

Performance Comparisons across Merger Cohorts: U.S. Banking Industry

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- Previous literature
 - Impact on consumer welfare: positive in most markets (Dick (2002))
 - Effects on banking market structure, service (+) and performance (Dick (2006))
 - Little evidence of any reduction in competition
 - Gains from mergers are either small or non existent.
- Research Question: How merger outcomes differ between early and late mergers
 - What are timing-patterns of mergers?
 - What are driving factors of post-merger performance?

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- 4 Measuring Post-merger Performance with Accounting Data
- 5 Timing: Is there early-mover advantage?
 - Timing with size controls
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 - Measuring Bank-average Branch Performance
 - Measuring Non-branch-based Activities
 - Measuring Market Overlap

Industry Background

Major part of the U.S. economy. In 2007¹

- About 2 million employees
- Over 12 trillion dollars in total assets
- 5.5 trillion dollars of total domestic deposits

Underwent several regulatory changes

- The Riegle-Neal Interstate Banking and Branching Efficiency Act in 1994 (Riegle-Neal): permitted nationwide branching

Significant bank response to this regulatory changes

- The number of FDIC-insured commercial banks decreased from 10,717(94) to 7,350(07)
- The overall increase in Branches; 52,884(94) to 83,360(07)
- 386 mergers per annum; 134 interstate mergers among 476 (97)

¹FDIC *Quarterly Banking Profile*

- Sample period: July 1994-June 2006
- 6,205 mergers of all FDIC insured banks in the U.S.
- Merger characteristics from FDIC:
 - Year
 - Acquiring bank, target bank
- Bank level characteristics from Summary of Deposits and Call Reports:
 - ROA etc.

Definition of Timing

- Timing of mergers: based on the calendar years
 - Early mergers: July 1994 (94) - June 1998
 - Middle mergers: July 1998 (98) - June 2002
 - Late mergers: July 2002 (02) - June 2006
- Based on the above timing categories, define acquirers and targets as the status of the end of each timing category.
 - Strength
 - Weakness

Sample Construction

- These merger data matched with balance sheet and income statement data (Call Reports) and branch data (SOD).
 - Pre-merger accounting data
 - Retrospectively merged as of 94, 98, 02, i.e., pre-merger data related to merging entities in the early period are linked with Call + SOD data from 1994
 - Data loss due to unmatched targets: 966 (15.55 % of 6,206) obs. deleted
 - Data loss due to unmatched acquirers: 208 obs. deleted
 - The number of obs: 5,063
 - Post-merger performance data
 - Define the final year as the year in which the last merger done by an acquirer in each period occurred.
 - 2 years after the merger: Long-term post-merger performance (data loss occurred (88 obs.))
- The number of obs: 4,855 (acquirer-target-year)
- Re-organize the sample. The unit of an observation is one acquirer (acquirer-period; multiple targets are included).
- Sample size is 2,013.

Distribution of Mergers based in the Timing of Mergers

Period	N of Transaction	N of Acquirers
Early	2,161	788
Middle	1,686	665
Late	1,008	560
Total	4,855	2,013

Newly-Acquired Mergers

- Focus on newly-acquired mergers
- Linder and Crane (1992)
 - : important to distinguish between mergers of newly acquired banks and mergers of banks acquired earlier by the holding company
- Because one observation includes multiple targets, first I define the intraholding company merger for each target. An intraholding company merger is defined as a merger where the merging banks have been subsidiaries of the same holding company for at least one year prior to the merger. Otherwise, mergers are categorized as newly-acquired mergers.
- Newly-acquired sample
 - : include when all mergers done by an acquirer are newly-acquired mergers
- Final sample size: 1,214

Distribution of Mergers based in the Timing of Mergers

Period	N of Transaction	N of Acquirers
Early	827	478
Middle	774	387
Late	520	349
Total	2,121	1,214

Post-merger Performance

- Examine post-merger bank performance using ROA (Calomiris and Karceski (2000) etc.) as proxy for bank profits

$$\Delta Profitability = Profitability_{postmerger} - Profitability_{premerger}$$

- ROA = Net Income divided by Gross Total Assets
 - GTA is superior to Total assets because GTA does not depend on the performance status of the assets (Berger and Mester 2003)
 - Weighted avg. Pre-merger ROA

Accounting Problem of Measuring Profitability

- Two methods for business combinations
: purchase accounting versus pooling-of-interests
- In purchase accounting, all the assets of the target bank have to be marked to market before they are combined with the acquiring bank's assets, including the target bank's premises and equipment
 - Goodwill (an intangible asset)
: the difference bet. the purchase price and the revised book value of target bank's equity
 - All intangible assets must be amortized and expensed per GAAP
- Both the stock of bank premises and the stock of intangible assets for the surviving bank would likely be higher than those of the combined total of the acquirer and target before the merger due to purchase accounting alone
- Kwan and Wilcox (1999): hidden cost savings

Suggested Remedy

- Use pre-merger assets instead of post-merger assets, i.e. the same denominator both before and after the merger, only the numerator

Empirical Specification

- Designed to investigate how the timing of a merger relates to the change in profitability after the merger
- The regression model:

$$\begin{aligned} \Delta Profitability &= \beta_1 Early + \beta_2 Middle + \beta_3 Late & (1) \\ &+ RegionFixedEffect + \epsilon \end{aligned}$$

where

$$\begin{aligned} \Delta Profitability &= Profitability_{postmerger} - Profitability_{premerger}; \\ Early, Middle, Late &= \text{Timing indicators}; \\ \epsilon &= \text{Random disturbance}; \\ Region &= \text{States in which trgt and acqr operate}; \end{aligned}$$

Result: Is there early-mover advantage?

