BANKING BUSINESS MODELS AND OWNERSHIP STRUCTURES IN EUROPE

– A CASE FOR DIVERSITY AND PROPORTIONALITY

Central Bank of Athens, Athens
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Background

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2008 GFC

Stability

- ✓ Flawed **Basel 2 framework**
- ✓ Failure of supervision
- ✓ Proportionality was a principle on paper and associated to supervisory discretion
- ✓ Inclusion issues under DG employment

1995-2007 FSAP

Inclusion

Financial integration

- ➢ TBTF, TSTF and TB/S TBS
- ➢ Massive State Aid
- ➢ Legacy assets

Financial integration a driver for economic integration and growth

➢ **Was it the case for the EU and individual MS?**

1995-2007 FSAP

Competition

- ✓ Key priorities underlined in the "economic freedom" model
- ✓ EU passporting
- ✓ From min to max harmonization
- ✓ Focus on financial performance (ROE)
- ✓ and efficiency (CIR)

Efficiency

BMM and Ownership Diversity in Europe: Complex Architecture

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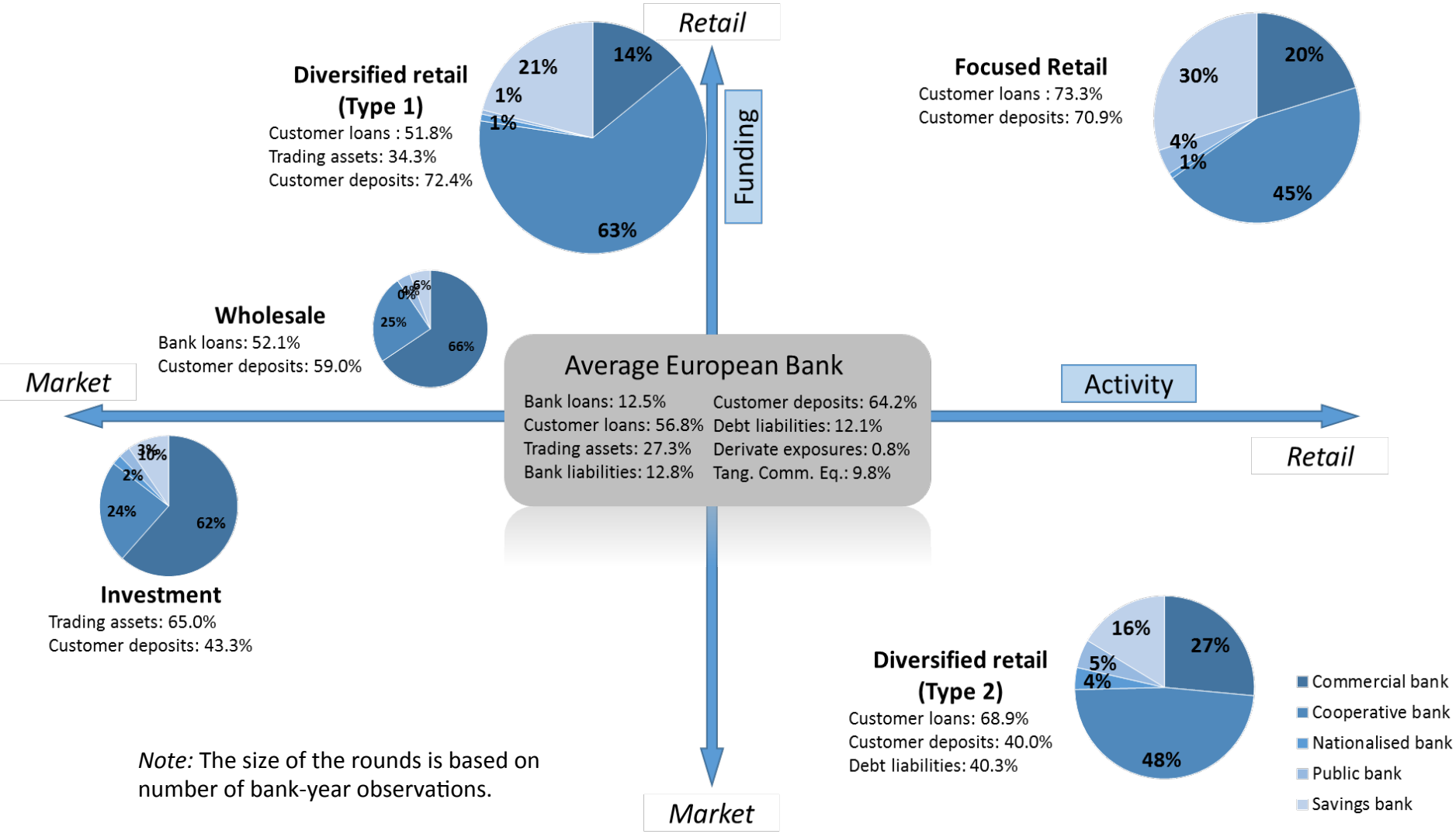

Note: The size of the rounds is based on number of bank-year observations.

BMM and Ownership Diversity

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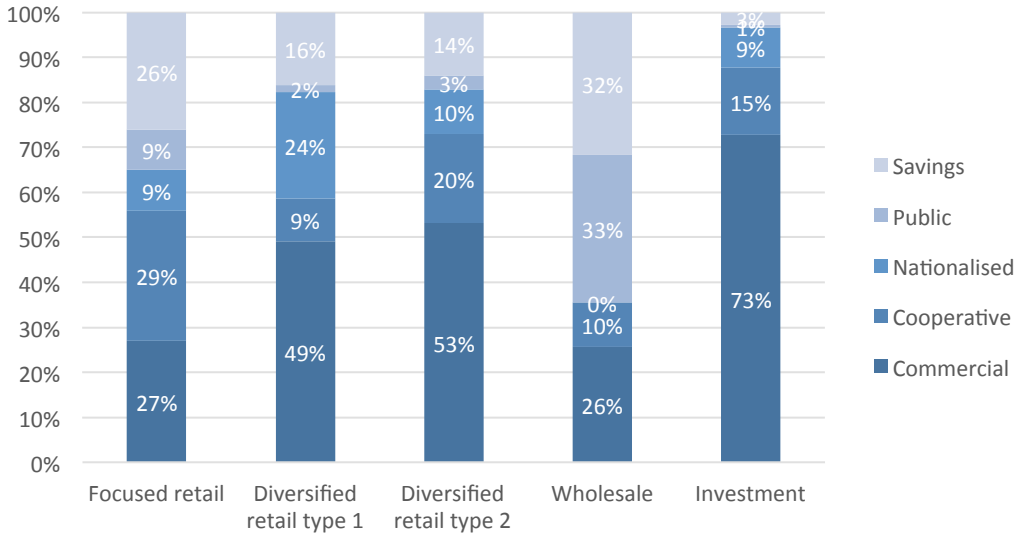
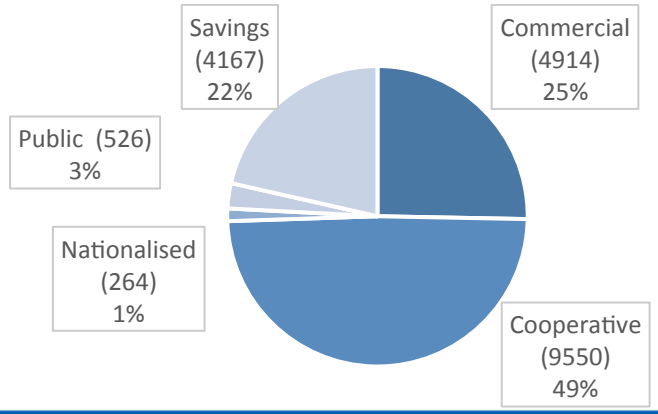
Ownership across business models (% of assets)



Observations by cluster (share in obs)



- 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

Financing the real economy

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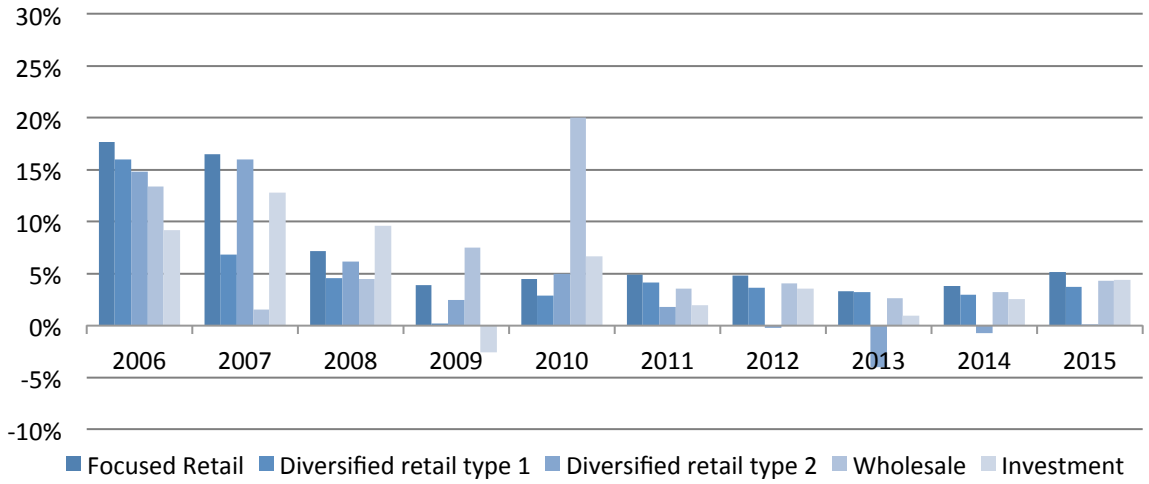
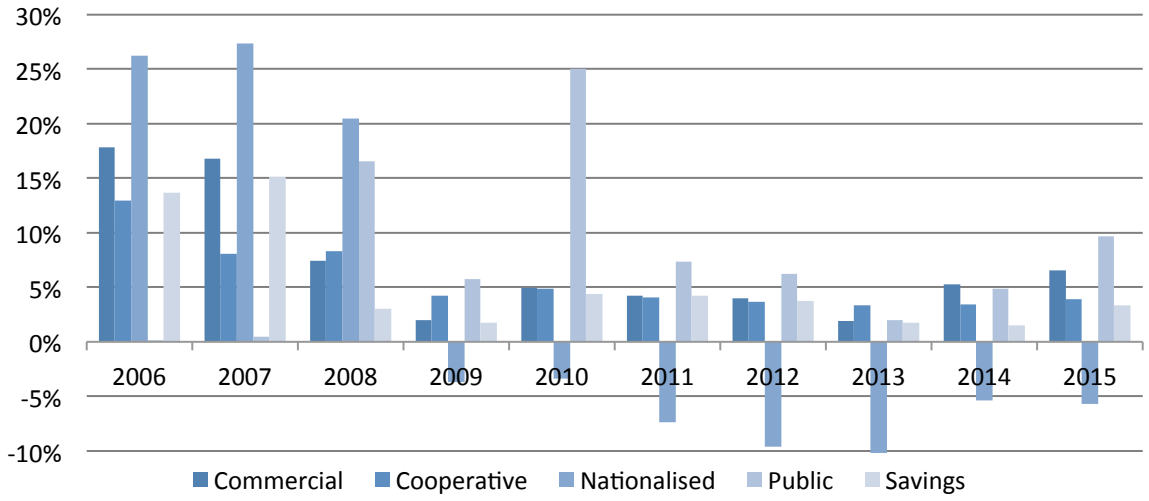
Growth in outstanding customer loans (median values)





