

Has the Relationship between Bank Size and Profitability Changed?

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Overview

1. What is the relationship between bank size and profitability?
2. Has this relationship changed over time?
3. What are the implications of the size-profitability relationship?
(How important is size?)





Motivation

- In recent years, community bankers and industry analysts have raised concerns that smaller community banks need to grow larger to be successful.
- While economies of scale do exist in banking, many other factors influence bank profitability.
- In order to thoroughly examine the size-profitability relationship, an analysis must account for these other factors.



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1. The Size-Profitability Relationship

How Does Profitability Vary with Size?

Size: Real Assets (Inflation Adjusted Total Assets)

Profitability: Return on Average Assets (ROAA)

Mean ROAA by Size Group

Size Group	Sample (2001-2014)	Pre-Crisis Expansion (2001-2006)	Crisis (2007-2009)	Post-Crisis Expansion (2010-2014)
Less than \$1 billion	0.77	1.01	0.50	0.59
\$1 - \$10 billion	0.86	1.34	0.15	0.78
Greater than \$10 billion	1.09	1.58	0.14	0.93





1. The Size-Profitability Relationship

Other Factors that Influence Profitability

- Size is not the only factor that affects profitability.
- Profitability depends on the characteristics of the individual bank and the market in which it operates.
 - *Bank-specific factors*: e.g. business strategy
 - *Market-specific factors*: e.g. local unemployment rate
- Need to control for these factors when analyzing the size-profitability relationship.



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1. The Size-Profitability Relationship

Data and Statistical Analysis

- Banks with real assets of \$100 billion or less that are at least 5 years of age during 2001-2014.
- Regression Analysis: Control for other factors
- List of Controls:
 - Loan to asset ratio, security to asset ratio, core deposit to deposit ratio, age, risk, subchapter S bank, rural bank, single-market bank, population level, unemployment rate, competition, GDP growth rate



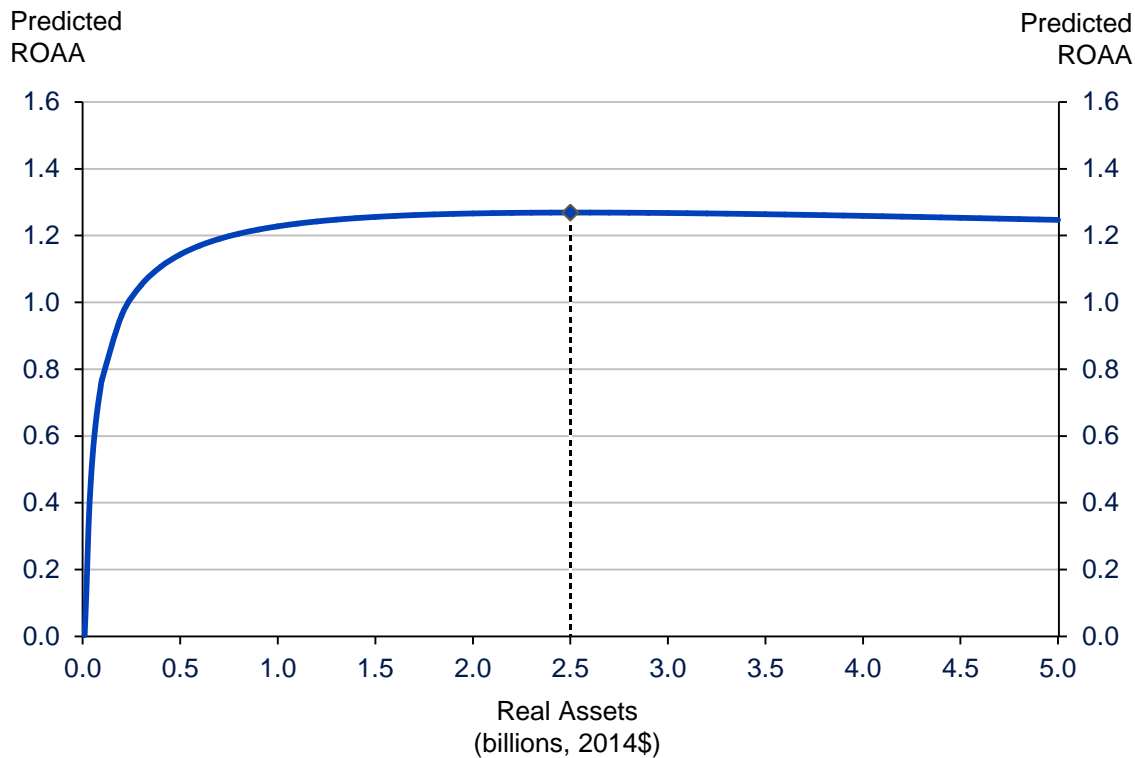
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1. The Size-Profitability Relationship

Estimated Size-Profitability Relationship: 2001-2014



The model supports the traditional view that there are economies of scale in banking, particularly for the smallest banks.

