

MONITORING BANKING BUSINESS MODELS AND OWNERSHIP STRUCTURES IN EUROPE – 2016

RISK AND RESPONSE TO REGULATION

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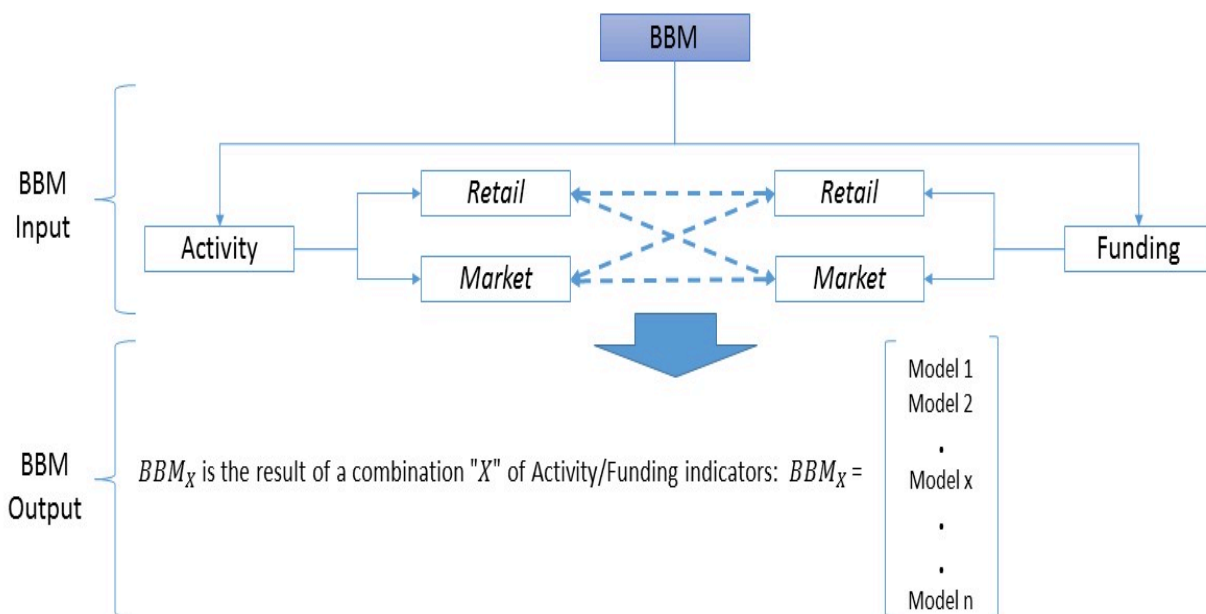
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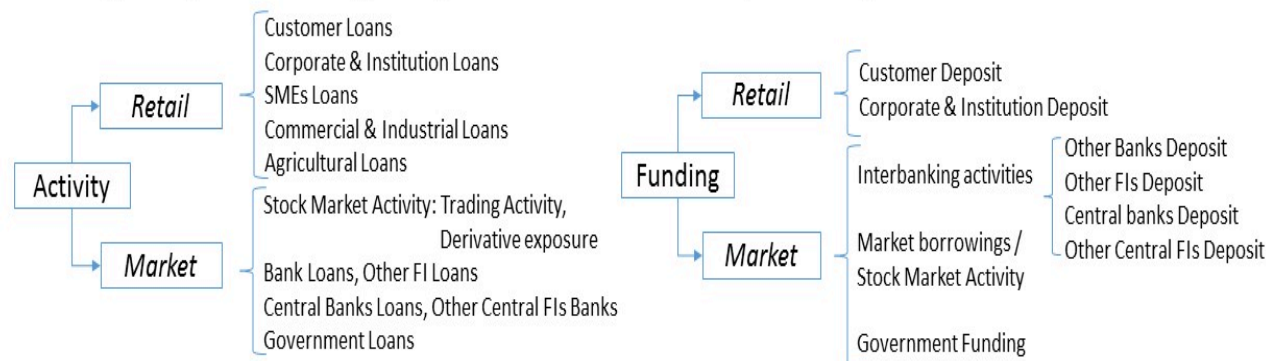
Contents

- ✓ **Banking Business Models (BBM) analysis for regulation and resolution**
 - ✓ Identification of BBM
- ✓ **Evidence based – 2005-2015**
 - ✓ **Performance of BBM**
 - Contribution to real economy
 - (Financial) performance
 - Risk
 - Response to regulation

Defining Bank Business Models (BBM)



The Activity/Funding Indicators defining a BBM_x are conceived based on an Asset/Liabilities logic:



Use of **Asset-liability** approach based on two dimensions:

- Activity (retail, market)
- Funding (retail, market)

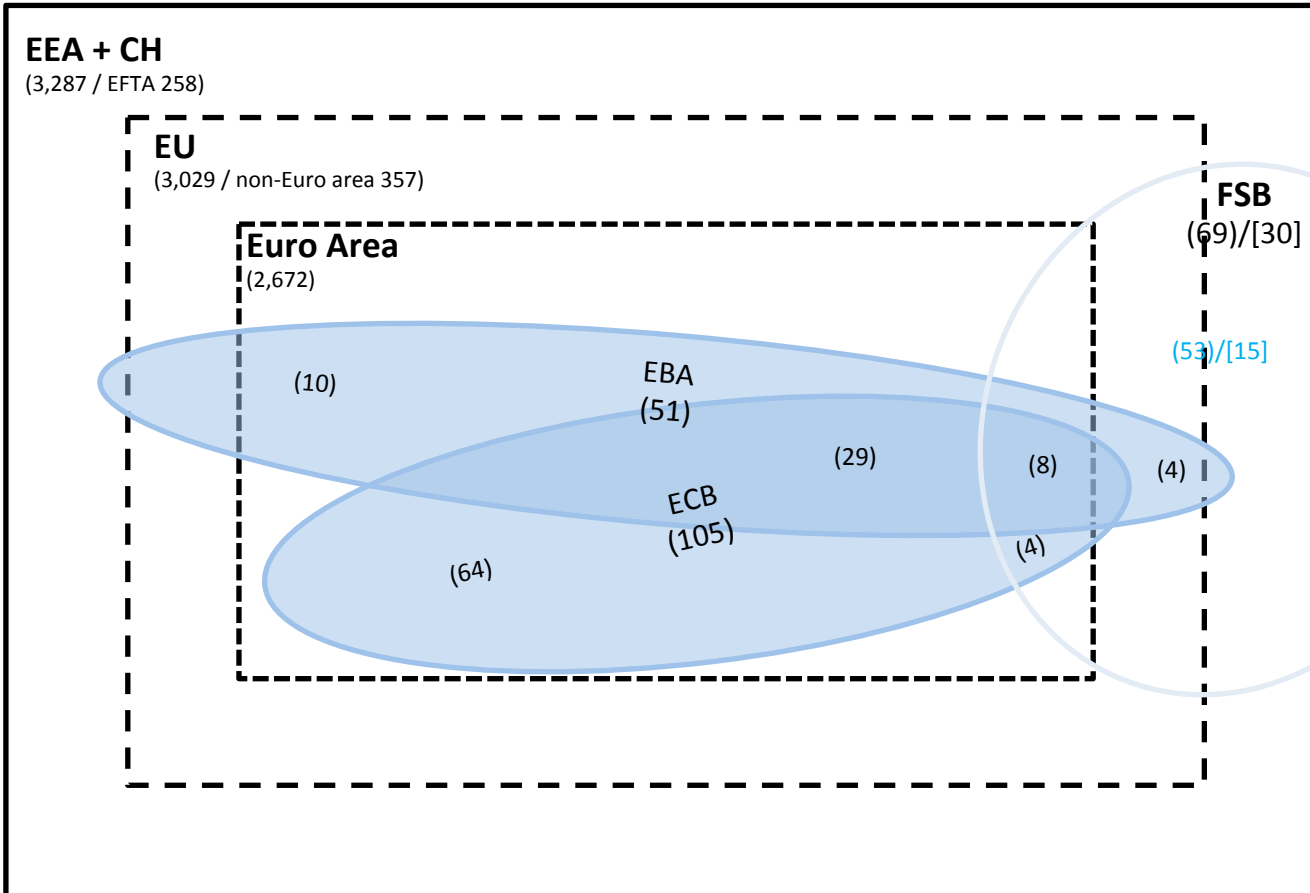
In Ayadi et al (2016) and Ayadi (2016)

➤ Applicable to other banking systems (e.g. US, Canada, Brazil and others) and easily comparable

➤ Robust for Europe since first computation in 2011

➤ Complement other dimensions such as ownership, size, systemic importance...