- 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

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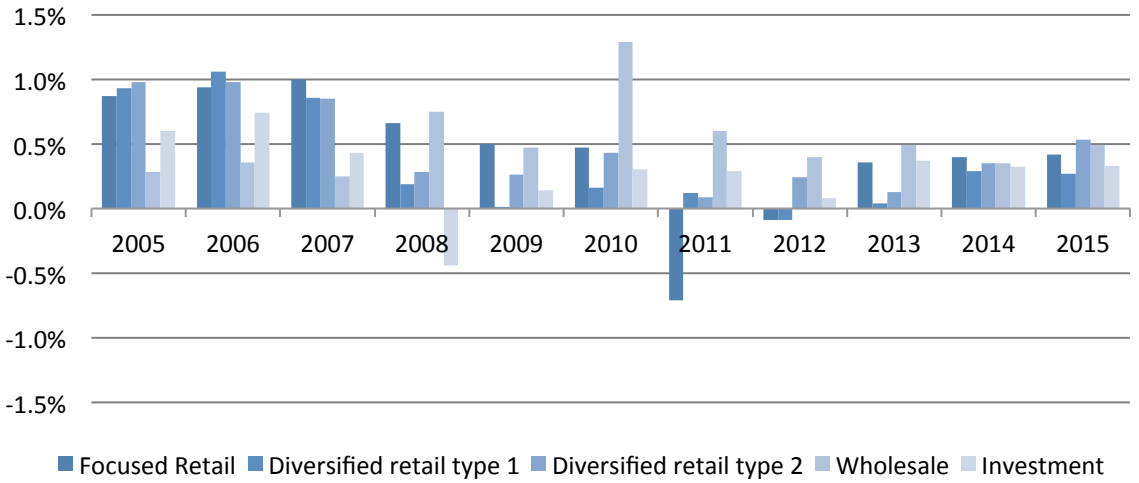
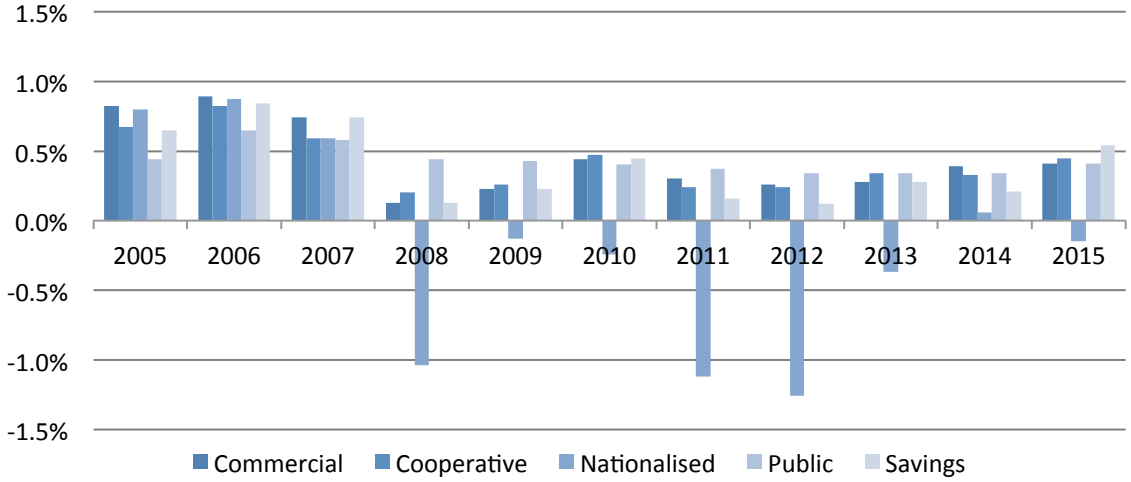
Return on assets (RoA)(weighted average)





- 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

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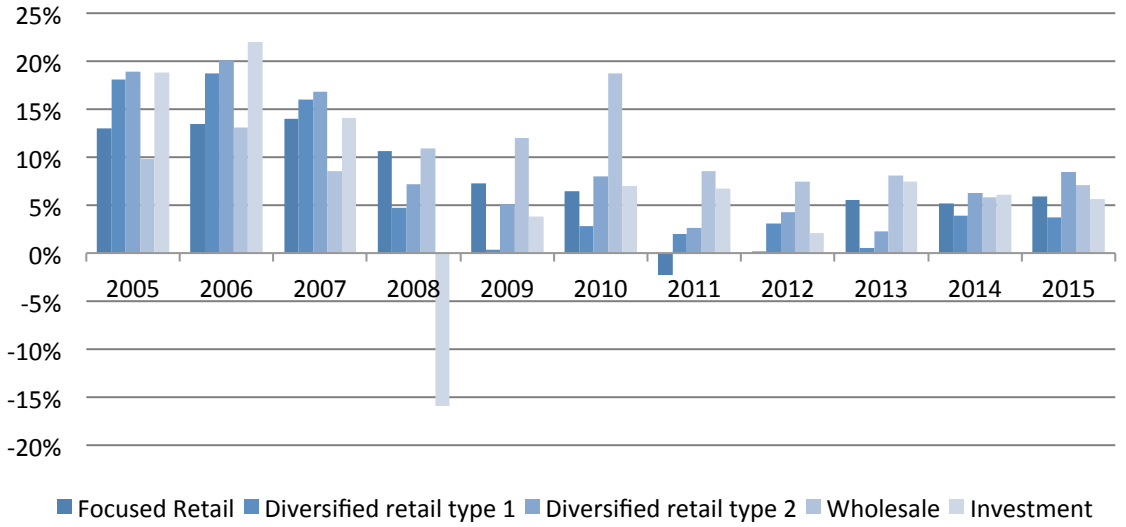
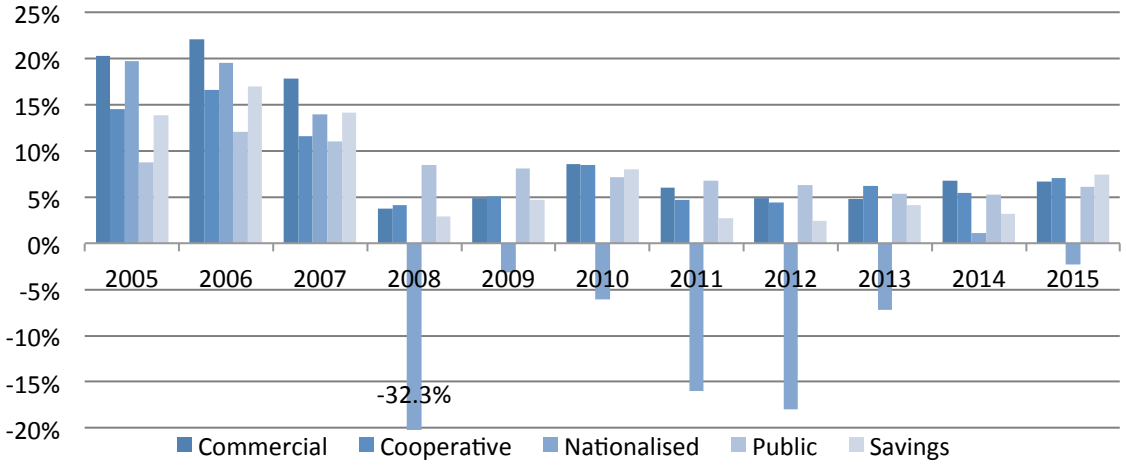
Return on equity (RoE)(weighted average)