However, the advantages of growth become progressively smaller as size continues to increase.

Assuming bank-specific and market-specific factors are at their mean values, ROAA is maximized when real assets equal \$2.5 billion.





2. Has the size-profitability relationship changed over time?

- Estimated the relationship for the full sample (2001-2014).
- Examine how this relationship changes over two different periods:
 - Crisis (2007-2009)
 - Post-Crisis (2010-2014)



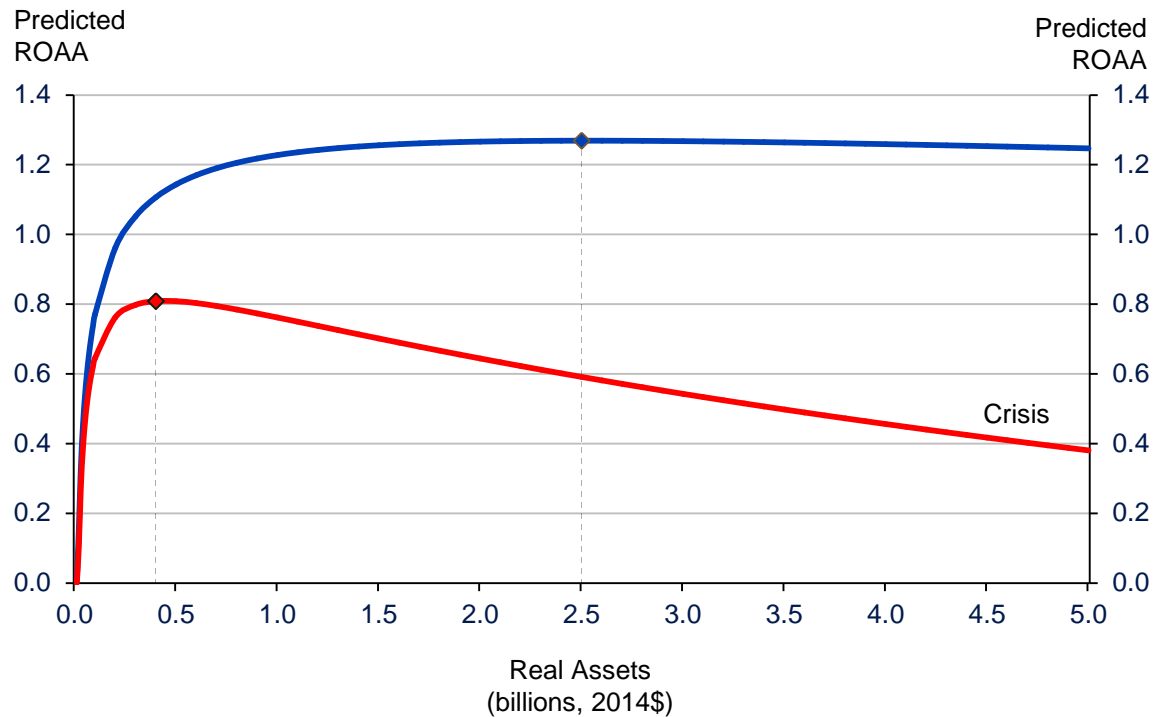
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2. Has the size-profitability relationship changed over time?