Identification of BBM: Sample



Comprehensive coverage of the European banking industry

3,287 institutions
>97.5% of total assets

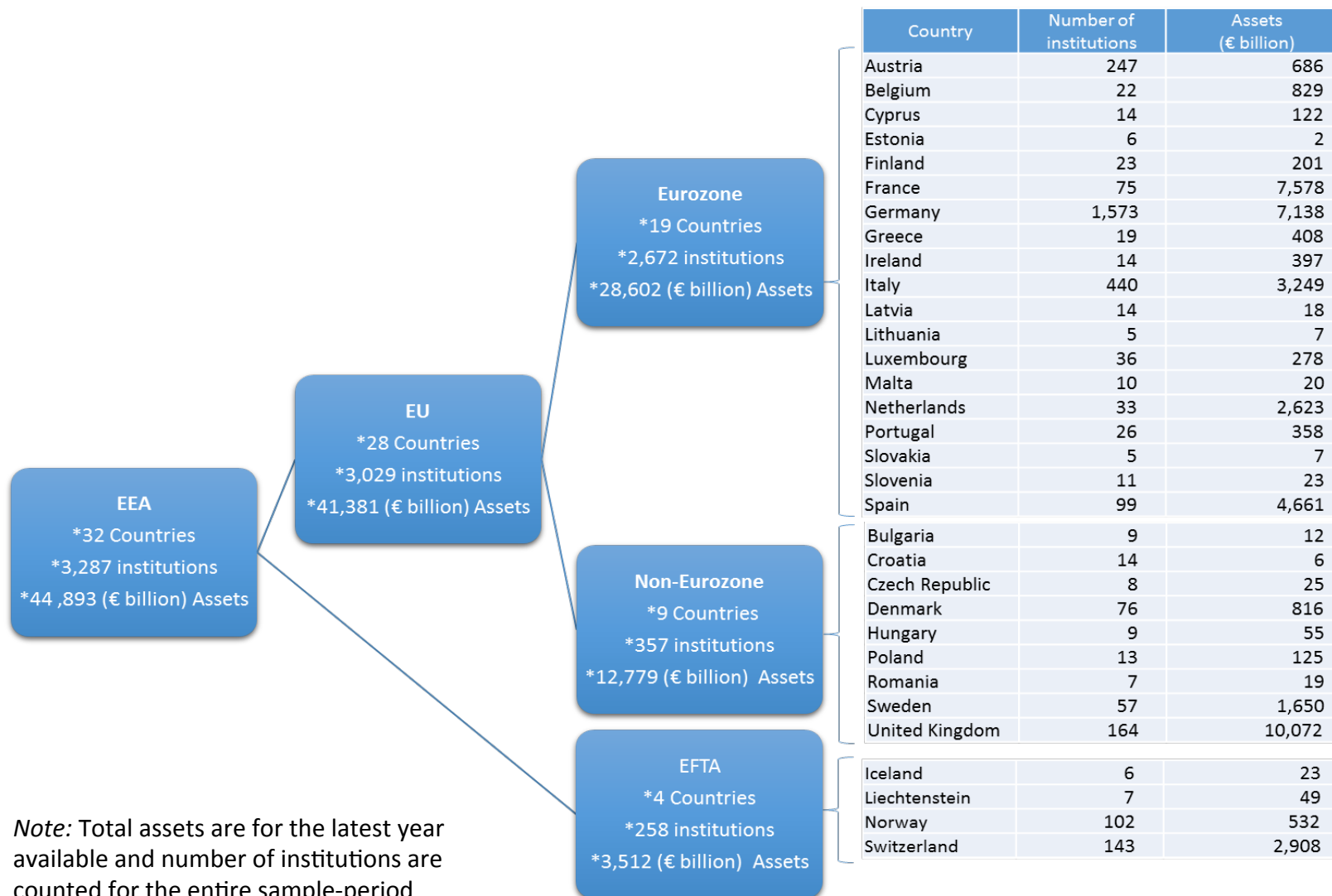
Period of analysis
2005-2015

More than 16000 observations for Europe

Systemic and less significant institutions

All regulatory institutions lists

Identification of BBM: Sample



Note: Total assets are for the latest year available and number of institutions are counted for the entire sample-period



Identification of BBM: Methodology

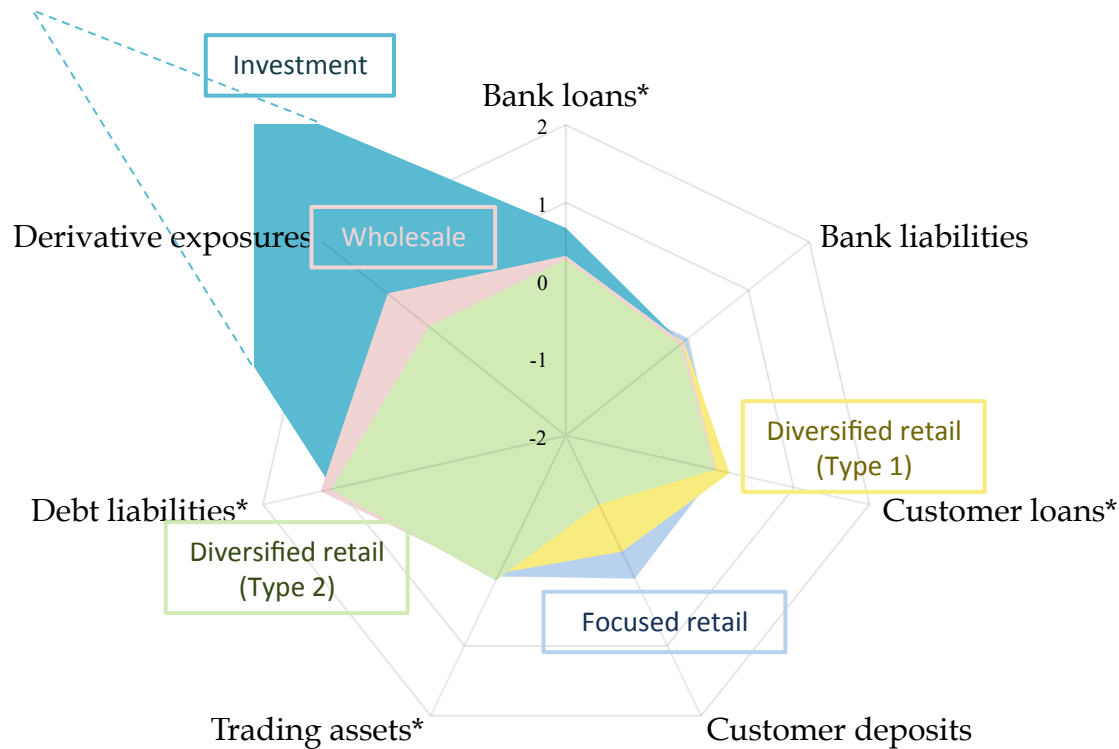
- **Clustering analysis** – statistical technique that assigns a set of observations into a distinct cluster used in Ayadi et al (2016)
 - A particular bank-year observation is assigned to a business model
 - Selection of instruments which are the defining activity – funding features of the BM
 - **Loans to banks (as % of assets)**. This indicator measures the scale of wholesale and interbank activities, which proxy for exposures to risks arising from interconnectedness in the banking sector.
 - **Debt liabilities (as % of assets)**. These are defined as non-equity liabilities other than deposits and derivatives. Although bank liabilities are comprised of short-term interbank debt, the broader debt liabilities indicator provides a general insight into the bank's exposure to market funding.
 - **Customer loans (as % of assets)**. This indicator identifies the share of customer loans to non-bank customers, indicating a reliance on more traditional banking activities.
 - **Trading assets (as % of assets)**. These are defined as non-cash assets other than loans; a greater value would indicate the prevalence of investment activities that are prone to market and liquidity risks.
 - **Derivative exposures (as % of assets)**. This measure aggregates the carrying value of all negative derivative exposures of a bank, which are often identified as one of the key (and most risky) financial exposures of banks with heavy investment and trading activities.
 - **Common tangible equity (as % of tangible assets)**. Control variable
 - Ward's (1963) procedure to calculate the distance between clusters was used
 - Calinski & Harabasz's (1974) pseudo-F index used to identify the optimal number of clusters
 - Does not impose any probability distribution to the data collected
 - Methodology relies largely on the quality and granularity of data collected



Identification of BBM

Standardized scores

Updated for data 2015



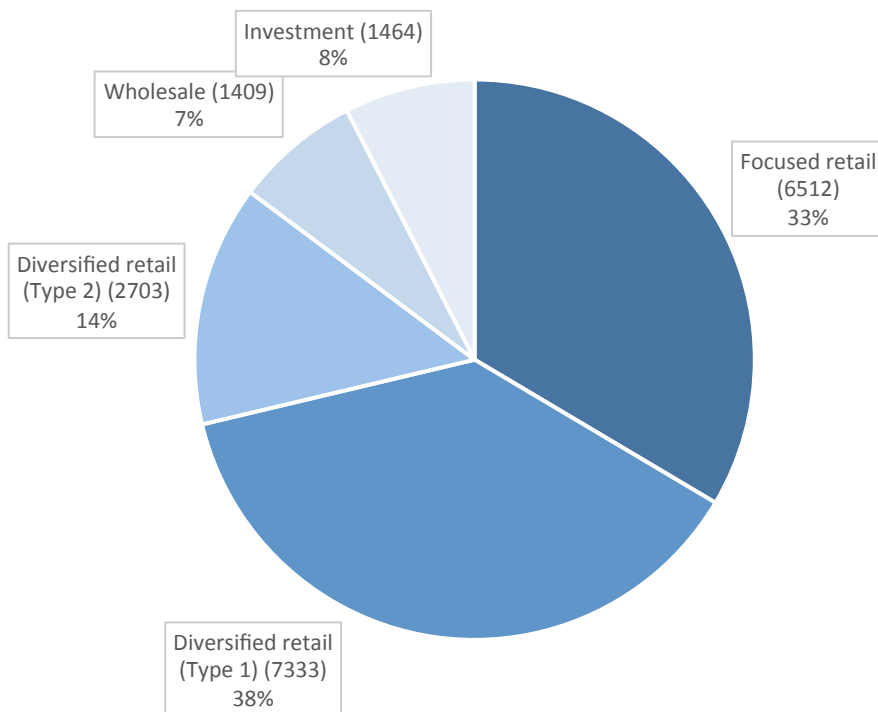
5 distinct banking models:

- Focused retail
- Diversified retail (Type 1)
- Diversified retail (Type 2)
- Wholesale
- Investment

Notes: Indicators marked with an asterisk (*) were used as instruments in the cluster analysis. The figures represent the number of standard deviations from the sample mean, implying that any observation above (below) the zero-axis is above (below) the sample mean.

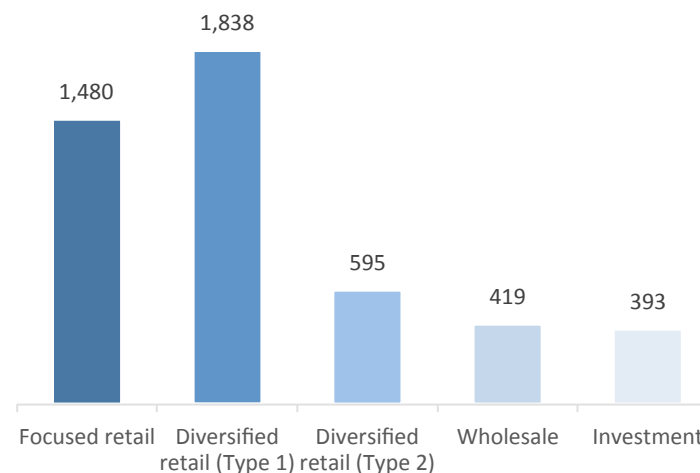
Identification of BMM: Distribution

Observations by model (share in nr of obs)



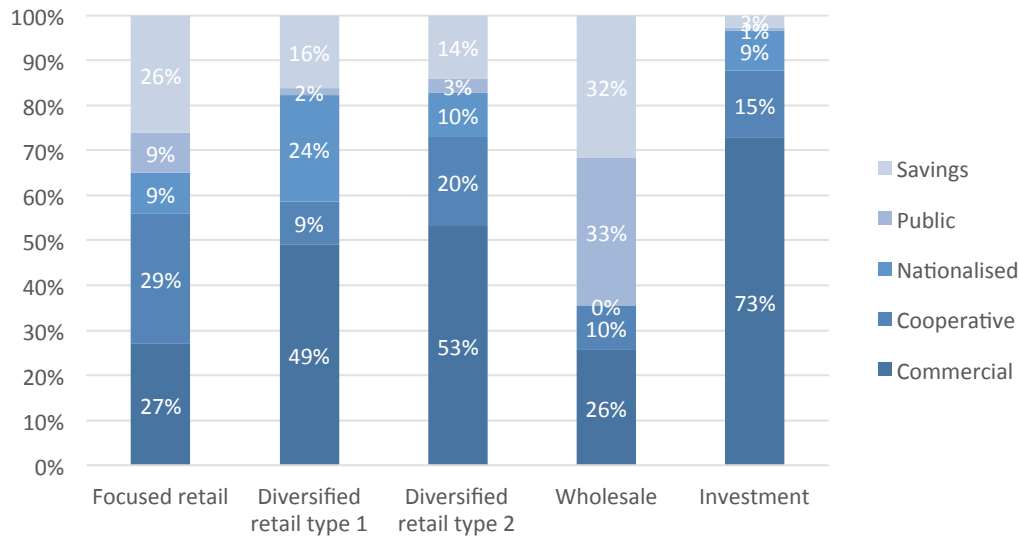
- Most banks (~71%) are identified as retail focused or diversified (Type 1)