- 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

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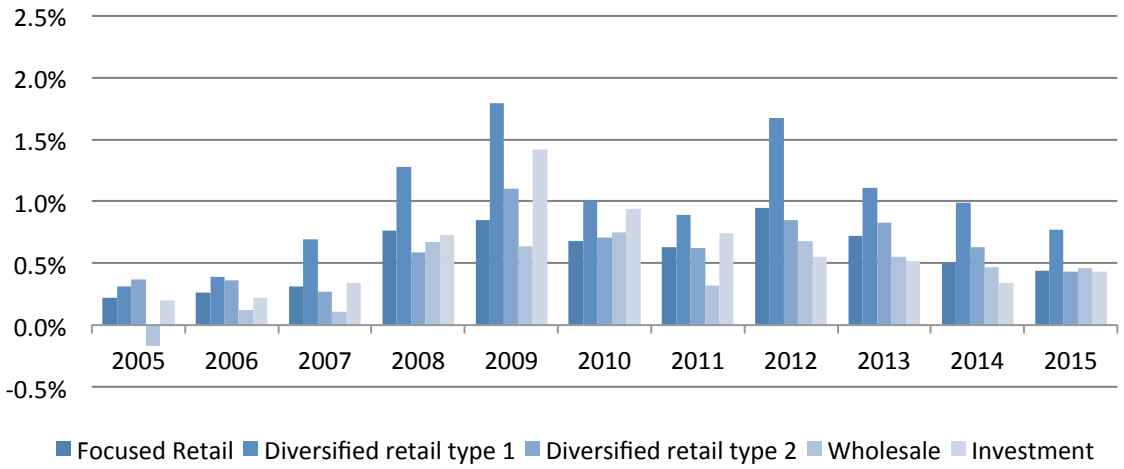
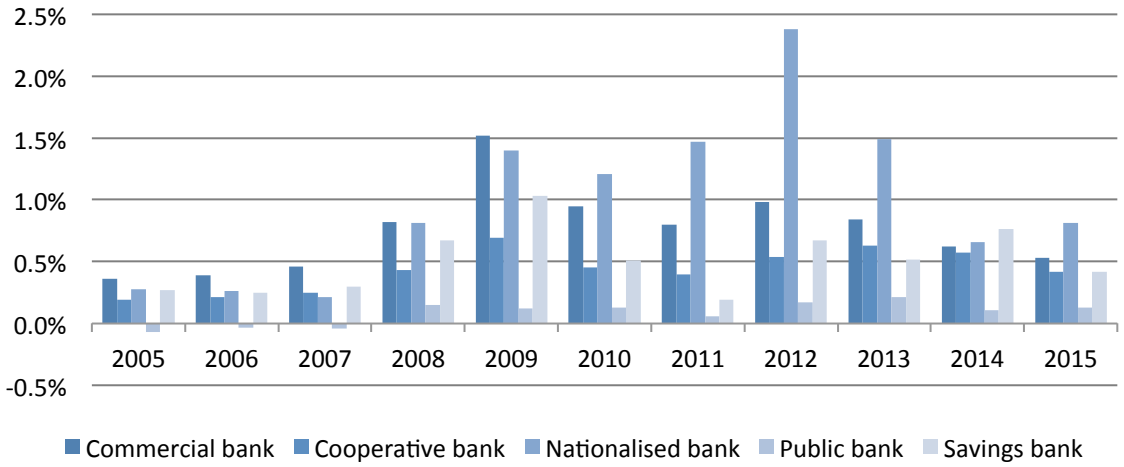
Loan loss provisions

(% 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

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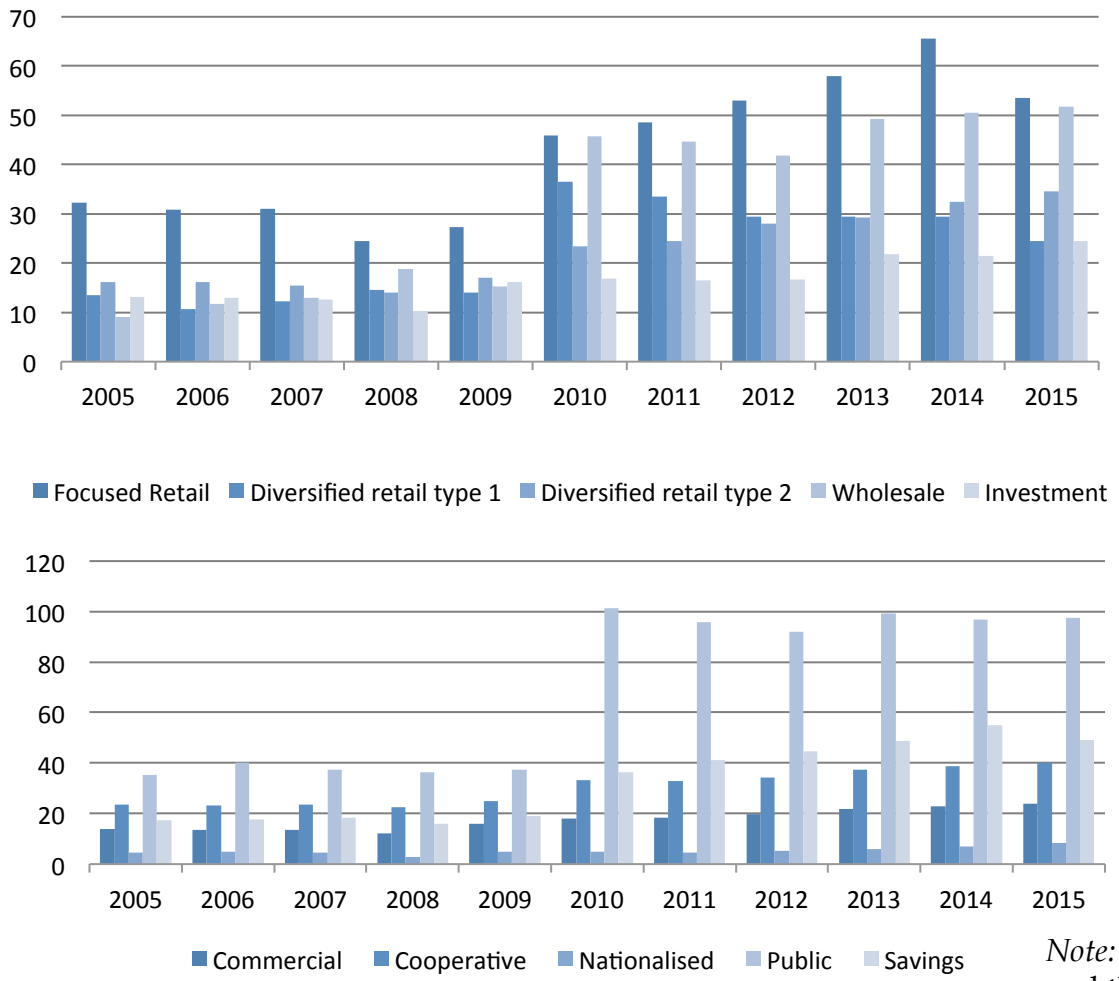
Distance to default estimates (Z-score, weighted average)



- Focused retail (Type 1) banks are furthest from default
- Diversified retail, wholesale and investment banks are facing similar, but higher default risksDistance 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

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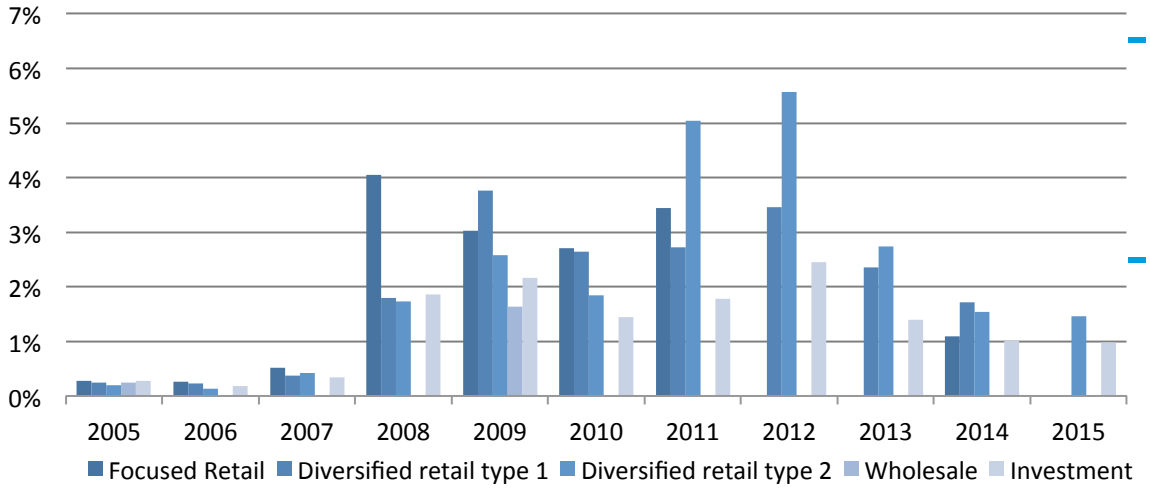
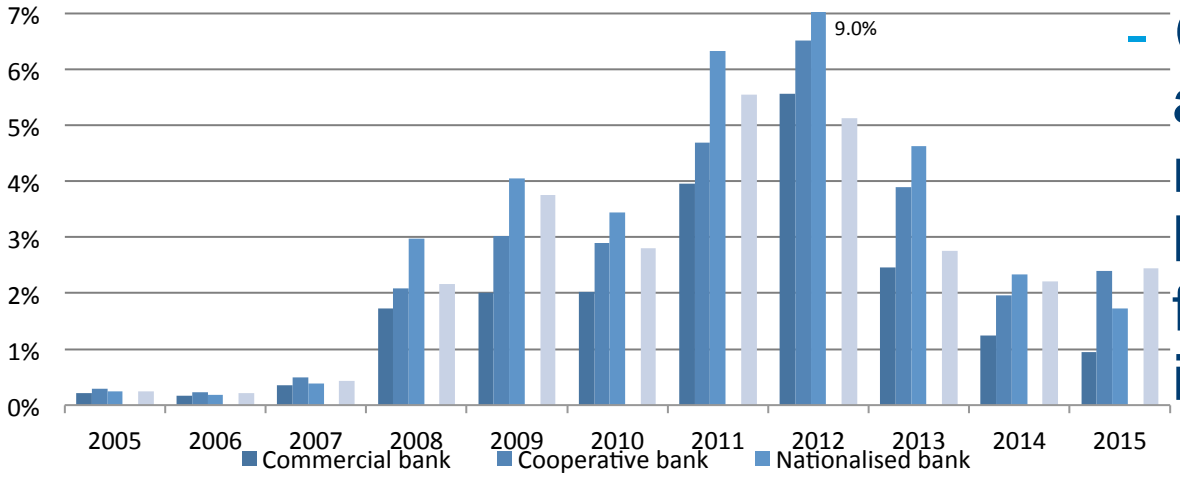
Subordinated CDS spreads (median)