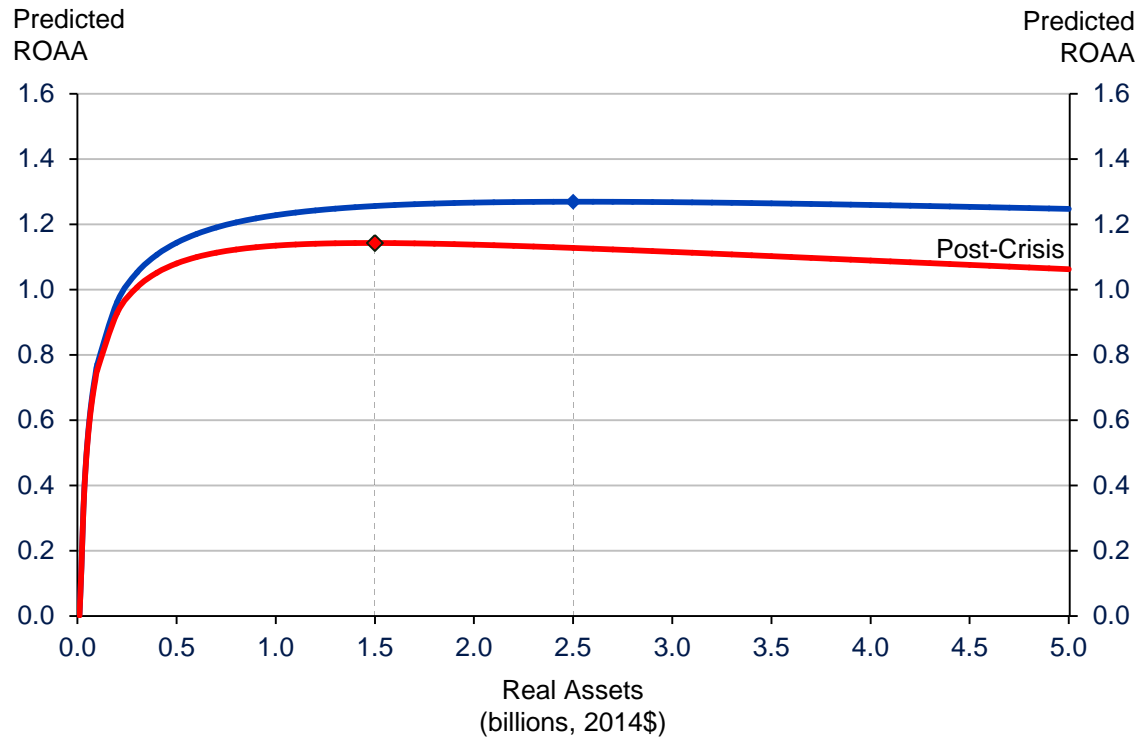
Crisis (2007-2009)





2. Has the size-profitability relationship changed over time?

Post-Crisis Expansion (2010-2014)





3. How important is size?

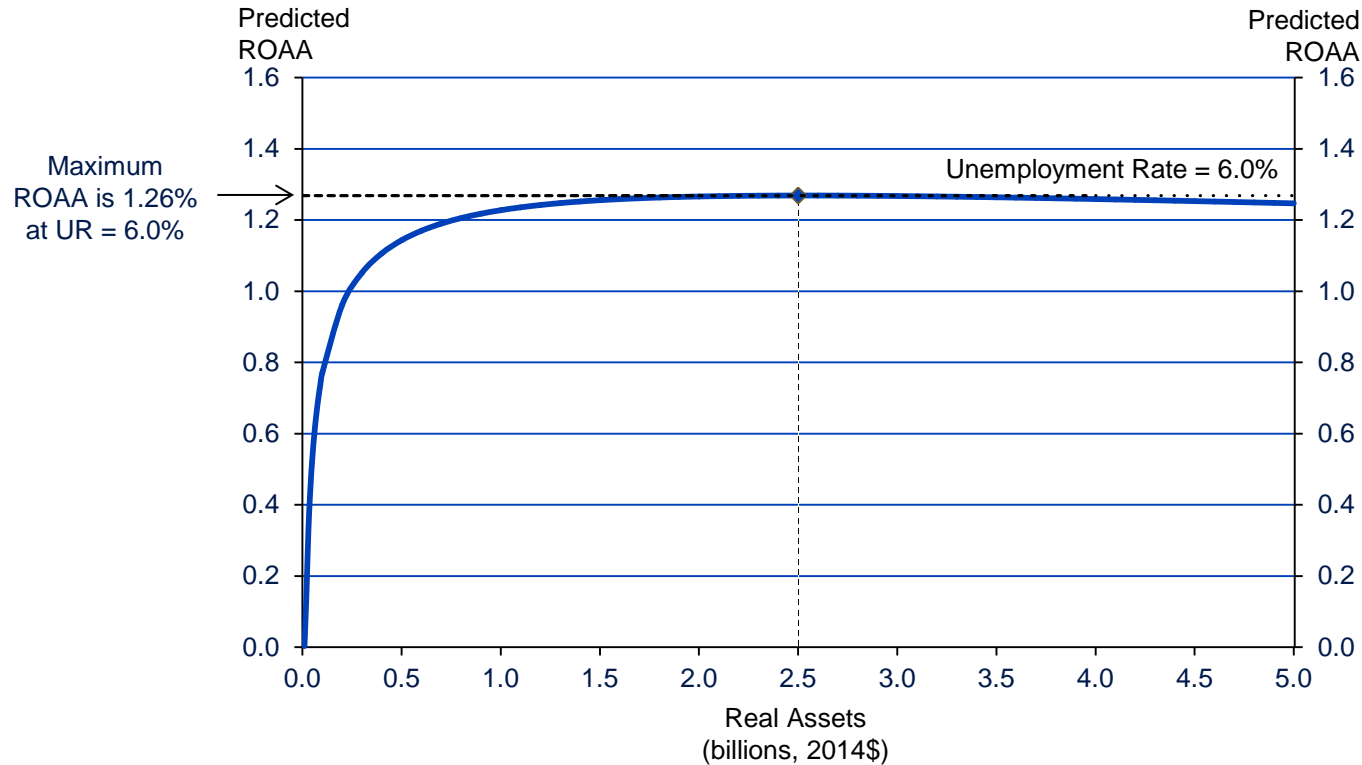
- Estimated how profitability varies with size.
- Relationship is fairly stable during non-crisis periods.
- But, how important is size relative to other factors that affect profitability?
 - One such factor is the local unemployment rate.
 - The predicted ROAA is at the mean value of the unemployment rate.
 - The mean local unemployment rate across the different markets is 6%.





