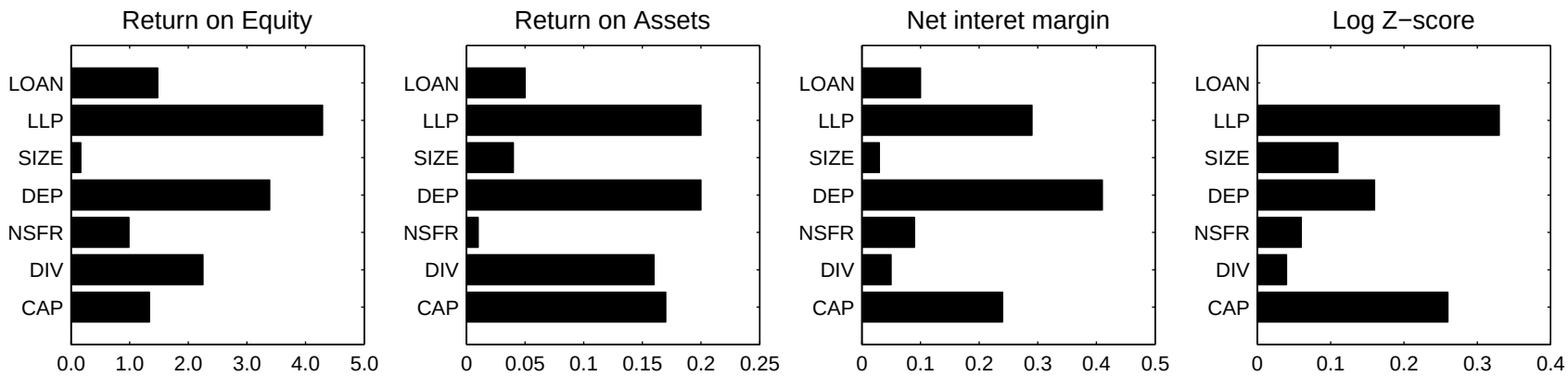
DIVERSIFICATION

	Within	Between
Return on equity	-1.303**	2.360***
Return on assets	-0.140***	0.115***
Net interest income	*-0.243****	*-0.219****
Non-interest income	*-0.014*	*0.250****
Operating expenses	*-0.057*	*0.038*
Net interest margin	-0.282***	-0.211***
Log Z-score	-0.163***	-0.057*
σ_{ROA}	*0.065*	*-0.023*

Between impact of individual characteristics

	ROE	ROA	NIM	Log Z
Loans	-0.092***	-0.003**	0.006***	0.000
LLP	-5.883***	-0.280***	0.404***	-0.453***
Size	0.106	0.025*	0.016	0.070***
Deposits	0.167***	0.010***	0.020***	0.008***
NSFR	-0.067***	-0.001	-0.006**	-0.004
Inc. Div.	0.169***	0.012***	-0.004*	-0.003
Capital ratio	-0.454***	0.057***	0.080***	0.087***

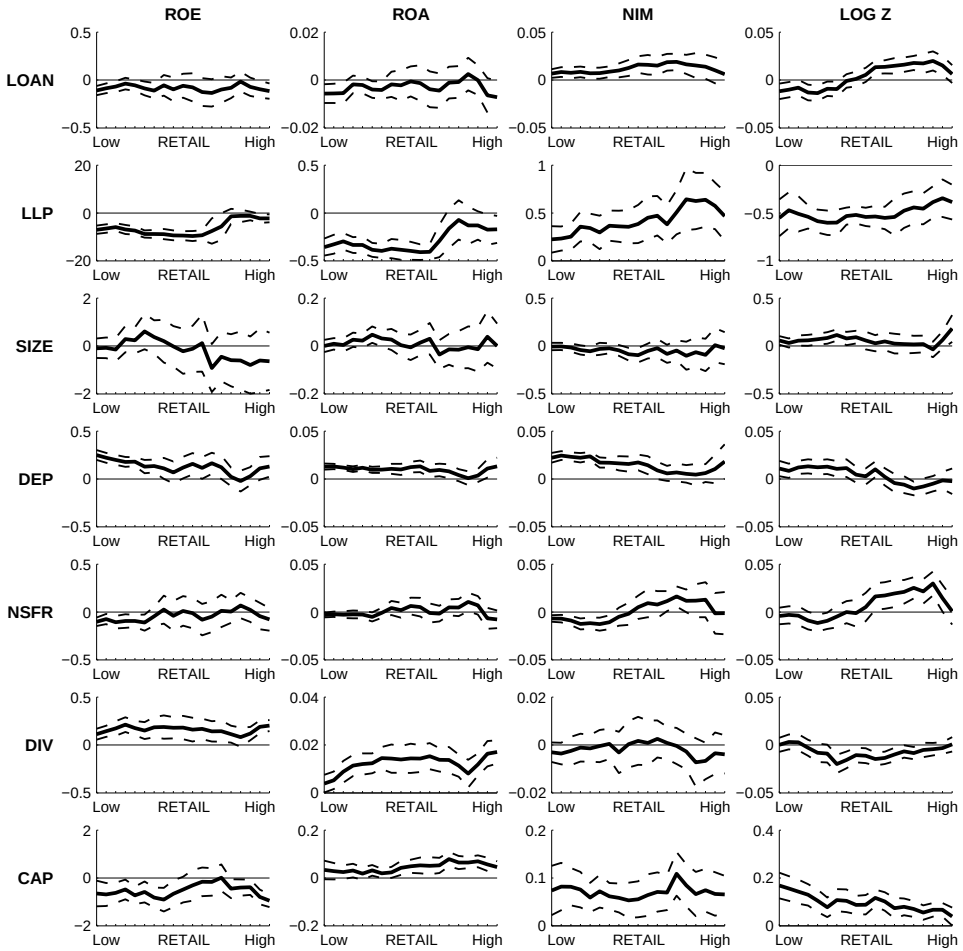
Magnitude of effects (absolute value)



Heterogeneity of business model effects

- Complementarity of business model characteristics
- Impact of individual characteristics depends on business model
  - e.g. Köhler (2015)
- Rolling regression analysis
  - Level of first common factor (*RETAIL*)

Heterogeneity of business model effects



Results

- Asset structure
  - Impact of loan ratio depends on level of retail-orientation
  - Retail-oriented banks better able to adequately price credit risk
- Liability structure
  - Deposits benefit non-retail banks more strongly
  - A high NSFR improves performance of retail-oriented banks

Results

- Income structure
  - Income diversification improves profitability for all banks
  - Impact on vulnerability to distress is ambiguous
- Capital structure
  - Stronger impact on less retail-oriented banks
  - Larger, more leveraged and more reliant on wholesale funding

Summary

- Identification of business models
  - Comparison and evaluation of different approaches
  - New approach based on factor analysis
- Effect of business models on performance
  - Long-term effect: focus on differences across banks
  - Heterogeneity of effects

Summary

- Retail-oriented business models are related to better long-term performance
- Functional diversification has more ambiguous impact
  - Higher profitability
  - Higher vulnerability to distress
- Impact of individual characteristics also depends on business model