- 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

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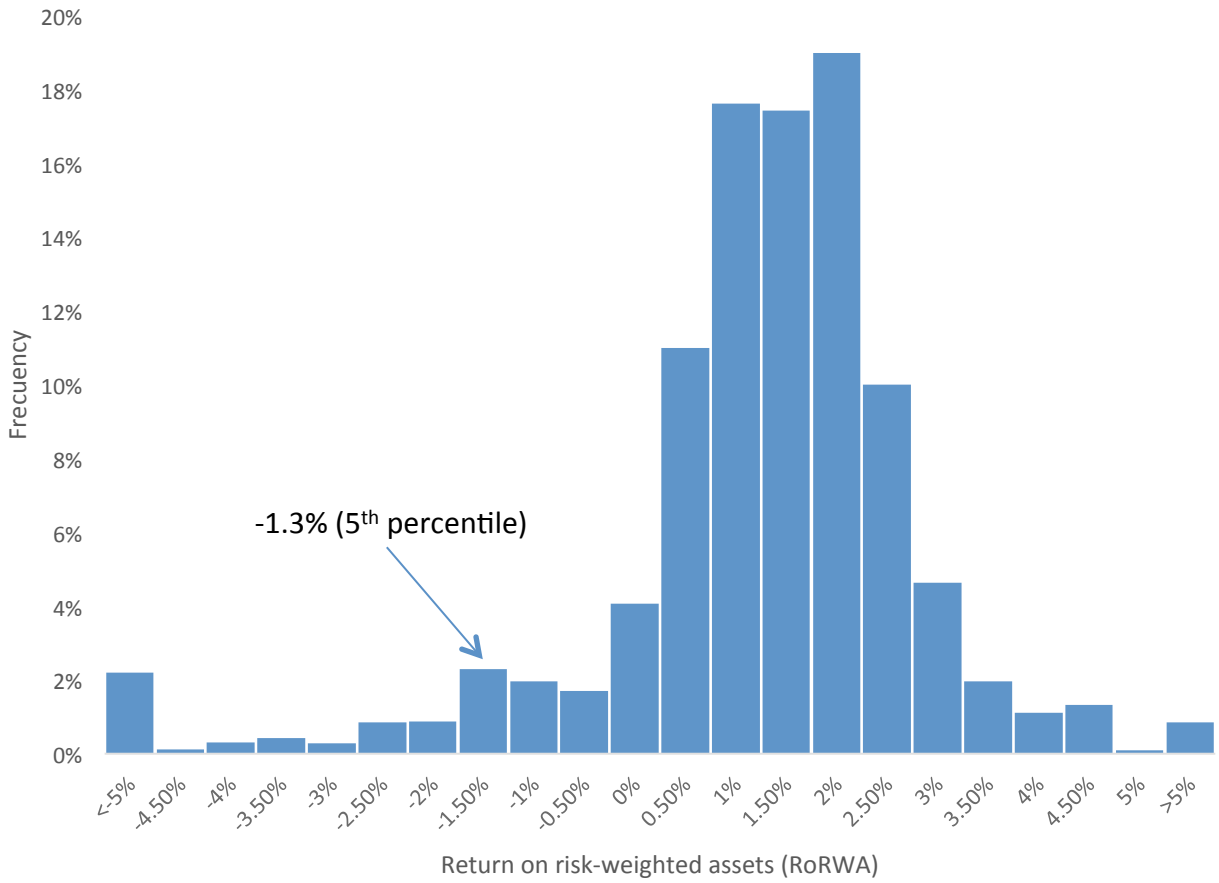
Distribution of return on RWA (RoRWA), 2005-15



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

Resilience: Tail losses

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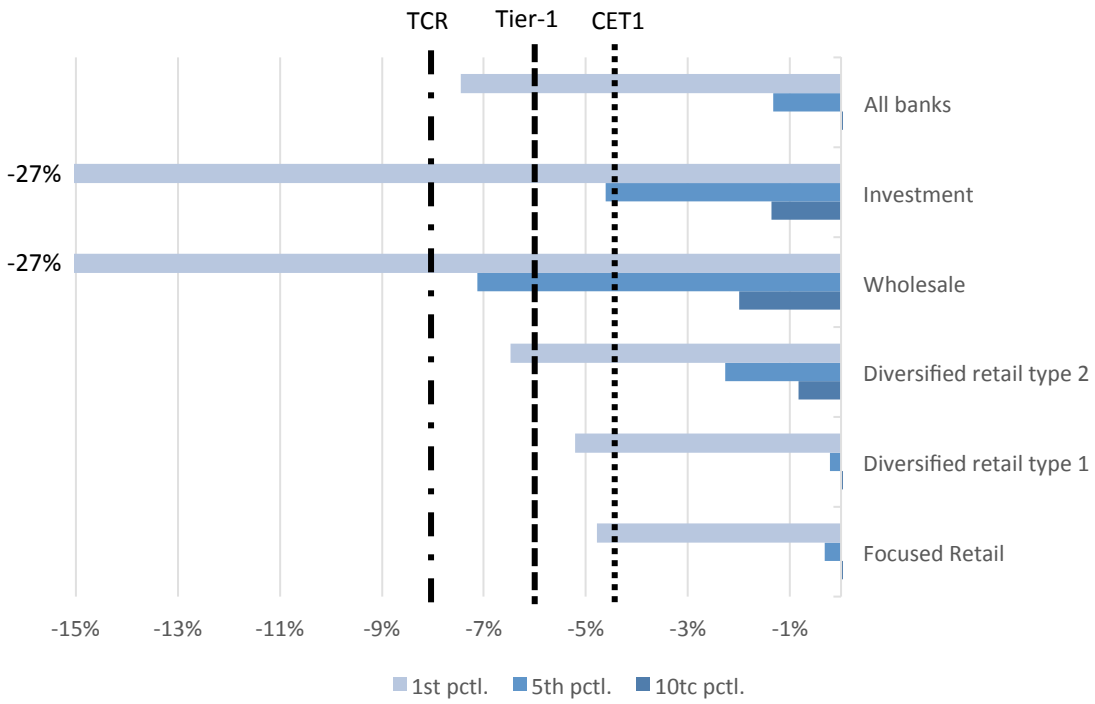
Return on RWA, tail loss estimates, 2005-15



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

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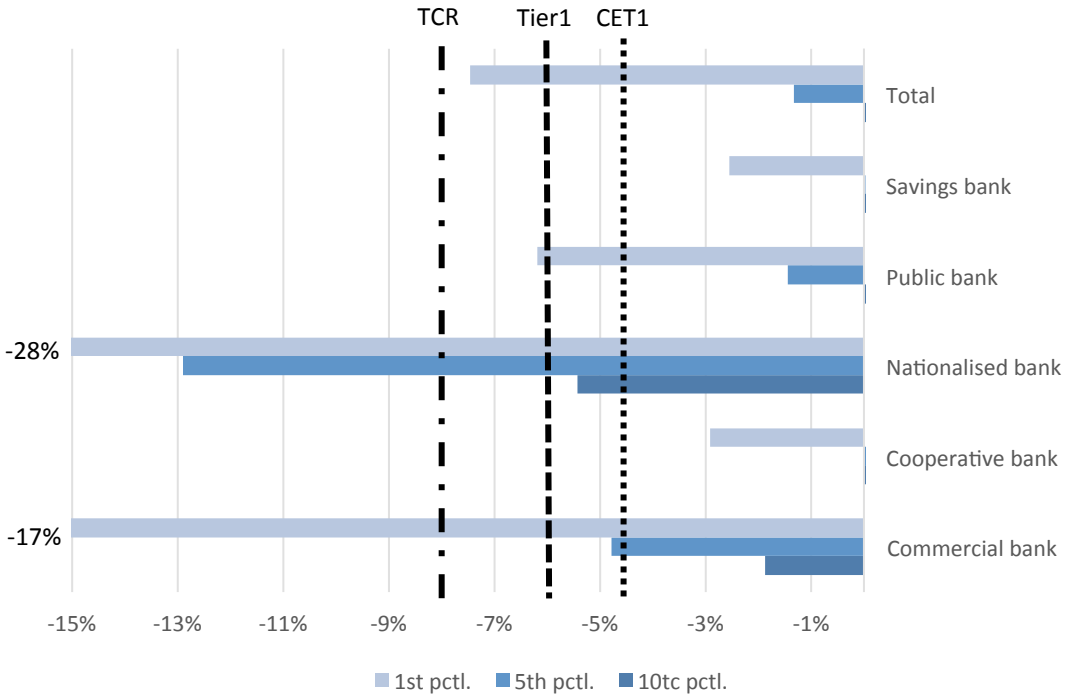
Return on RWA, tail loss estimates, 2005-15 (obs)



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- 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

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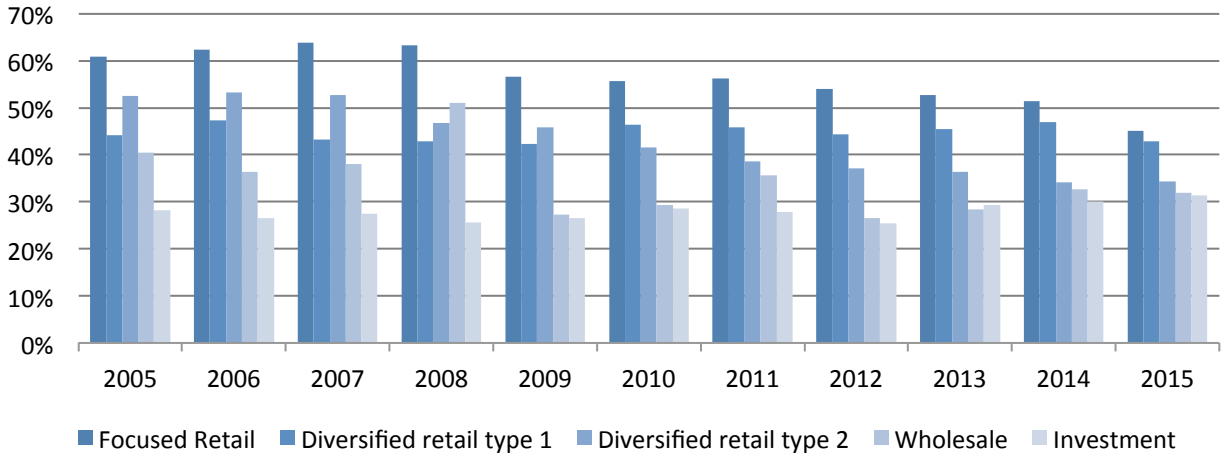
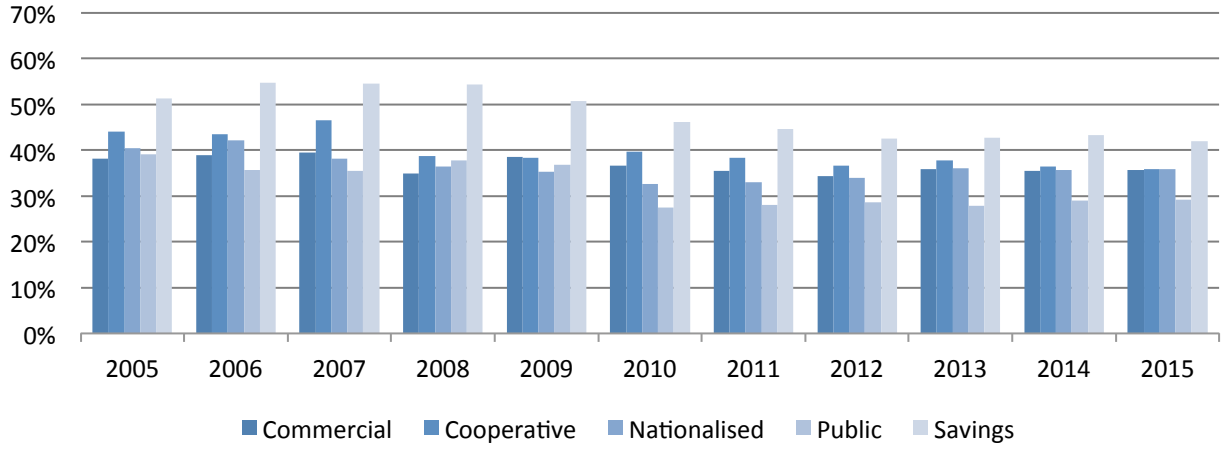
Risk weighted assets (% of assets)(weighted average)





