

Motivation and research question

- Seemingly successful business models proved fragile during the financial crisis
- In the wake of the crisis new regulation was introduced that will affect banks' business models and how they perform

⇒ **Which business models are viable and sustainable?**

Data

Our sample consists of 505 banks from 30 European countries observed over the period from 1998 to 2013. After the removal of domestic subsidiary banks we retain around 6300 observations.

Identification of bank business models

The space of possible business models in banking is spanned by a number of strategic variables that reflect the long-term choices of bank management with respect to assets, funding, capitalization and income diversification:

Asset structure	Liability structure	Income structure	Capital structure
Loan ratio	Deposit ratio	Income diversification	Capital ratio
Loan quality	Funding risk		
Bank size			

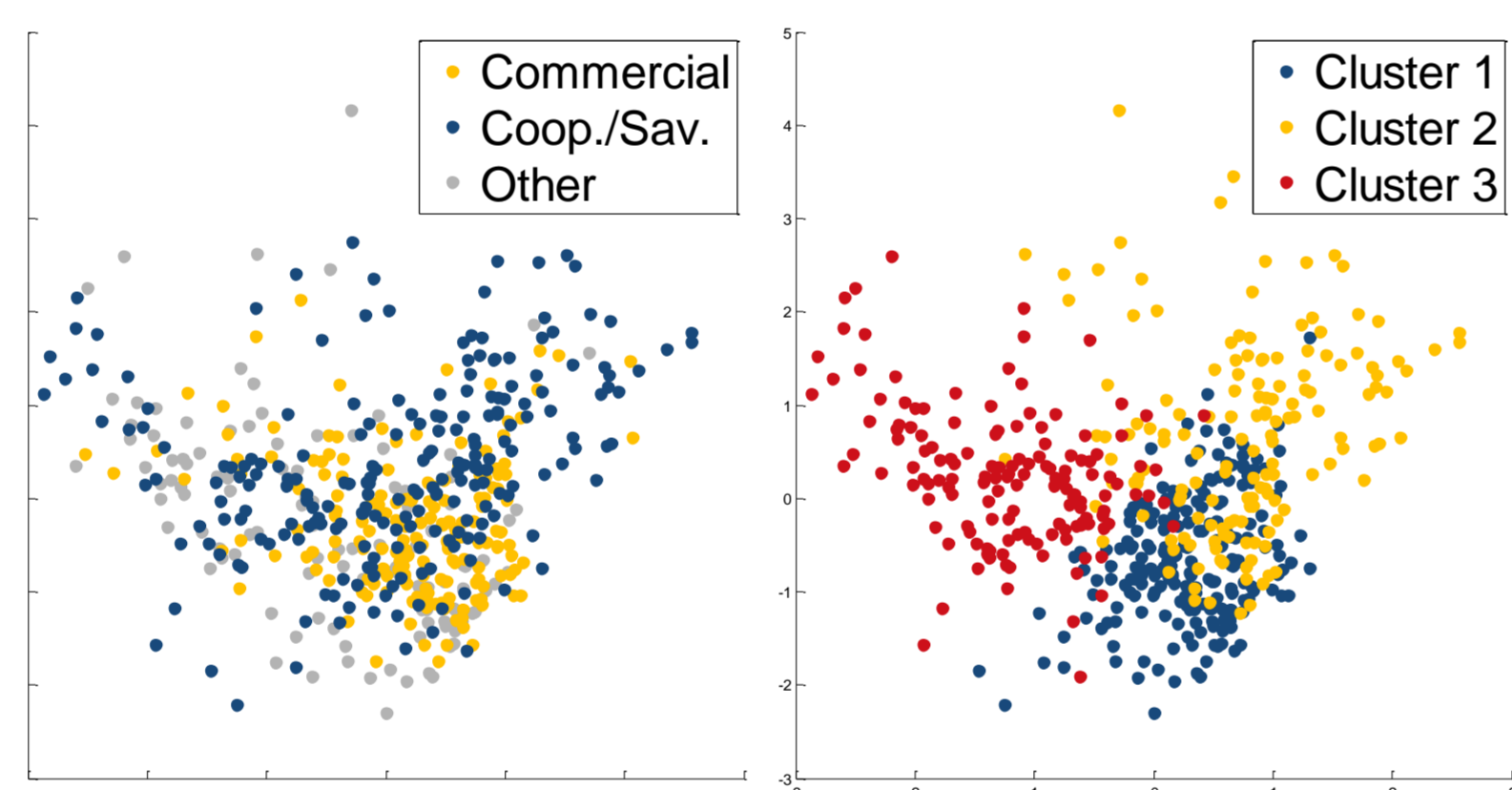
Classification

This approach allocates banks to specific, discrete groups, that are either directly observed (e.g. cooperative banks) or based on data analysis, most often in the form of cluster analysis (Ayadi et al., 2011, 2012; Ayadi and de Groen, 2014).

Classification assumes the unavailability of intermediate strategies, or in other words that the space of possible business models is discontinuous. This assumption is difficult to maintain for the European banking sector. As a result, this approach could classify very similar banks into different categories.

Figure:

A two-dimensional representation of the distances between banks. Each dot represents one bank. This figure shows that classification can put very similar banks in different clusters and vice versa. It furthermore illustrates that the European banking sector is characterized by a continuous spectrum of available strategies.



Alternative: Business models as latent strategies

The observed strategic variables are the outcome of the bank's business model, but also of bank-specific variation. Our identification strategy is based on factor analysis. It uses the common variation of the business model variables to capture latent strategies, which are assumed to be of lower dimension. In the spirit of cluster analysis, it combines the information from all variables and observations, but instead of resulting in binary group membership, it generates continuous common factors.