Nr. of different banks by model



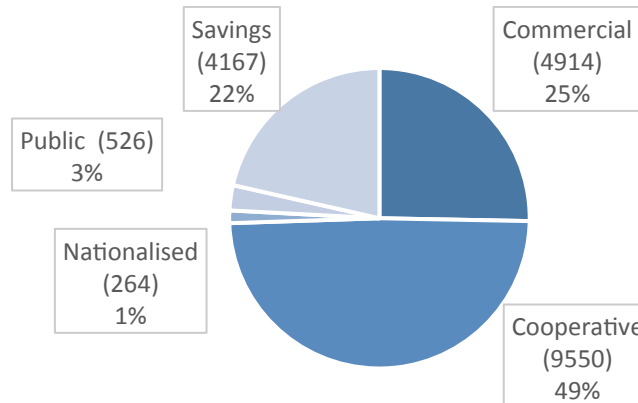
BMM and Ownership

Ownership across business models (% of assets)



- Stakeholder value (STV) banks (e.g. cooperatives and savings banks) divided across all five business models
- Highest share among retail banks (i.e. focused and diversified)
- Shareholder value (SHV) banks relatively more wholesale and investment oriented

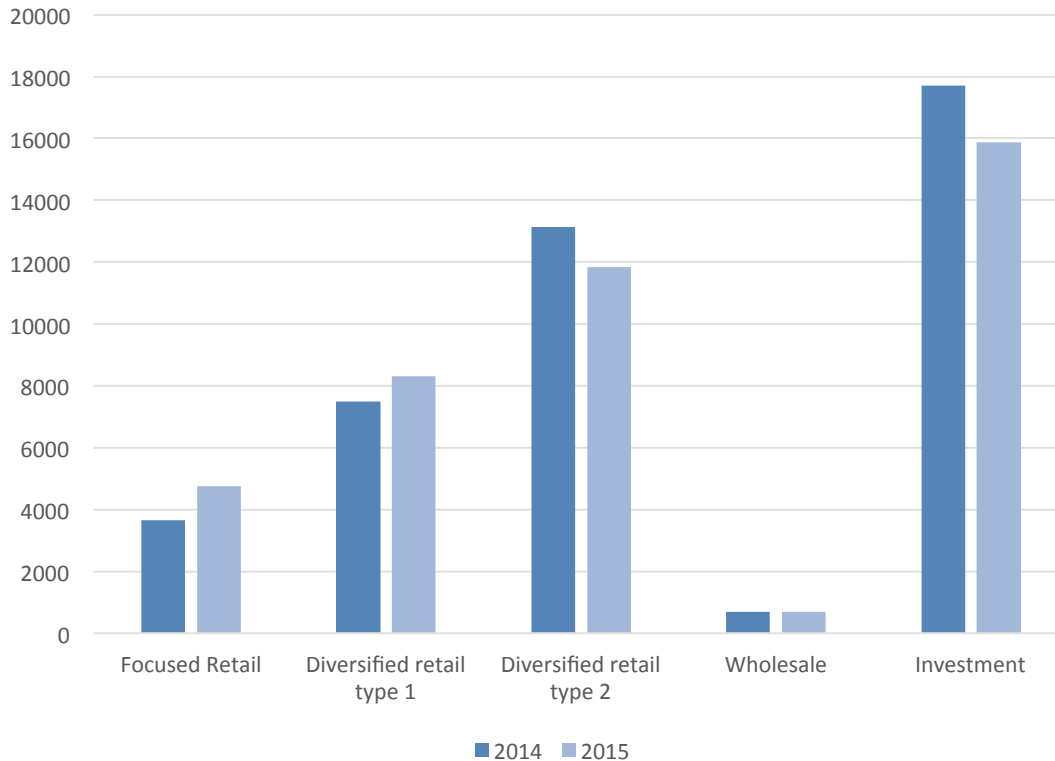
Observations by cluster (share in obs)





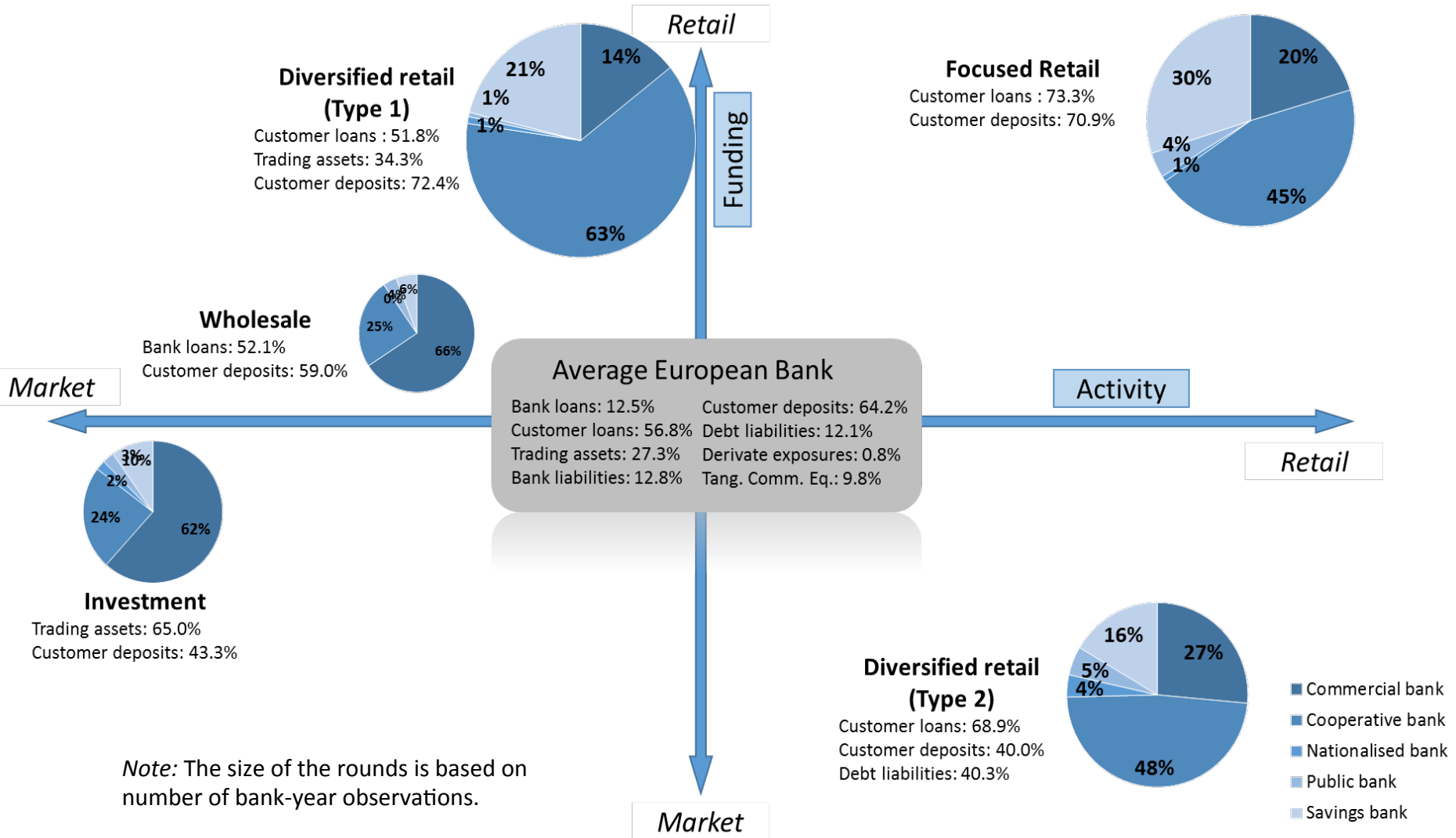
BMM and Size

Total assets (€bn)



- Although small in number, investment largest in terms of assets
- The large flow from diversified retail (type 2) to diversified retail (type 1) resulted in substantial increase in assets

BMM and Ownership: Cartography



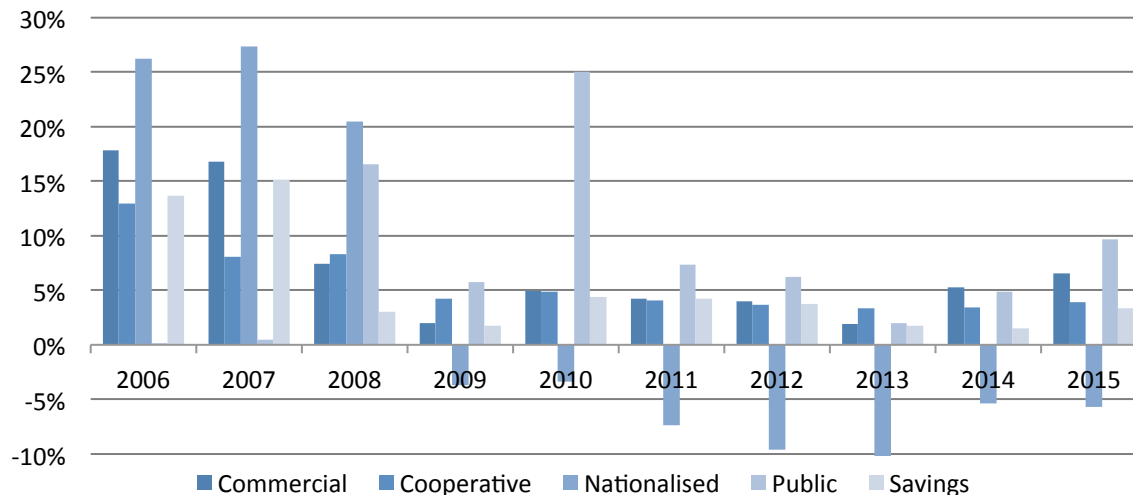
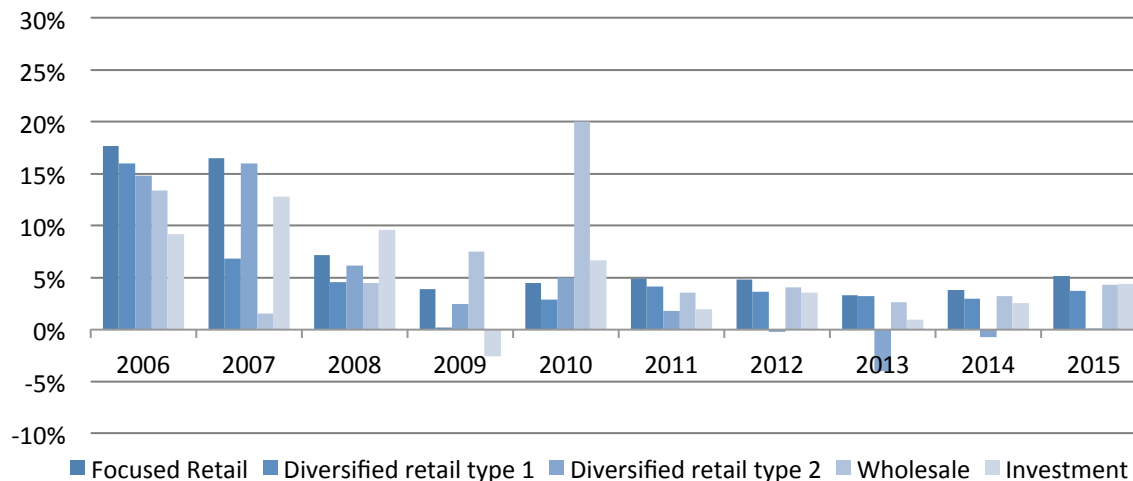
- Institutional diversity promotes systemic stability (Ayadi et al (2009, 2010))
- Bank regulation should be calibrated to BM (Ayadi et al (2011, 2012))
- BBM diversity important to support the economy throughout the economic cycles (Ayadi et al (2015, 2016))
- Changes in the economic and market conditions, regulation and supervision can lead to changes in the BMs of banks towards more diversity or convergence (Ayadi et al (forthcoming))
- Each BBM contributes differently to the accumulation of risk in the system (Investment and wholesale banks accelerate systemic risk while typically exhibit higher financial performance as compared to peers) (Ayadi et al (forthcoming))
- Monitoring BBM is the tool for dynamic supervision
 - *Paper by Ayadi (2016) on BBM for regulation and resolution*