- 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

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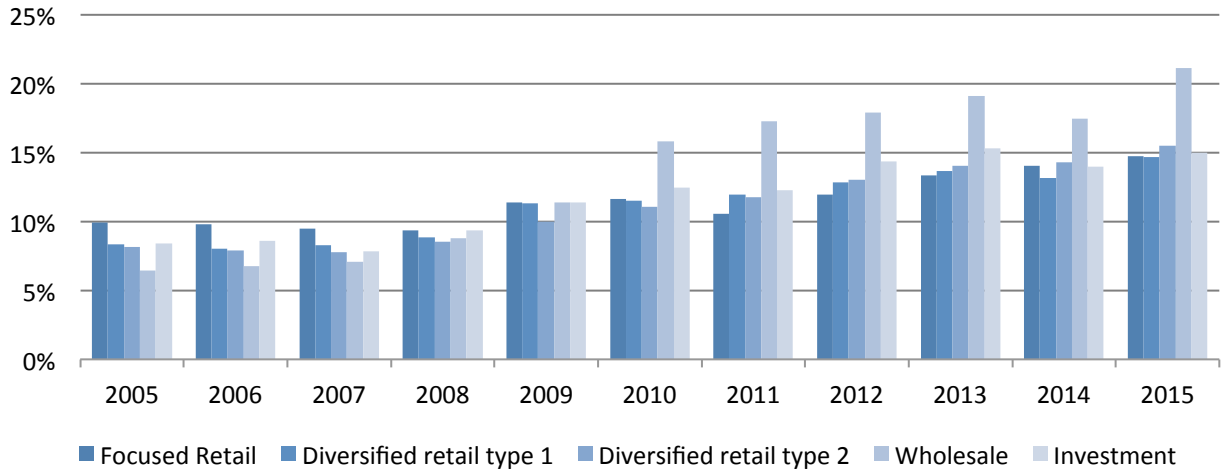
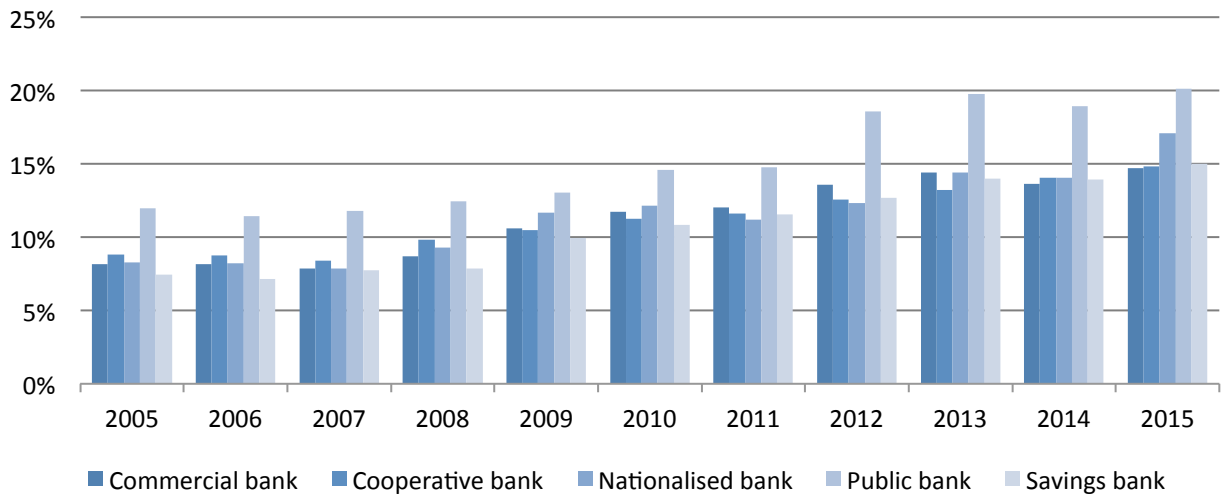
Tier-1 capital ratio (% of RWA)(weighted average)





- 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

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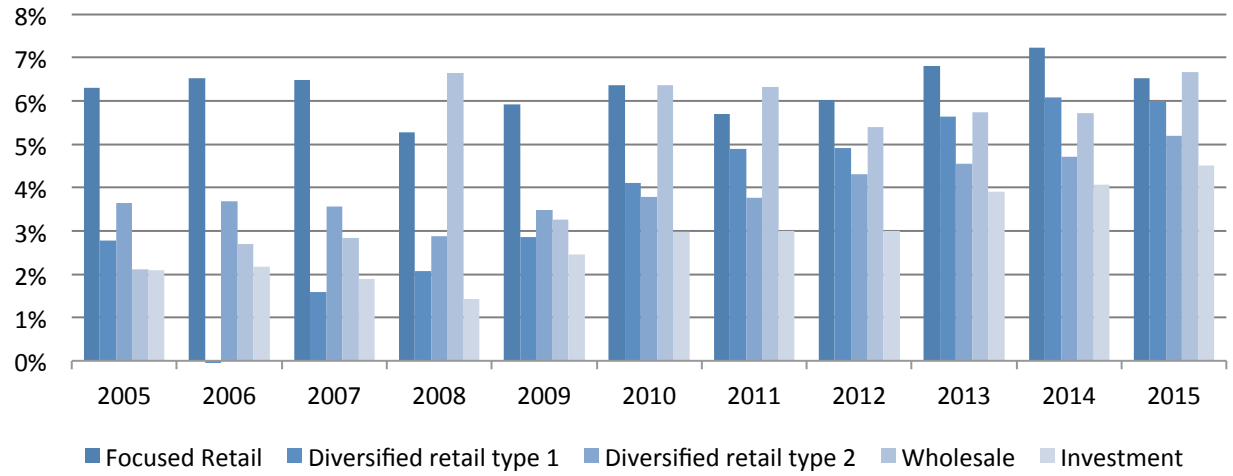
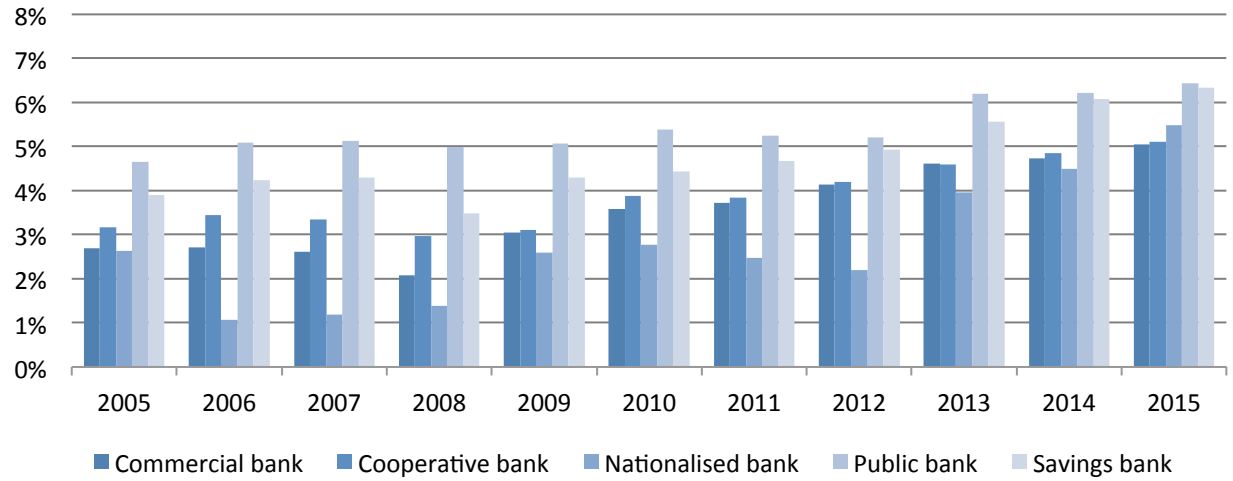
Leverage ratio (Common tangible eq./tangible assets)