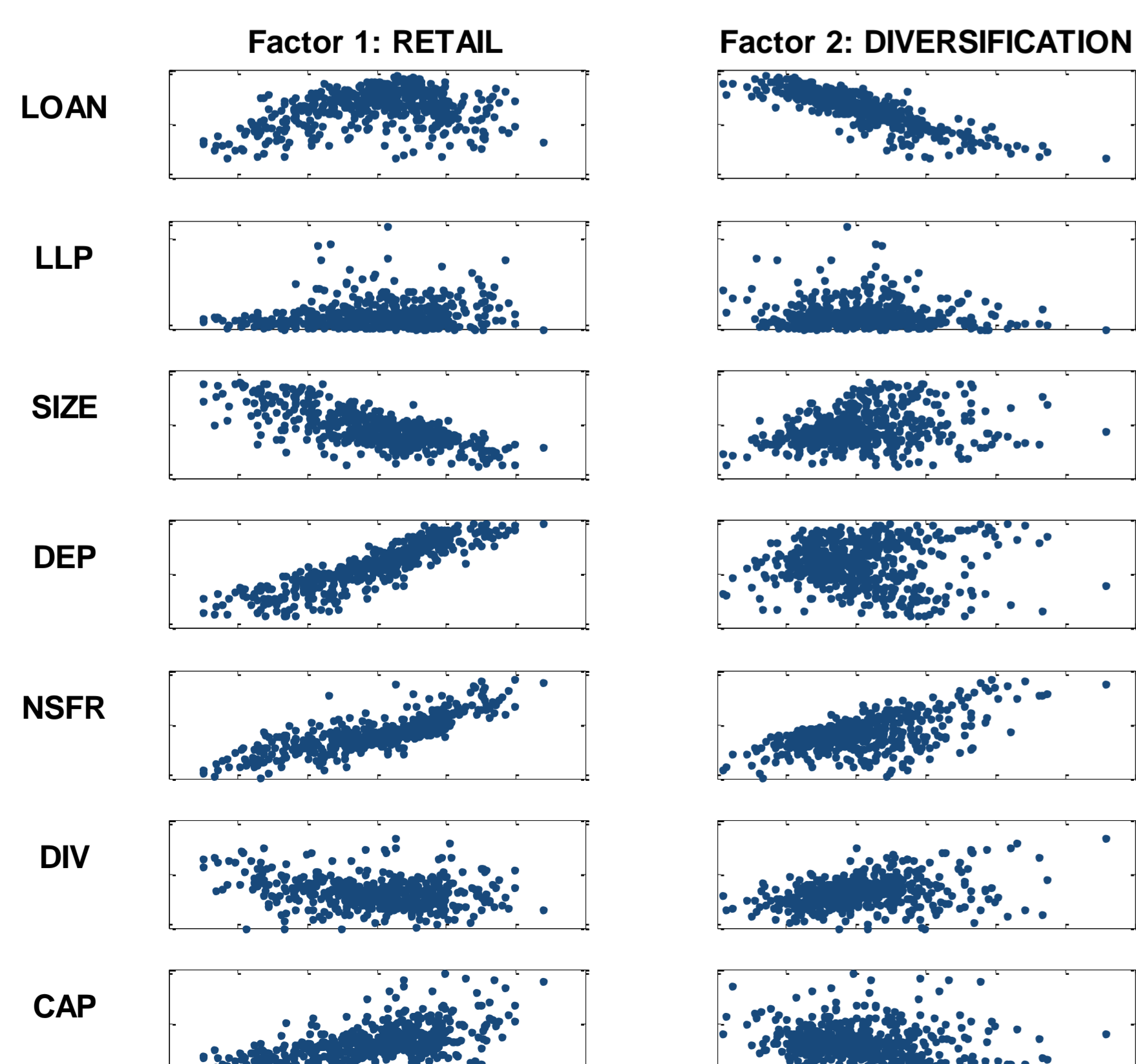


Figure:

This figure presents the relation of the common factors and the individual business model characteristics. A higher value of the *RETAIL* factor indicates that the bank is more similar to a traditional retail bank. The *DIVERSIFICATION* factor reflects the trade-off between a loan-oriented asset composition and a high degree of income diversification. A high level of this factor is associated with a more diversified asset composition and in-come structure.

Model

Measurement of bank performance

We use four indicators to capture bank performance: *return on equity*, *return on assets*, the *net interest margin* and stability as measured by the *Z-score*. We also