- **BBM-analysis for regulation**
 - **Capital requirements (CR)**
 - Each BM has a distinct risk profile – CR should distinguish between business models –
 - Minimum capital requirements (Tier 1 capital ratio) are insufficient to account for the risk profiles of BBM
 - RWAs do not capture overall risk, in particular for the more market oriented BMs (diversified retail (type 2), wholesale, investment banks)
 - Capital floor of Basel can potentially answer this weakness but must be assessed in terms of its perverse incentives
 - Do not allow the use of mixed models (Cherry picking)
 - CR must be topped up with a buffer for riskier BBMs
 - **Leverage ratio**
 - Addresses weakness w/ risk-sensitive requirements
 - Must be binding and a minimum of 5% (based on definition used in this presentation)
 - Must be calibrated per BM

- Pillar 2
 - Add-ons should be scientifically linked to BMs
- Disclosure
 - Clear need for stronger and harmonised disclosure requirements for all banks in particular the Stakeholders Value Banks (STV) banks
- Resolution
 - Clear differences between BMs (in Ayadi and Ferri (2016))
 - Additional research required to assess need to adjust base and/or calibration of contribution (Ayadi et al (2017))
- Macro Prudential Policy (on-going)
 - To what extent does a BBM diverse system work as a shock-absorber? Is there an optimal level of diversity of business models? Is there an optimal distribution (i.e. do some BMs contribute more to systemic risks than others?)

Financing the real economy

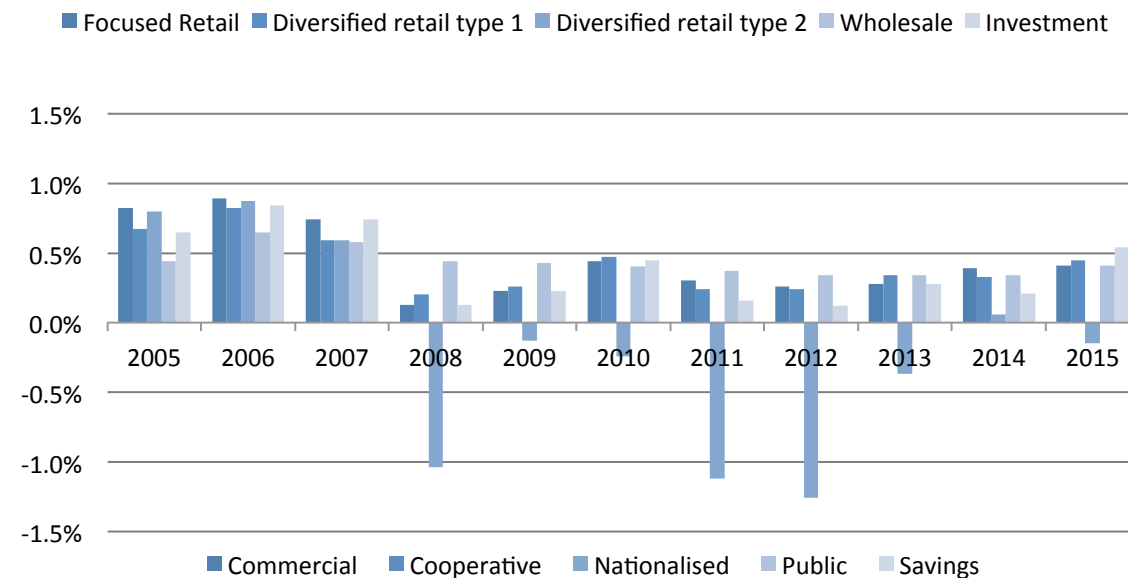
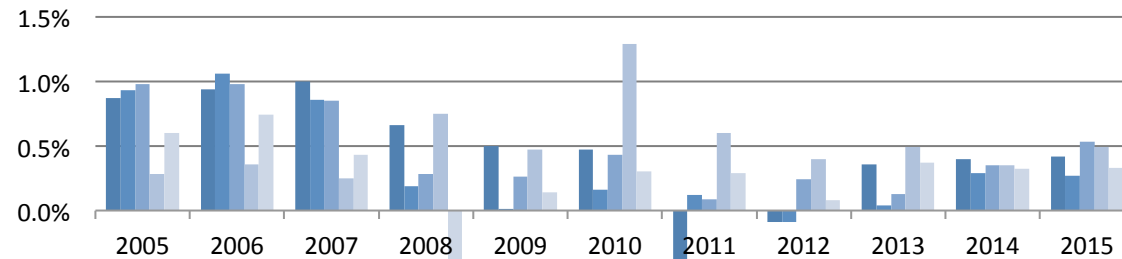
Growth in outstanding customer loans (median values)



- Slowdown in loan growth during fin.- and econ. crises, except for wholesale banks in 2010
- Contraction for investment banks in 2009
- Commercial, cooperatives, and in particular public banks continued to lend at lower levels to the economy in contrast to nationalised banks

Performance: RoA

Return on assets (RoA)(weighted average)

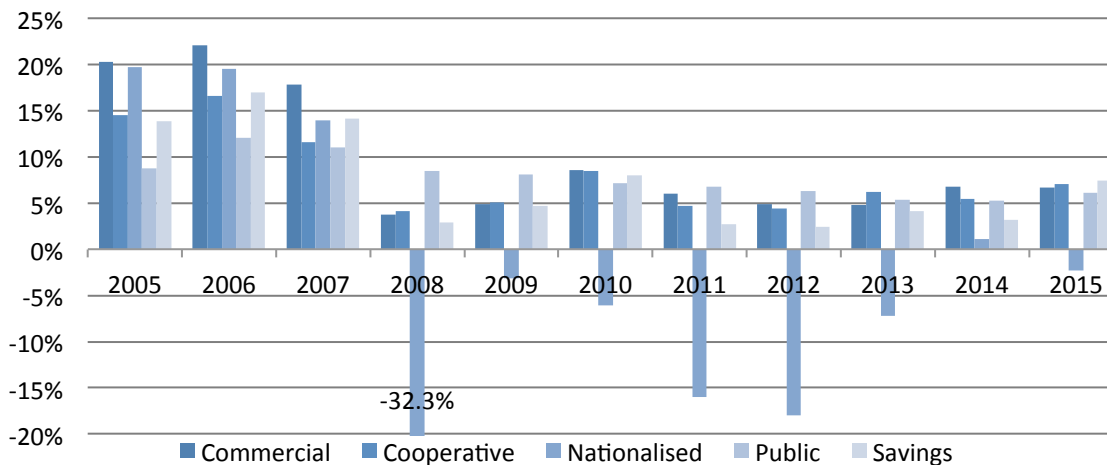
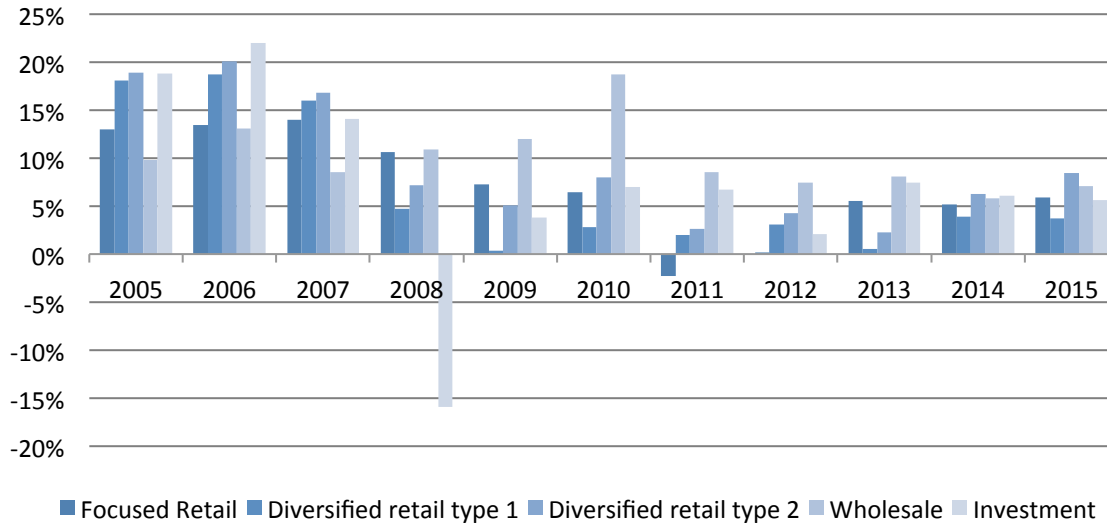


- Profits declined for across all BMs except wholesale
- Investment banks took severe hit in 2007/08
- Retail focused and diversified took hit during econ. crisis
- STV and SHV banks (e.g. cooperatives) continued to be profitable, except for the nationalised banks. Differences between most ownership structures limited