- 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

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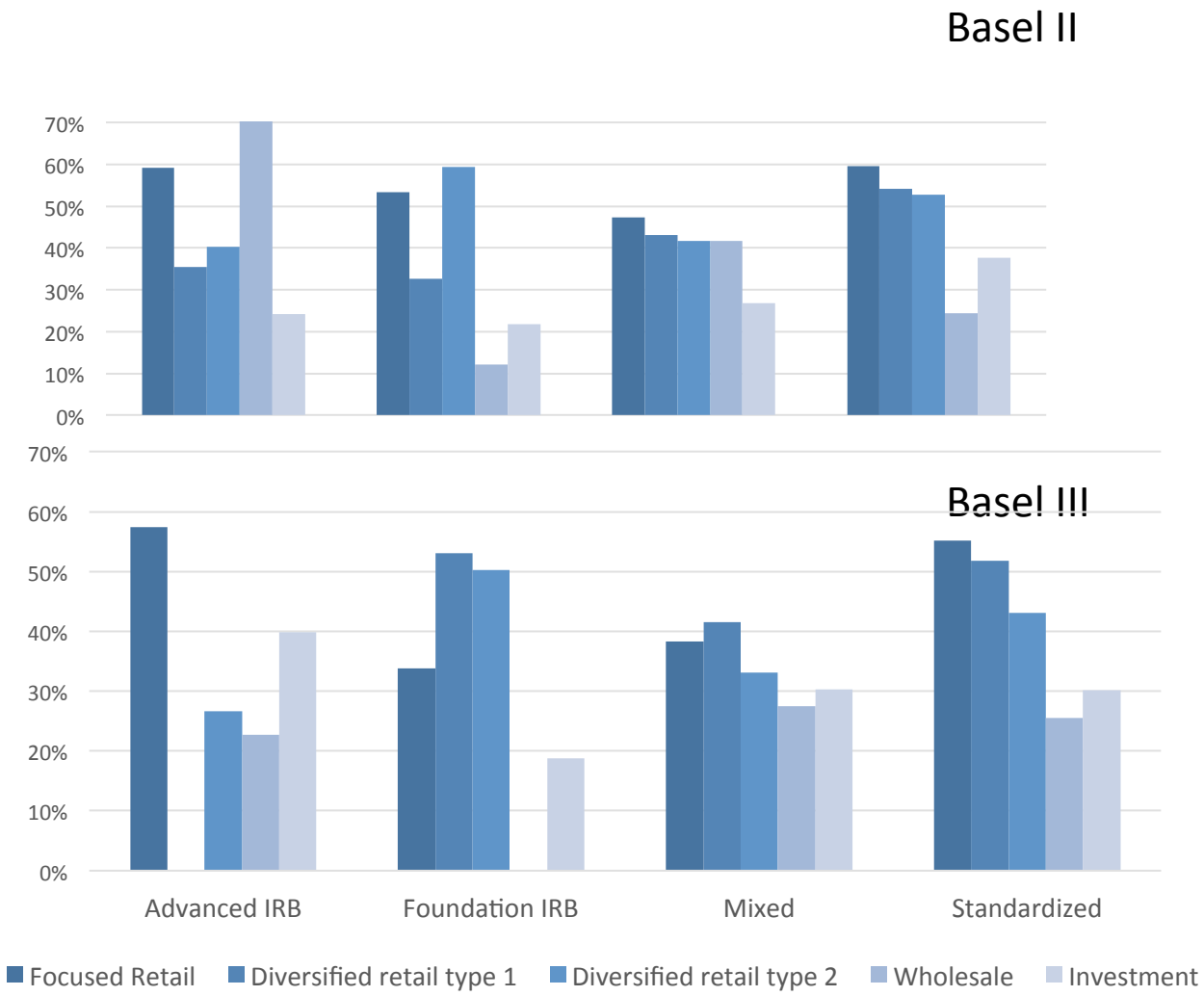
Weighted average of RWA (% of TA) by business model



- 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

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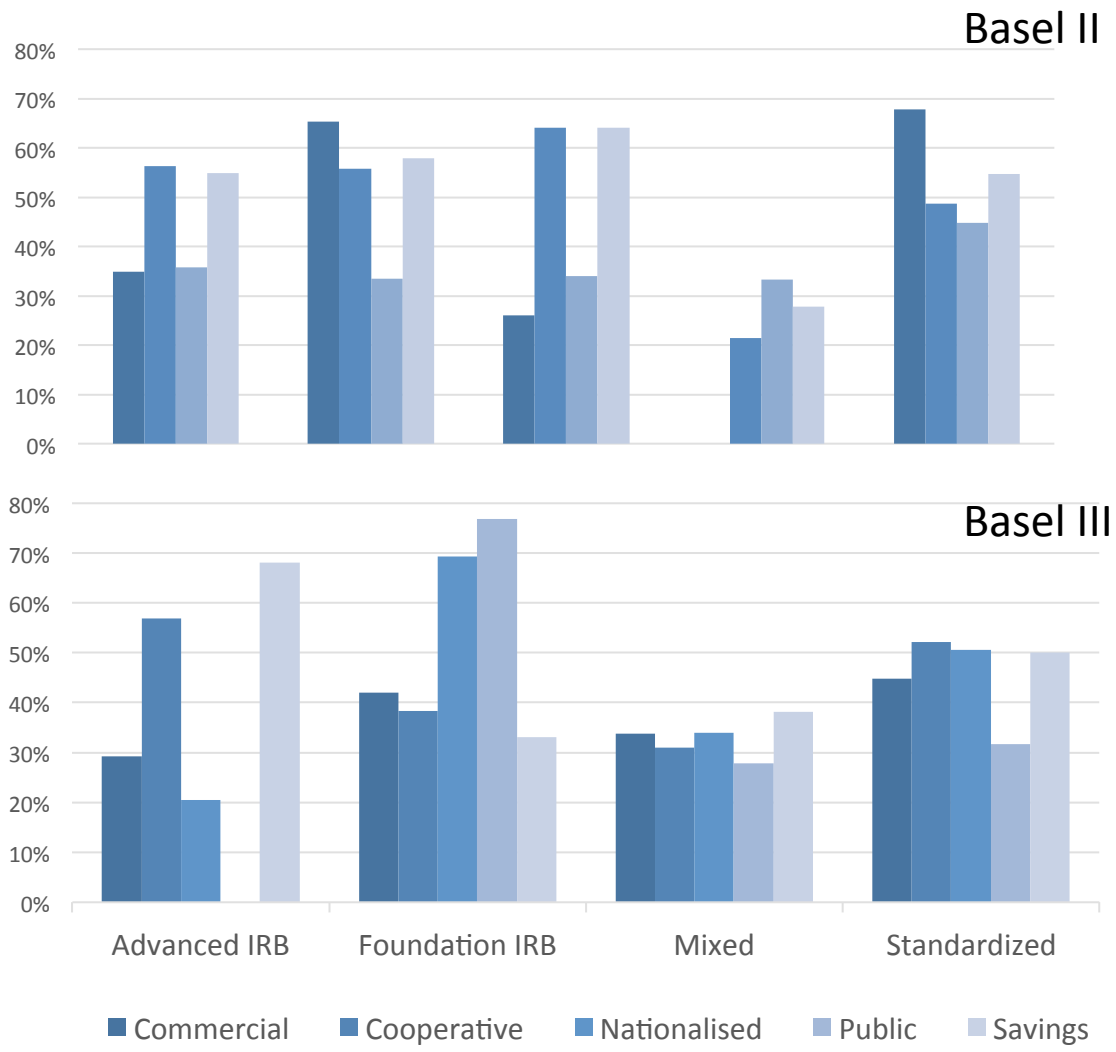
Weighted average of RWA (% of TA) by ownership structure



- 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

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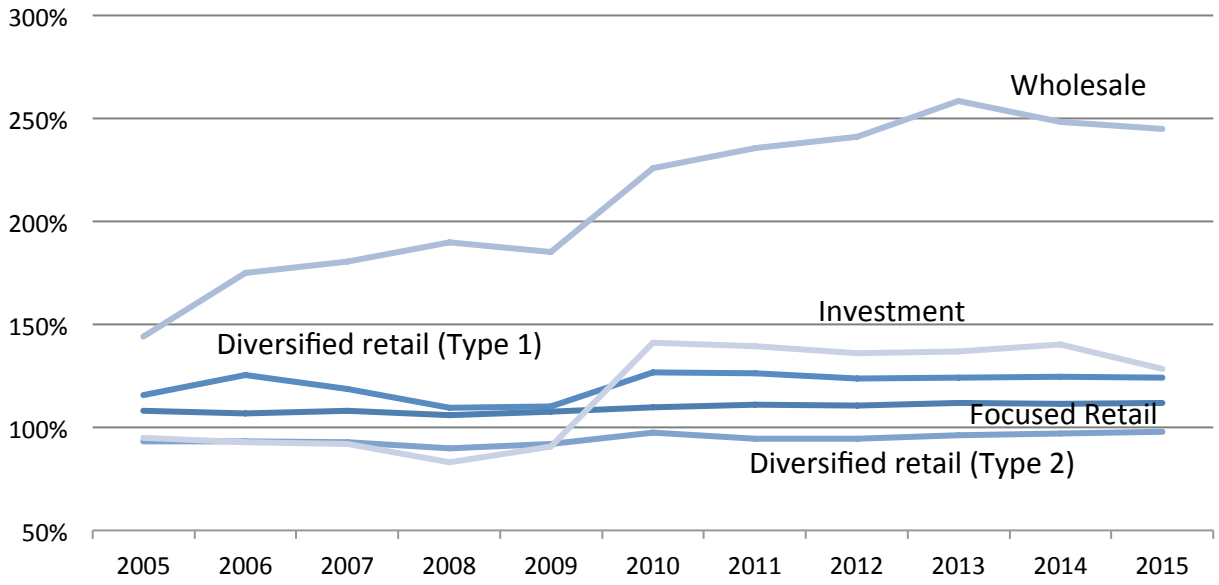
Evolution of net stable funding ratio (NSFR)



Notes: Assumptions for construction of NFSR 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

BBM & OS Diversity: A case for Proportionality

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- Institutional diversity (the co-existence of stakeholders and shareholders banks) promotes systemic stability (Ayadi et al (2009, 2010))
- The Business Model (BM) analysis is key for bank regulation and supervision (Ayadi et al (2011, 2012)
- Since Bank Business Models (BBM) contribute differently to performance and risk, bank regulation (pillars 1 and 2) 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, regulatory and market conditions can lead to changes in the BMs of banks towards more diversity or convergence (Ayadi (forthcoming 2017))
- 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 (2017))
- Each BBM reacts differently to external shocks – and therefore have different characteristics that make them more or less resilient to shocks (Ayadi (2017)

⇒ Monitoring BBM is the tool for dynamic supervision

⇒ BBM and OS diversity is a driver to design a proportional regulation

- *Paper by Ayadi (2016) on BBM for regulation and resolution*

BBM & OS Diversity: A case for Proportionality

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- **Institutional diversity in banking** is assessed via the co-existence of different ownership structure (OS) that is stakeholders (e.g. cooperatives banks and savings banks) and shareholders banks (e.g. commercial private banks and investment firms) is linked to varied incentives and therefore different mandates and risk appetites
- **Bank Business Models** is assessed via the different behaviour of banks (irrespective to their ownership structure) in the system where they operate

⇒To maintain a diverse banking system, which is a condition for systemic stability, proportionality in regulation and supervision means to take into account the OS and BBM in the current regulatory and supervisory framework

⇒ BBM and OS diversity is a driver to design a proportional regulation

BBM & OS Diversity: A case for Proportionality

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- Capital requirements (CR)
  - Each BM has a distinct risk profile and reacts differently to external shocks
    - ⇒ 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

BBM & OS Diversity: A case for Proportionality

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- Pillar 2
  - Add-ons should be scientifically linked to BMs
  - Adapted framework to assess internal governance for OS
- 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 extend 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?)