3. How important is size?

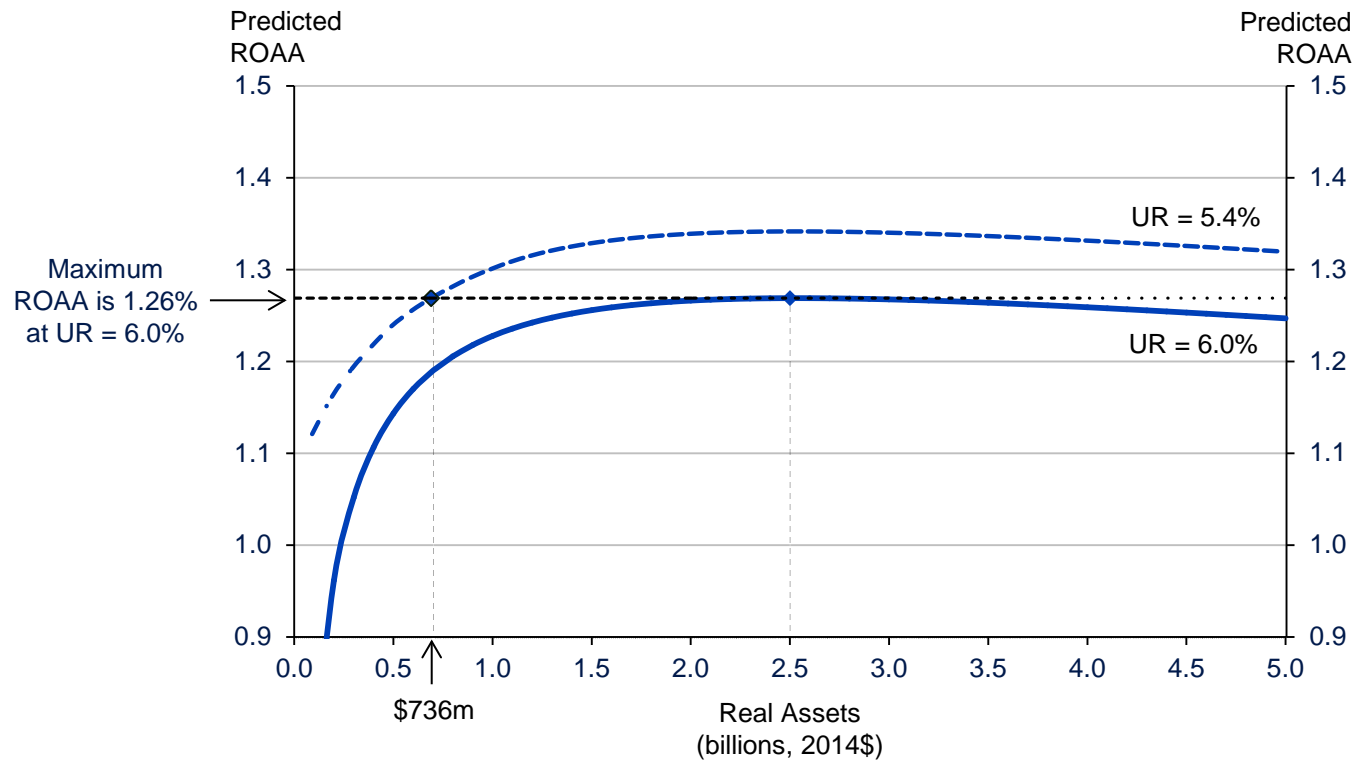
Predicted ROAA: Unemployment Rate at Mean Value