Performance: RoE

Return on equity (RoE)(weighted average)

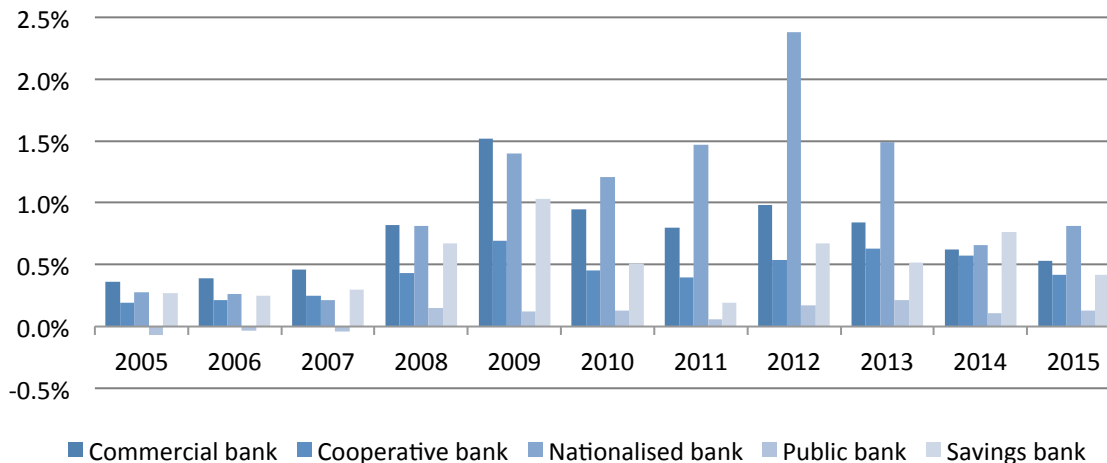
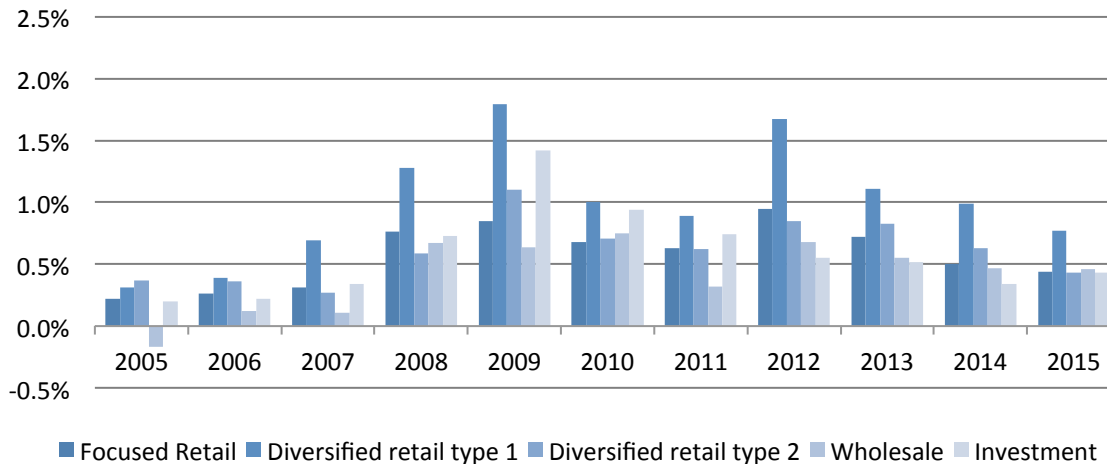


- Similar results for RoE
- Relatively better performance investment and wholesale banks compared to other models due to lower equity ratios
- SHV & STV models profitable, except for nationalised banks

Risk: Loan losses

Loan loss provisions

(% of gross customer loans, weighted average)

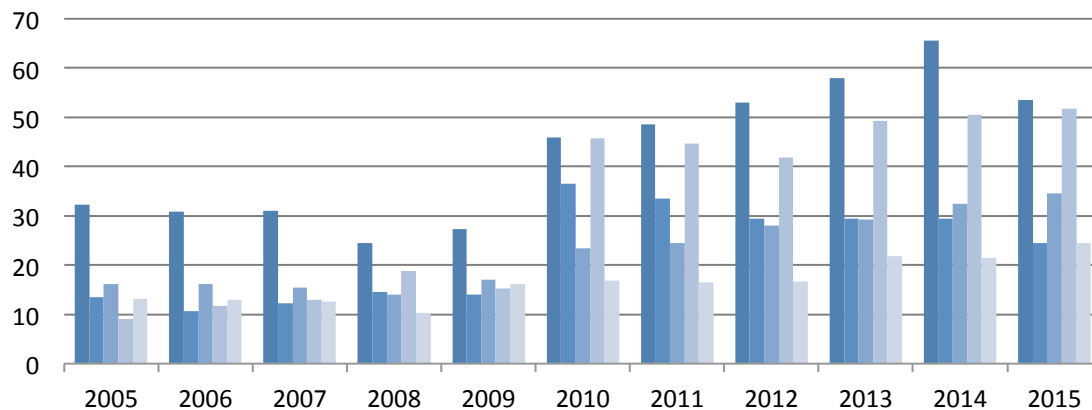


- Provisions for loan losses increased substantially during crises
- Retail banks suffered especially during fin. and econ. crisis, while wholesale and investment banks increased provisions relatively more during fin. crisis
- The provisions remain in most recent years higher than before the crisis
- SHV- and nationalised banks increased the provisions substantially during crises as compared to STV banks

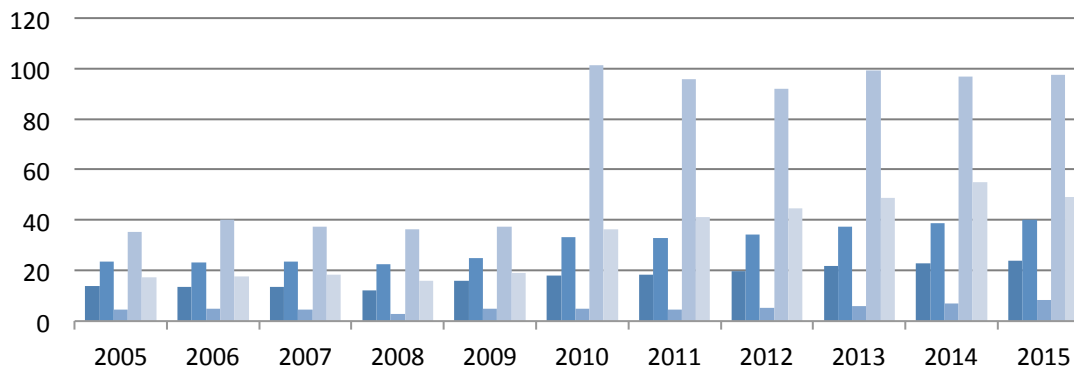
Risk: Distance to default IRCCF

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Distance to default estimates (Z-score, weighted average)



■ Focused Retail ■ Diversified retail type 1 ■ Diversified retail type 2 ■ Wholesale ■ Investment



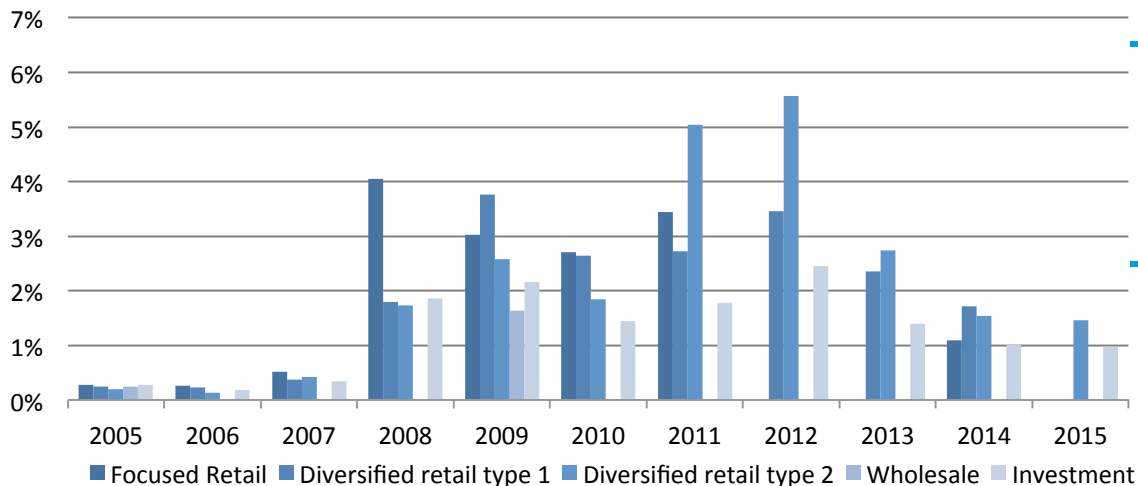
■ Commercial ■ Cooperative ■ Nationalised ■ Public ■ Savings

- Focused retail (Type 1) banks are furthest from default
- Diversified retail, wholesale and investment banks are facing similar, but higher default risks
- Distance to default stakeholder-value (STV) clearly above shareholder-value banks (SHV)
- Public banks furthest from default
- Nationalised banks closest to default, i.e. due to higher volatility in earnings

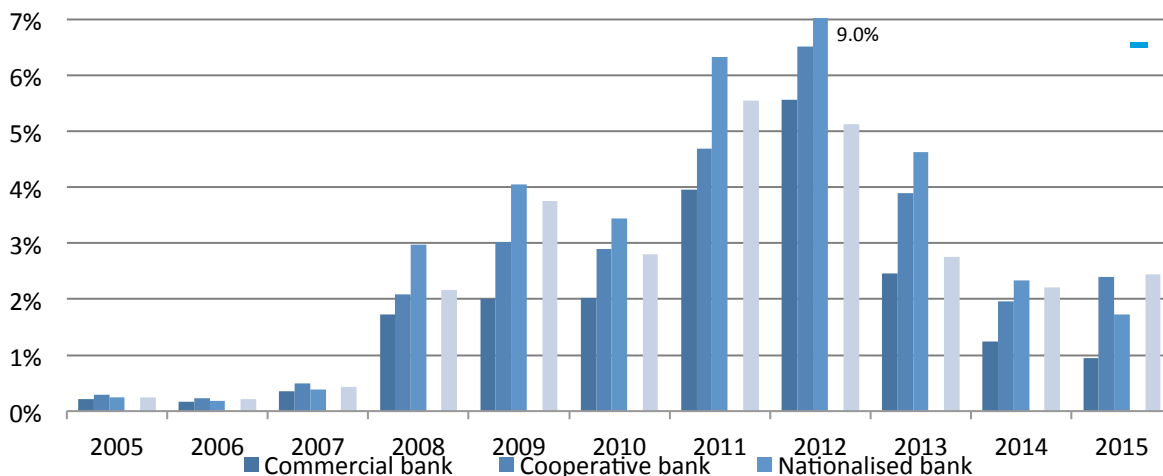
Note: A greater score implies greater distance to default and thus a lower default probability.