examine the transmission of the strategic variables by decomposing the performance indicators into several of their subcomponents.

Estimation

We define business models as long-term concepts, meaning that the differences across banks are crucial to identify the impact of business models on bank performance. We therefore use the approach proposed by Mundlak (1978), which simultaneously explores both the within and the between dimension. The following model is estimated, where y_{ict} captures a measure of bank performance and x_{ict} includes the business model indicators:

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

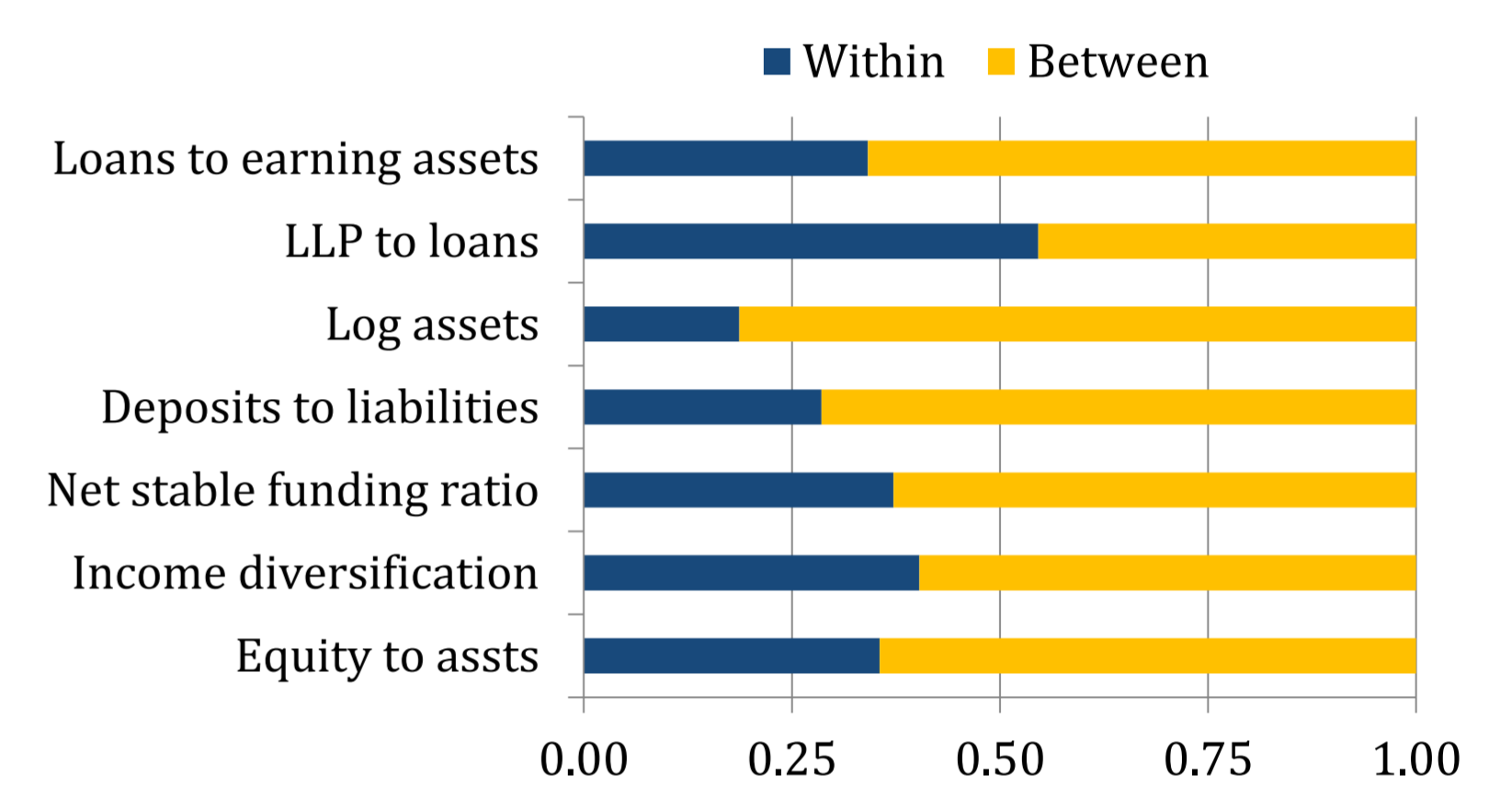
Impact of business models on bank performance