Conclusions

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Multi-dimensional holistic regulatory framework Underpinned in well devised risk assessment framework

Multi-dimensional **proportional** supervisory framework

Size	Impact on GDP (domestic & regional)
Ownership	Incentives (STV, SHV.. and governance (board and management, mandates
Business model (Ayadi model)	Accumulation of risk based on bank behavior and resilience to external shocks
Extent of Cross-border Activities	High importance when failures occur
Systemic nature	Financial stability and un-stability

- Variables are correlated

Capital & Risk measurement and management

Liquidity

Internal governance assessment

Reporting and market discipline

Annex

Defining Bank Business Models (BBM)

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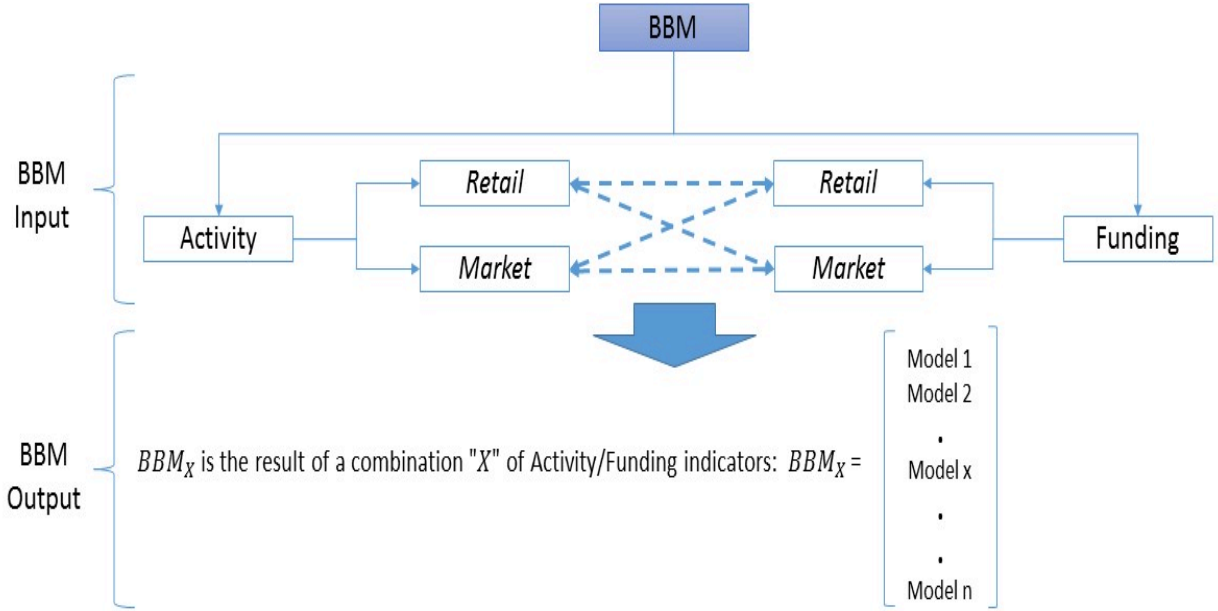
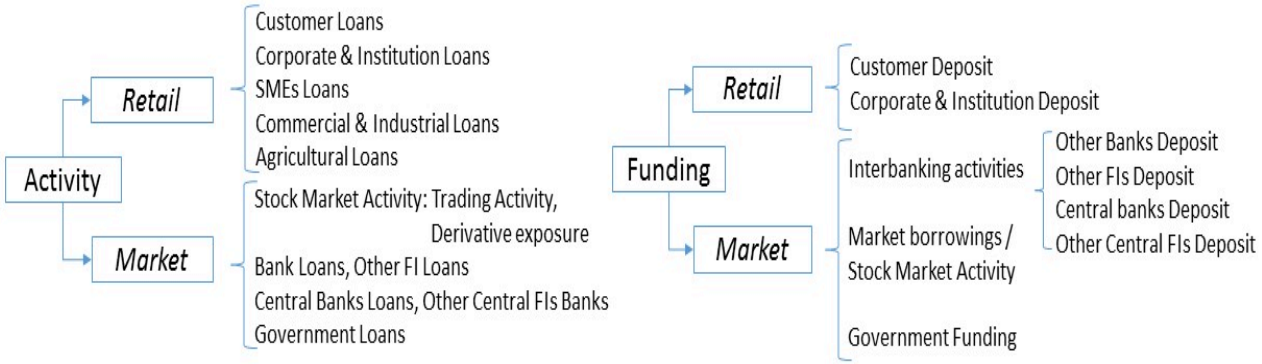


The Activity/Funding Indicators defining a BBM_X are conceived based on an Asset/Liabilities logic:



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

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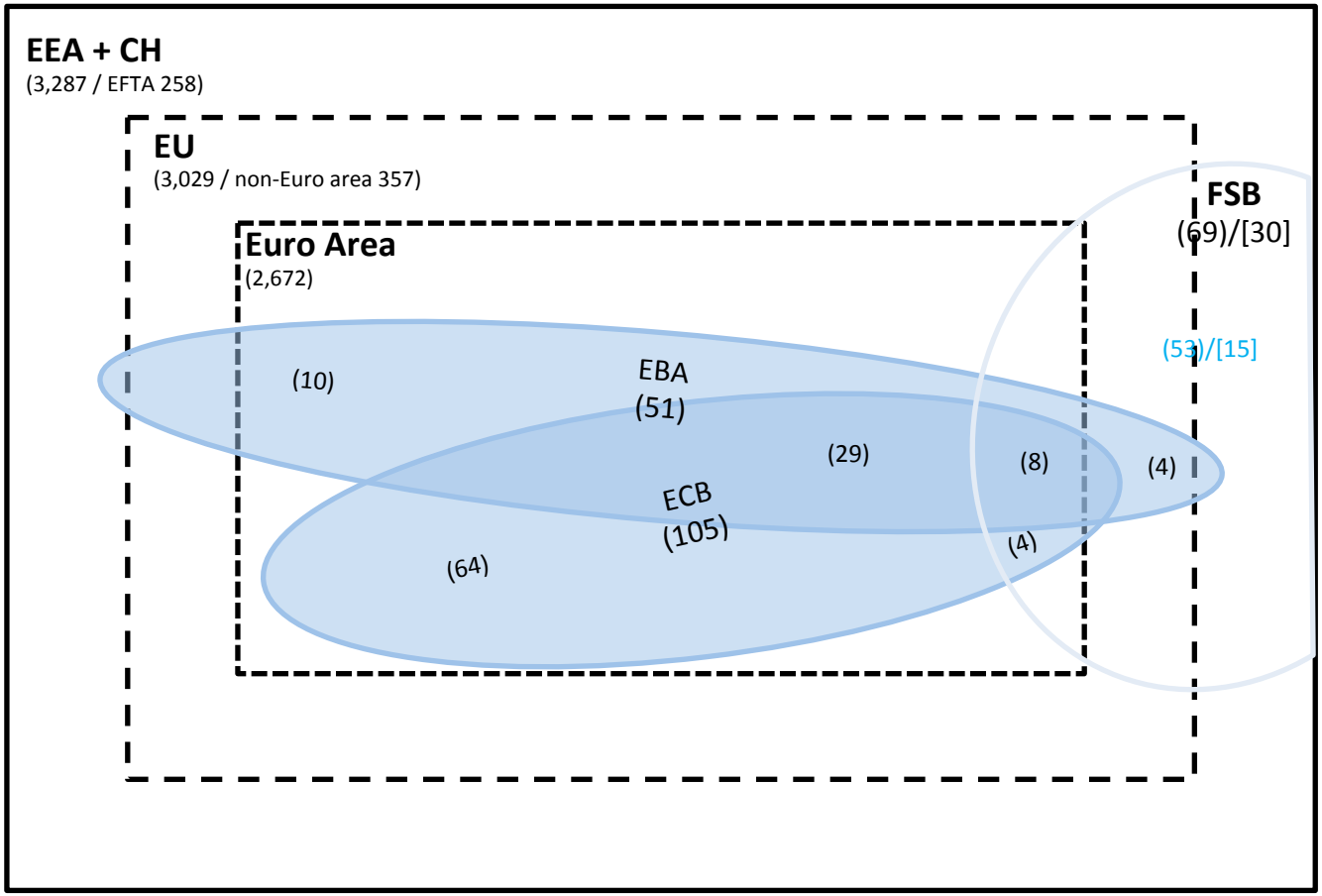

Comprehensive coverage of the European banking industry

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

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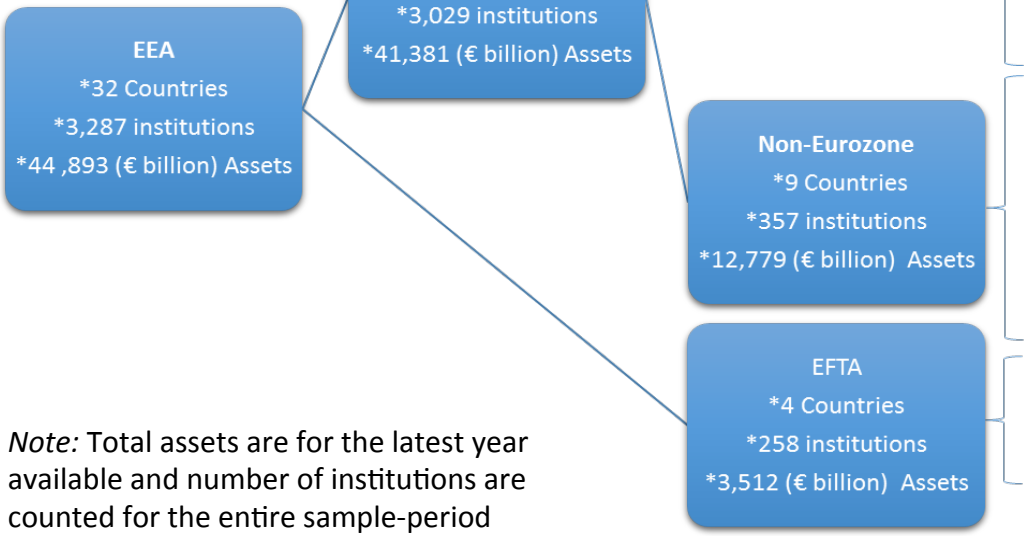