Risk: CDS spreads

Subordinated CDS spreads (median)



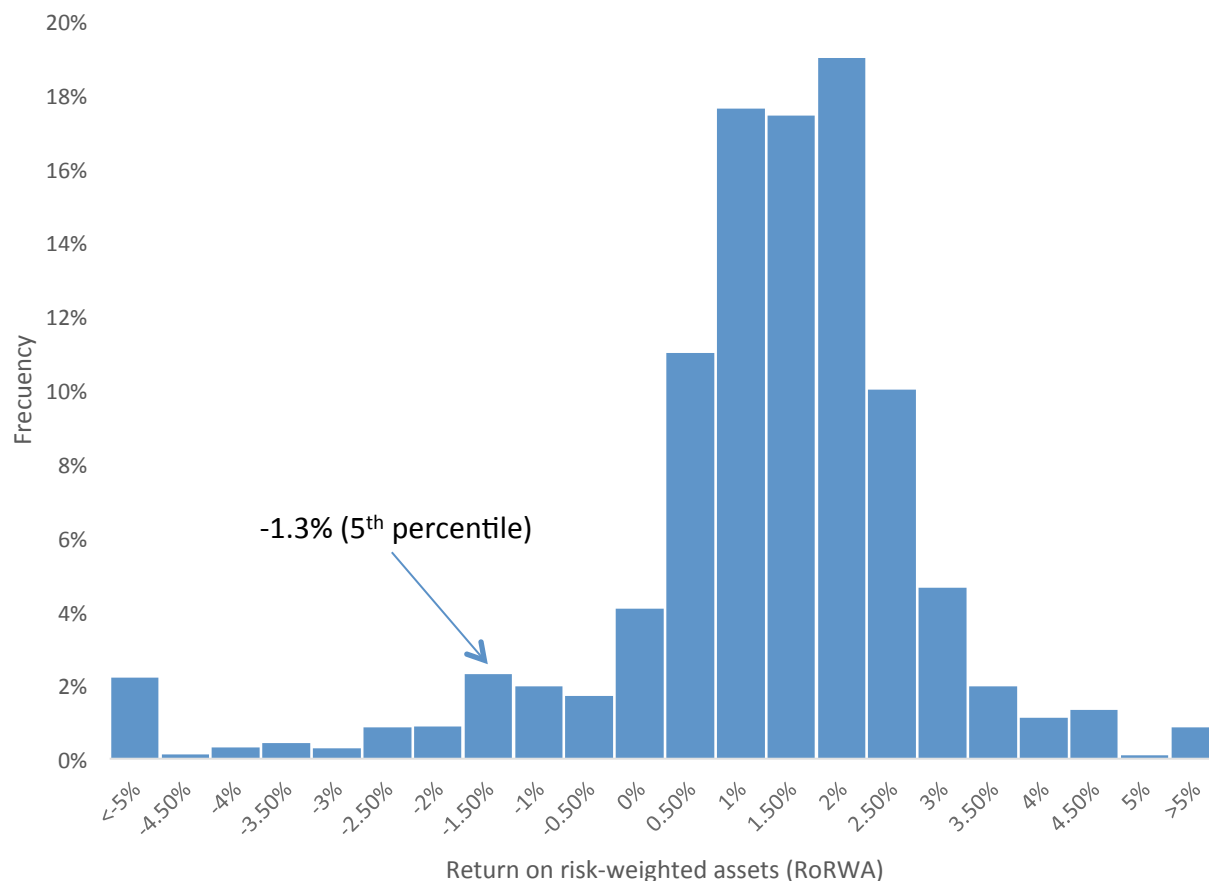
- Before and during fin. crisis limited variance between rates
- Since economic crisis more difference (sovereign and default risks)



- CDS rates only available for limited number of large banks (only relevant for debt securities issuing banks)

Resilience: Tail losses

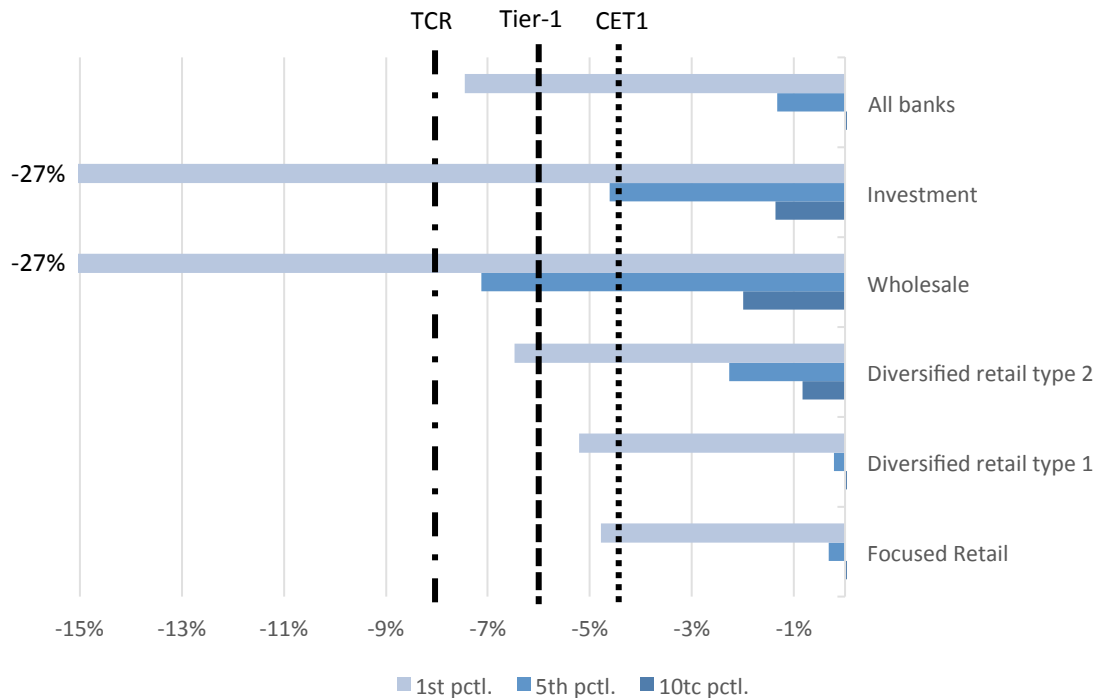
Distribution of return on RWA (RoRWA), 2005-15



- Distribution of RoRWA
 - Long-tail for losses
- 1-in-20-year event could wipe out 1.3% of risk-adj. capital

Resilience: Tail losses

Return on RWA, tail loss estimates, 2005-15

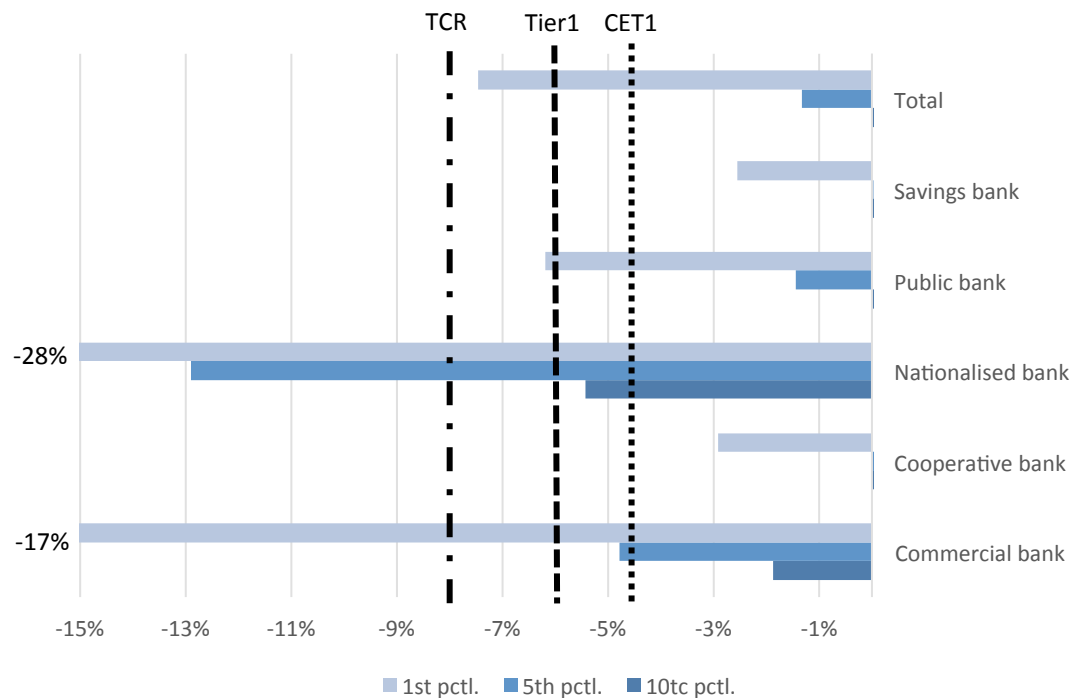


Notes: Figures provide the percentile estimates for the distribution of return on RWA. CET1 (i.e. 4.5%), Tier-1 (i.e. 6.0%) and TCR (i.e. 8.0%) stand for CRD IV minimum requirements for common equity, Tier-1 ratios and Total capital ratio. The actual capital requirements are higher due to buffers and supervisory add-ons.

- Comparison of peak losses across business models
- Peak-losses are high for:
 - Investment & wholesale models
- For all models high losses under rarer events!