Importance of the between dimension

The strategic variables vary more across banks than within banks over time.

Figure:

Comparison of within and between standard deviations of the business model indicators. The sum of these standard deviations has been normalized to 1. For six out of seven variables the between variation exceeds the within variation.



Impact of the common factors

	RETAIL		DIVERSIFICATION		R ²	
	Within	Between	Within	Between	Within	Between
Return on equity	4.248***	-0.264	-1.380**	2.315***	0.45	0.71
Return on assets	0.330***	0.140***	-0.141***	0.133***	0.53	0.77
<i>Net interest income</i>	0.388***	0.436***	-0.243***	-0.195***	0.58	0.77
<i>Non-interest income</i>	0.177***	0.097***	-0.006	0.268***	0.43	0.85
<i>Operating expenses</i>	0.373***	0.328***	-0.047	0.056*	0.61	0.78
Net interest margin	0.427***	0.476***	-0.282***	-0.185***	0.58	0.79
Log Z-score	0.394***	0.147***	-0.142***	-0.046	0.31	0.65
σ_{ROA}	-0.133	0.130***	0.052	-0.017	0.27	0.67

This table shows the estimated impact of the *RETAIL* and *DIVERSIFICATION* factors on bank performance. Note that the between R² exceeds the within R² in all cases, implying that these variables can better explain the performance differences across banks than over time.

- The results suggest that business models characterized by a stronger retail orientation are on average more profitable and more stable.
- The within effects of the *DIVERSIFICATION* factor imply that increasing the level of functional diversification negatively affects all performance indicators in the short term. However, the between effects demonstrate that more diversified banks perform better in the long term: they are more profitable and not significantly more susceptible to distress

Conclusion

- We document the difficulties of a classification approach to the identification of bank business models and propose an alternative strategy based on factor analysis.
- We consider business models to be long-term concepts and adapt our estimation methodology accordingly.
- Both a higher degree of retail orientation and functional diversification are associated with better performance.
- These considerations imply that the application of prudential regulation should also reflect the heterogeneity of bank business model decisions. This recommendation is in line with the guidelines of the European Banking Authority to supervisors that are designed to be the cornerstone of the Pillar 2 supervisory review of European banks in the future (EBA, 2014).