Country	Number of institutions	Assets (€ billion)
Austria	247	686
Belgium	22	829
Cyprus	14	122
Estonia	6	2
Finland	23	201
France	75	7,578
Germany	1,573	7,138
Greece	19	408
Ireland	14	397
Italy	440	3,249
Latvia	14	18
Lithuania	5	7
Luxembourg	36	278
Malta	10	20
Netherlands	33	2,623
Portugal	26	358
Slovakia	5	7
Slovenia	11	23
Spain	99	4,661
Bulgaria	9	12
Croatia	14	6
Czech Republic	8	25
Denmark	76	816
Hungary	9	55
Poland	13	125
Romania	7	19
Sweden	57	1,650
United Kingdom	164	10,072
Iceland	6	23
Liechtenstein	7	49
Norway	102	532
Switzerland	143	2,908

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

Identification of BBM: Methodology

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- **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

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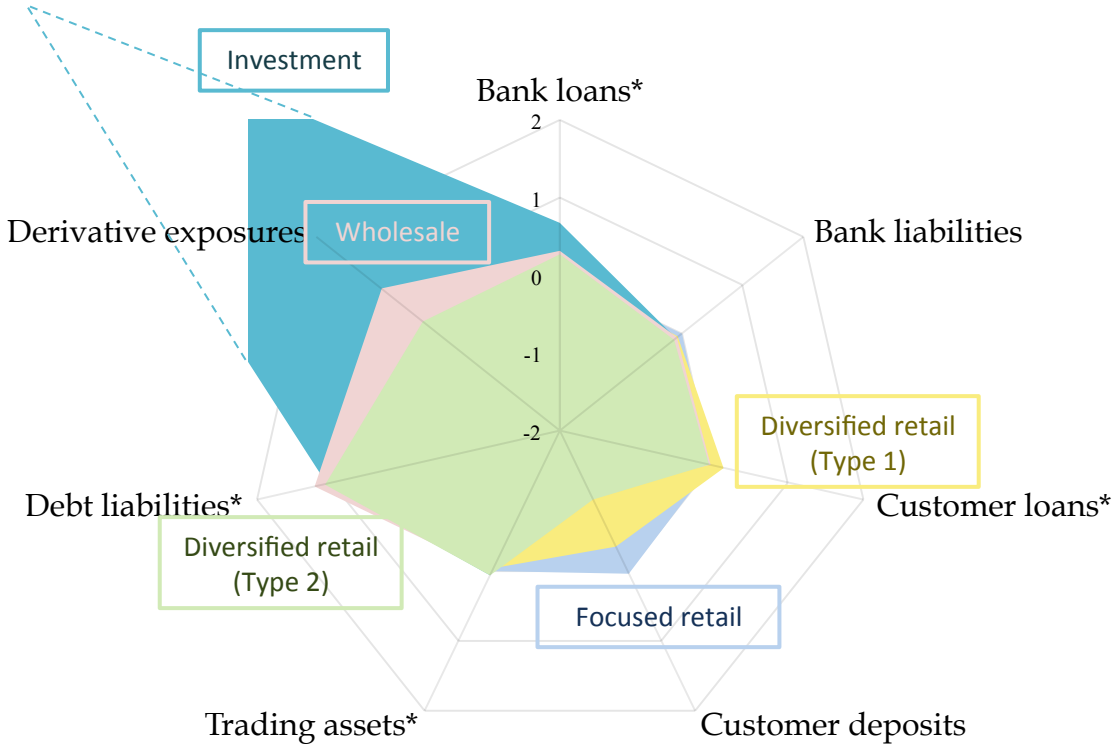
Standardized scores



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

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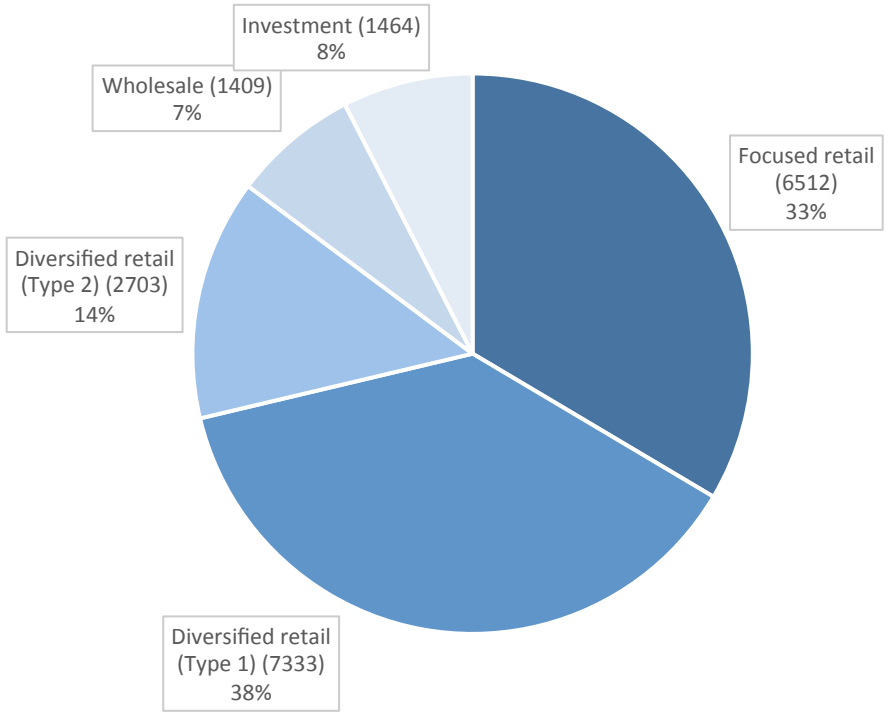
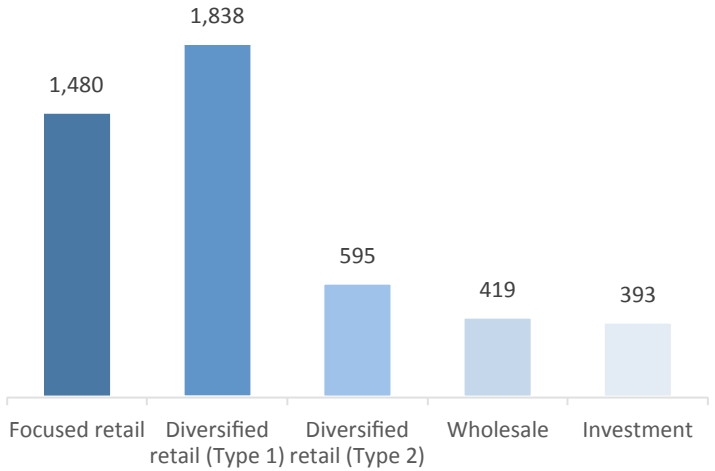
Observations by model (share in nr of obs)



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

Nr. of different banks by model



BMM and Size

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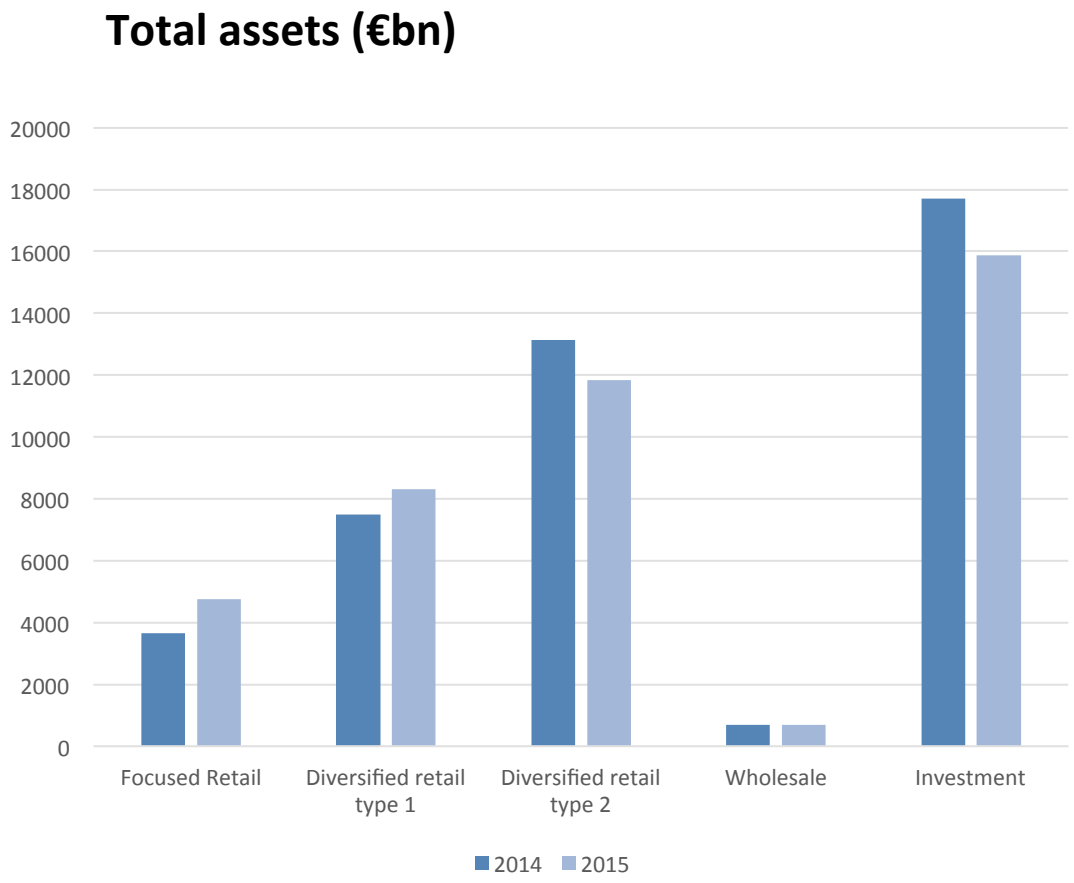

- Although small in number, investment largest in terms of assets
- The large flow from diversified retail (type 2) to diversified retail (type 1) resulted in substantial increase in assets

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