Resilience: Tail losses

Return on RWA, tail loss estimates, 2005-15 (obs)

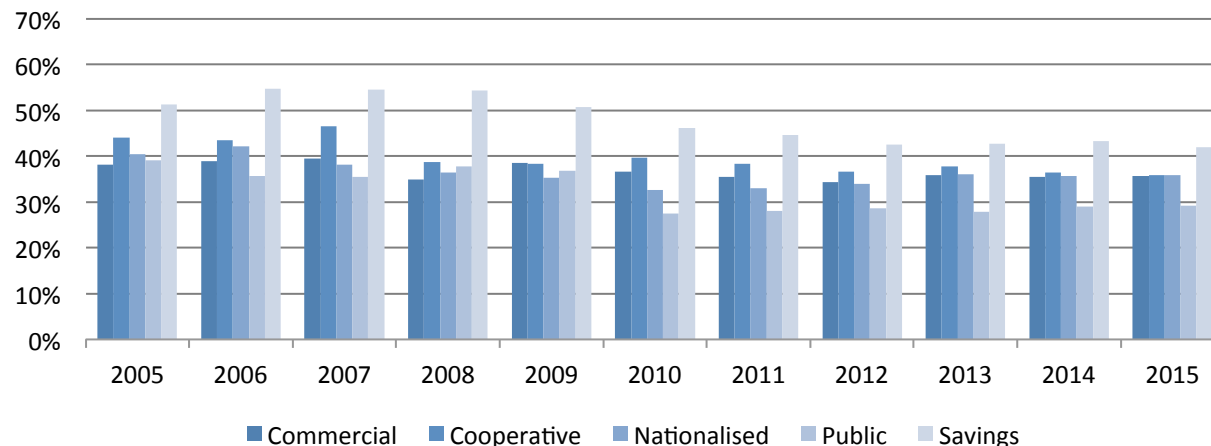
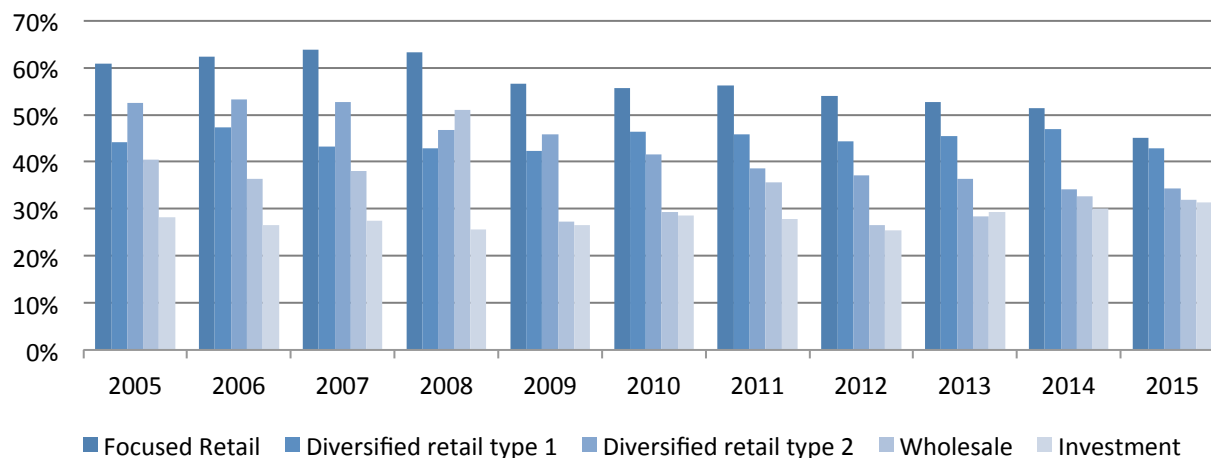


Notes: Figures provide the percentile estimates for the distribution of return on RWA. CET1 (i.e. 4.5%), Tier-1 (i.e. 6.0%) and TCR (i.e. 8.0%) stand for CRD IV minimum requirements for common equity, Tier-1 ratios and Total capital ratio. The actual capital requirements are higher due to buffers and supervisory add-ons.

- Comparison peak losses across ownership types
- Losses are high for:
 - Nationalised and commercial banks
 - For all models, except cooperative/savings banks, high losses under rarer events!

Response to Regulation: RWA

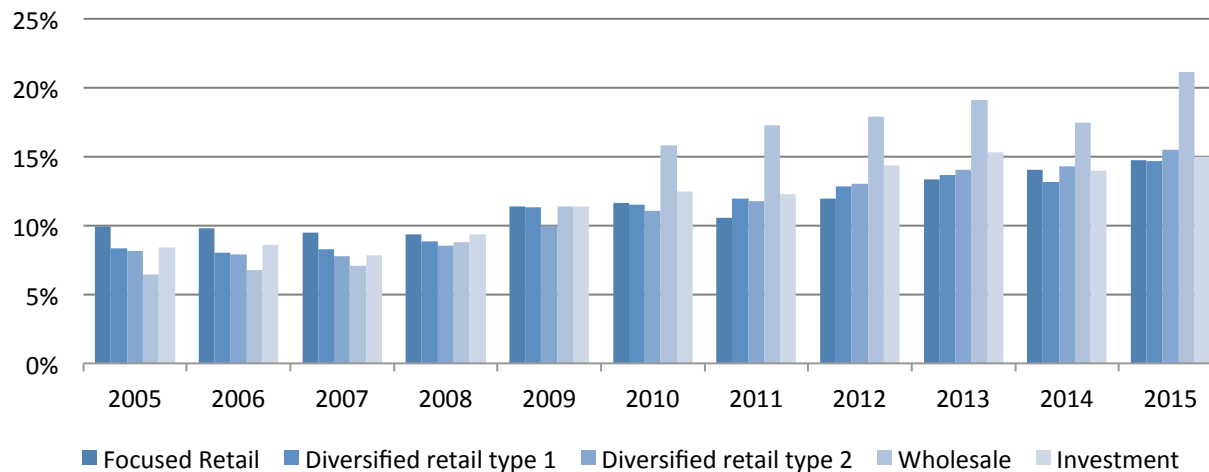
Risk weighted assets (% of assets)(weighted average)



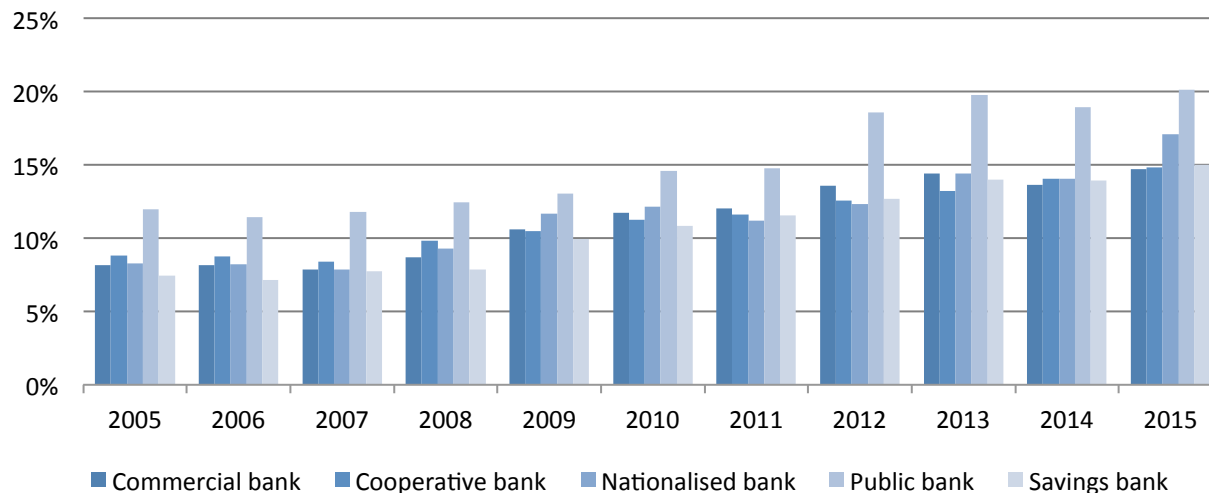
- Retail banks have higher average risk-weights
- Banks across all BMs decreased the average risk-weight except for investment banks
- Average RW for savings banks converging, while for public banks' reducing (public guarantee effect)

Response to Regulation: Tier 1 Capital

Tier-1 capital ratio (% of RWA)(weighted average)



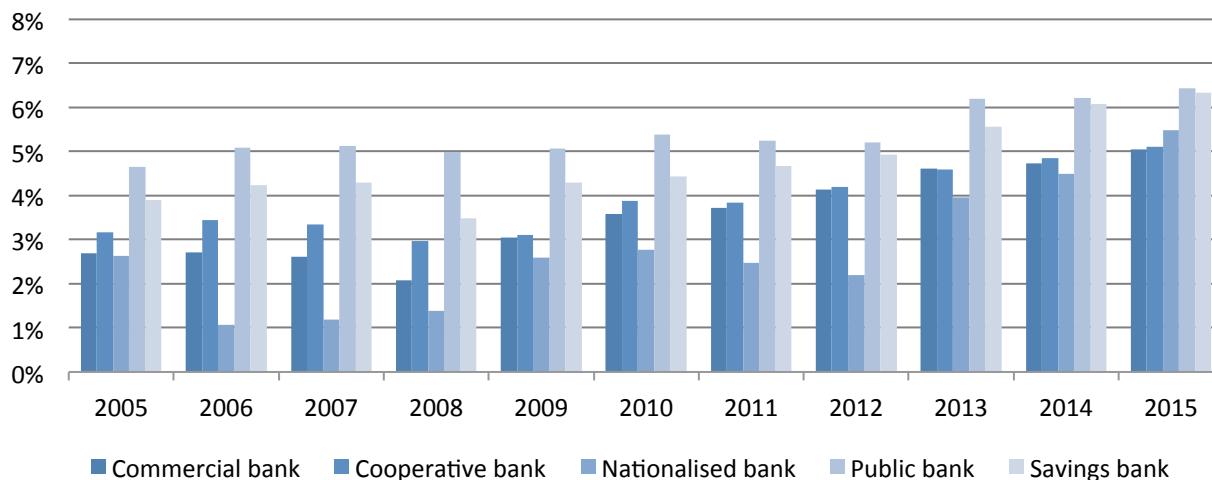
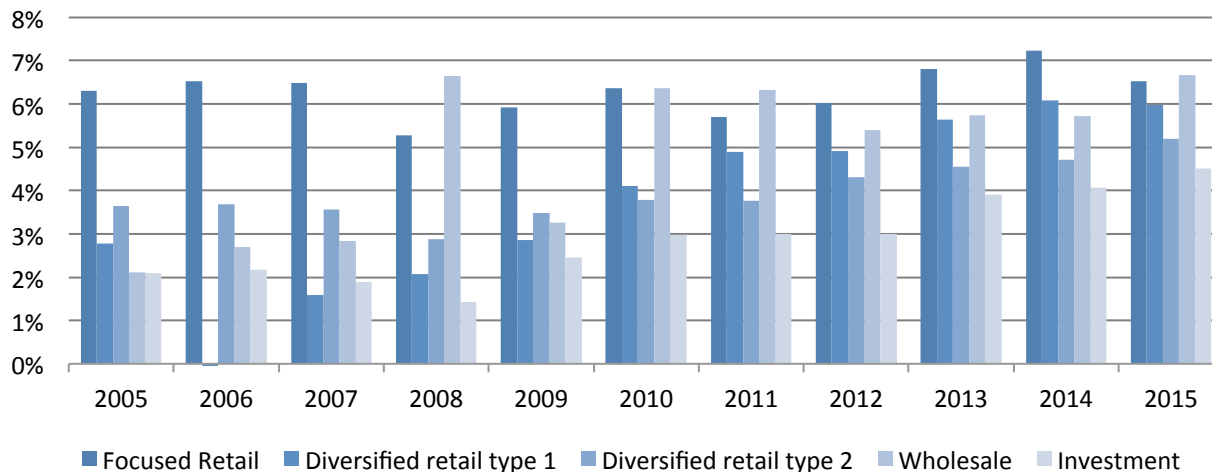
- Banks across the five BMs increased Tier-1 capital ratios, especially wholesale banks