3. How important is size?

What if we lower the unemployment rate by 10%?





Conclusions

1. What is the relationship between bank size and profitability?
 - Increases with size at a decreasing rate with only modest increases in profitability at greater size.
2. Has this relationship changed over time?
 - Has remained relatively stable during non-crisis periods.
3. How important is size?
 - Other factors such as local economic conditions are at least as important to profitability as size.



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Further Research

- Does loan concentration (specialization in a given sector) affect the size-profitability relationship?



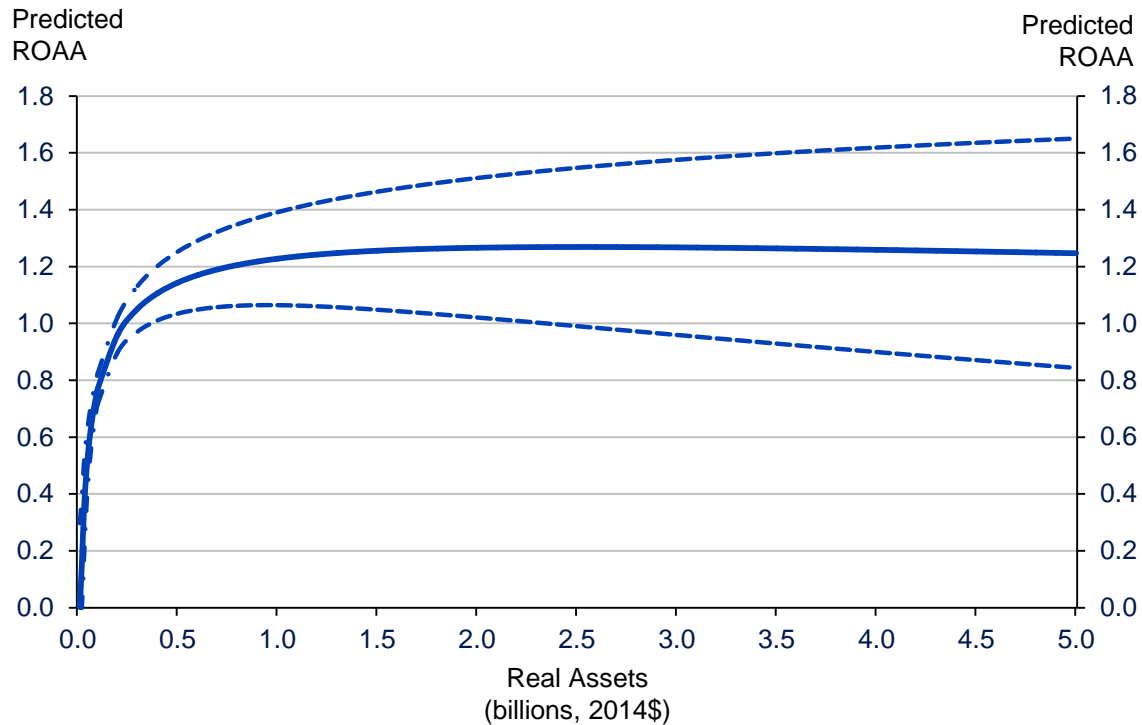
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Additional Slides

Predicted ROAA with 95% Confidence Interval





Additional Slides

Banks with Real Assets less than \$1B in 2014