- Tier-1 capital ratios increased across ownership types, especially public banks

Response to Regulation: Leverage

Leverage ratio (Common tangible eq./tangible assets)

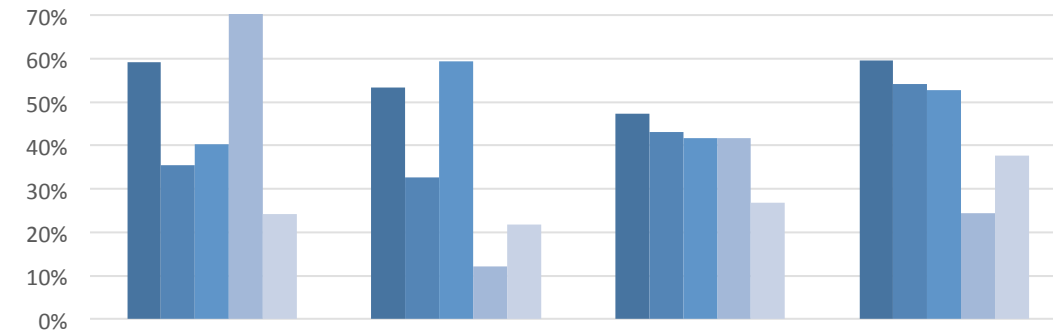


- LR increased for all BMs, except for retail focused (since 2014)
- LR (as per this def. reached more than 5% except for investment banks
- Differences are statistically significant
 - Wholesale/ investment banks had lowest ratios
 - Wholesale banks increased most
- LR increased for for all types of banks based on ownership, highest for savings, and nationalised banks

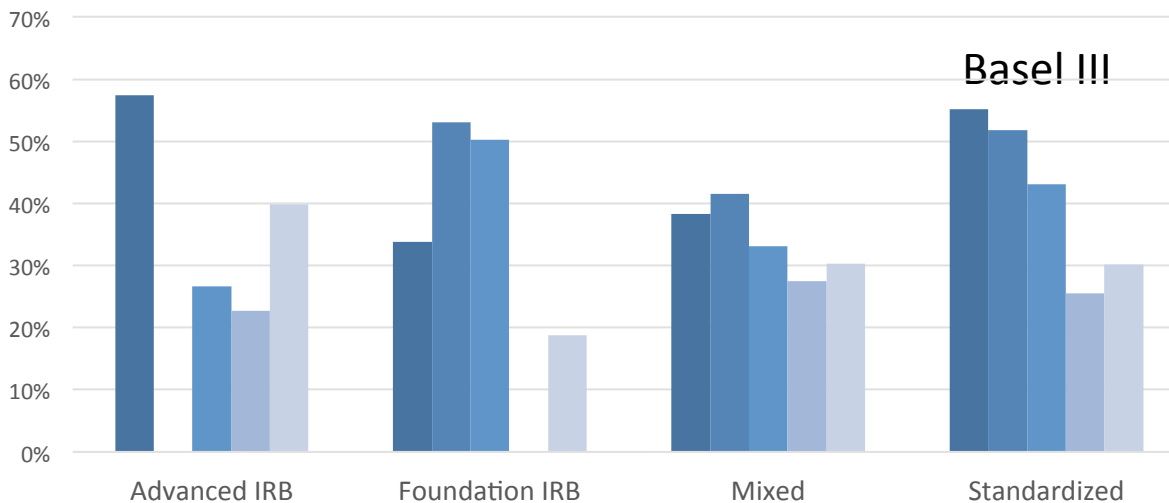
Response to Regulation: Basel II, Basel III

Weighted average of RWA (% of TA) by business model

Basel II



Basel III

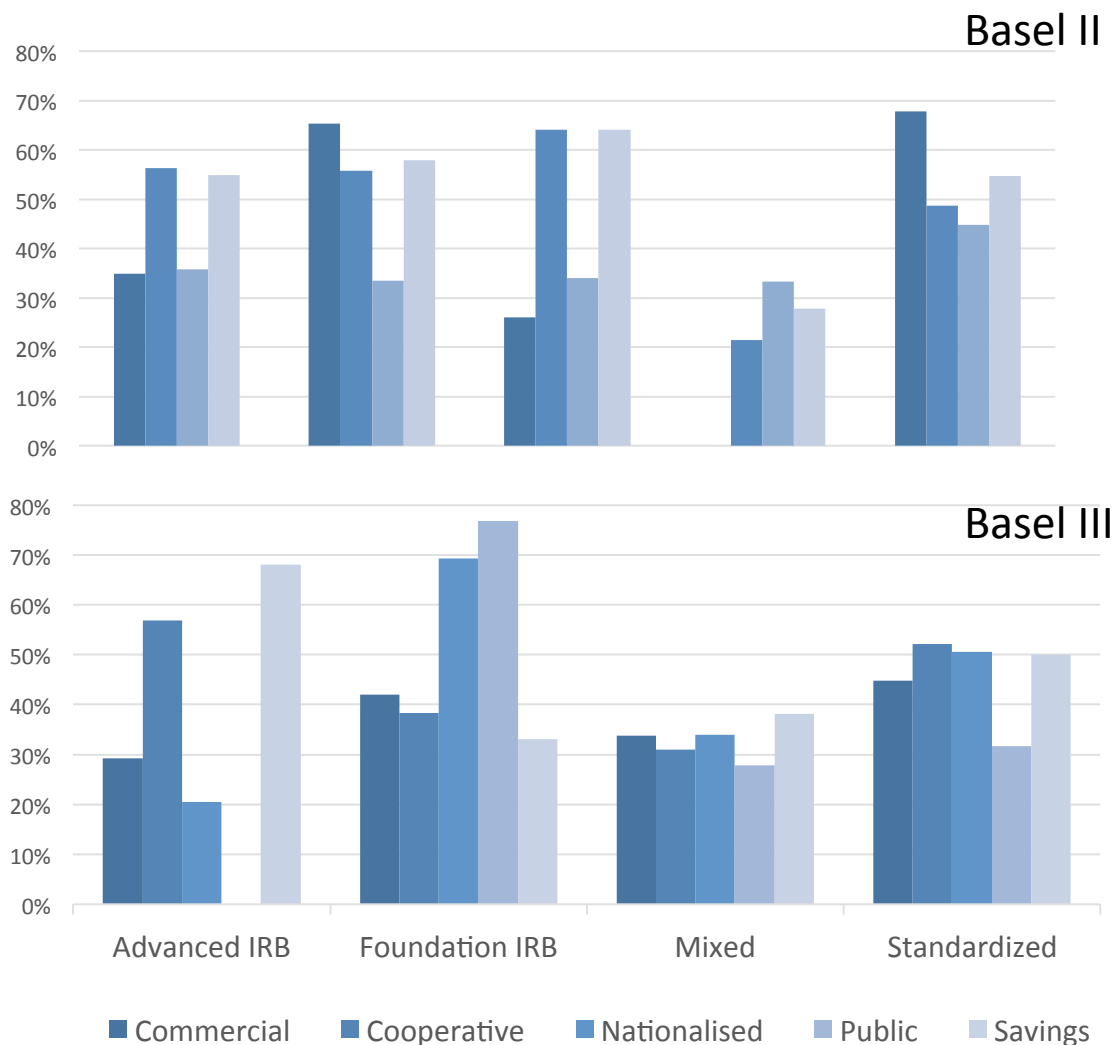


■ Focused Retail ■ Diversified retail type 1 ■ Diversified retail type 2 ■ Wholesale ■ Investment

- When using mixed models, banks with all BM tend to reduce their RWAs
- Investment banks using FIRB reduce their RWA
- All banks except investments and Wholesale report low RWA under SA

Response to Regulation: Basel II, Basel III

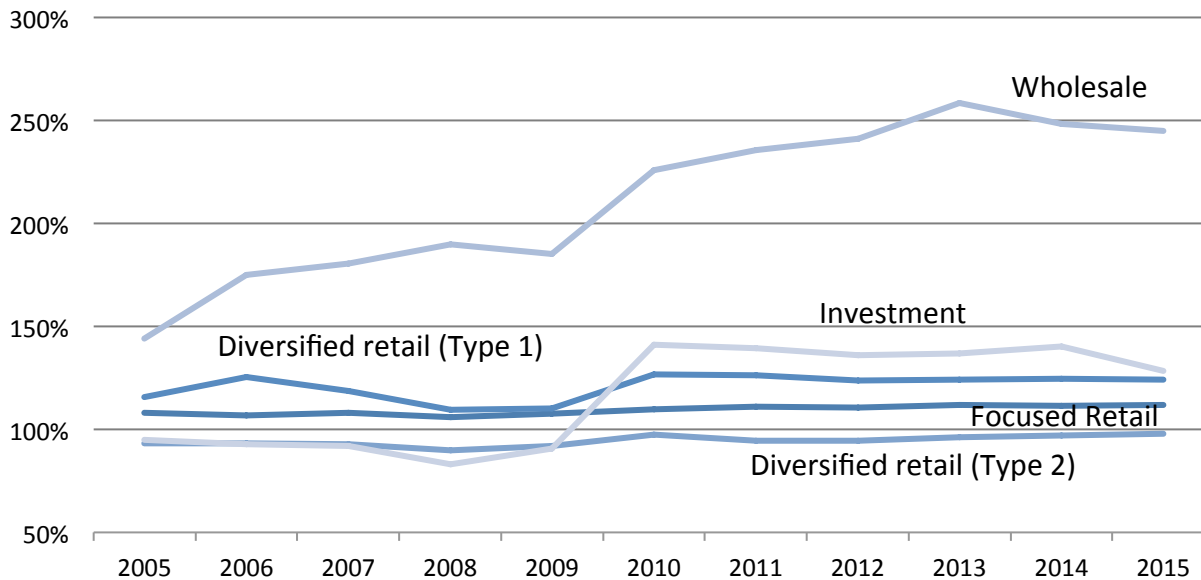
Weighted average of RWA (% of TA) by ownership structure



- Mixed models under Basel III exhibit low RWA for all OS
- FIRB to lead to higher RWA as compared to RWA under SA

Response to Regulation: Liquidity

Evolution of net stable funding ratio (NSFR)



Notes: Assumptions for construction of NSFR are similar to those put forward in IMF (2011a), to the extent of data availability.

- The NSFR is not yet disclosed and binding (future threshold 100%), therefore a proxy has been used to get an indication
- NSFR lower than 100% for diversified retail (Type 2)
- Focused retail, diversified retail (Type 1) and investment have access liquidity up to 40%
- Wholesale banks' NSFR increased significantly to more than 2.5 times the future requirement



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