OLS Regression on the Change in ROA 2yrs after the merger

Variable	Estimated Coefficient	
	Fixed ROA	
Early	0.00333107	***
	(0.0006)	
Middle	0.00294382	***
	(0.0007)	
Late	0.00261407	***
	(0.0008)	
Region F.E.	Yes	
R-squared	0.11753768	

Std errors in parentheses; *** significant at $p=0.01$; ** significant at $p=0.05$

- Coefficients are significantly positive
- But, not significantly different from each other
- No early-mover advantage
- No learning effect

Result: Timing with size controls

OLS Regression on the Change in ROA 2yrs after the merger

Variable	Estimated Coefficient	
	Fixed ROA	
Early	0.00326758	***
	(0.0008)	
Middle	0.00285703	***
	(0.0009)	
Late	0.00248196	**
	(0.0010)	
Size Controls	Yes	
Region F.E.	Yes	
R-squared	0.12044214	

Std errors in parentheses; *** significant at $p=0.01$; ** significant at $p=0.05$

- Previous result still holds
- Coefficients of size controls are all insignificant
- Size has no significant impact on merger performance

Determinants of Bank Performance

- An overall strategy of banking organizations involves both branch-based and non-branch-based activities
- Mergers
 - Expansion of branch networks, so focus on profitability of branches
 - Geographic diversification or in-market?
- Ex-ante sources of change in ROA after a merger
 - Branch-related performance measure: core deposits-per-branch, premises-per-branch, branches per dollar of assets
 - Non-branch-based: non-deposit fee income ratio

Core deposits-per-branch

- One of key function of a branch is to collect deposits
 - : all else equal, the higher the level of deposits held at a branch, the more profitable the branch, as the fixed costs of branch operation can be spread across a wider deposit base(Orlow et al. (1996))
- Various ways of calculation of deposits-per-branch
 - Total domestic deposits
 - : the aggregate of transaction (checking), savings, and large and small time deposits
 - : the most straightforward, but biased (overstate)
 - Non-head office deposits (Hirtle (2007))
 - : remove 'head office' branches that appear to have large volumes of non-retail deposits
 - Core deposits
 - : total domestic deposits minus all time deposits greater than \$100 thousand
 - : relatively inexpensive and stable funding source
 - : held by customers likely to purchase additional products form the bank

- (Cost) Efficiency (of a bank) Measures
 - Efficiency Ratio (Calomiris and Karceski(2000))
 - : $\text{noninterest expense} / (\text{interest income} + \text{noninterest income} - \text{interest expense})$
 - : physical efficiency measure, bankers' use
 - NIE ratio (Peristiani (1997))
 - : $\text{noninterest expense} / \text{total assets}$
 - : traditional operating costs measure
 - Noninterest expense
 - = salaries and employee benefits + expenses of premises and fixed assets + other noninterest expense
 - Premises and fixed assets: occupancy and equipment expenses
 - Other noninterest expense: most affected when try to reduce overhead costs
- Definition
 - Expenses of premises and fixed assets divided by the number of branches

- Definition

- The number of branches is highly correlated with institution size
- One of proxies of institutional scale is total assets
- Branches per billion dollars of assets
: the number of branches divided by total assets (Hirtle and Stiroh (2007))

- Meaning

- A key retail banking delivery channel, physical capital
- Bricks-and-mortar branches are a comparatively expensive means of delivering retail financial services, particularly deposit-based services (Orlow et al. (1996)).

Non-deposit Fee Income Ratio

- Fee generating from non-traditional banking (investment banking, securities brokerage, insurance activities, merchant banking)
- Non-interest income now accounts for nearly half of all operating income (DeYoung and Rice (2004))
- Definition
 - Non-deposit fee
= non-interest income – service charges on deposit accounts in domestic offices
 - Total income
= total interest income + non-interest income
 - Non-deposit fee income ratio
= Non-deposit fee divided by total income

Market Overlap

- Cost savings and market power depends on the geographical overlap of markets between the acquirer and the target
- Mixed results on post-merger performance
- Houston and Ryngaert (1997), Houston et al. (2001)

$$\text{MarketOverlap} = \frac{\sum_{i=1}^{51} \min(N.Br.Acqr_i, N.Br.Trgt_i)}{\sum_{i=1}^{51} (N.Br.Acqr_i + N.Br.Trgt_i)}$$

Result: Sources of Performance Improvement

OLS Regression on the Change in ROA 2yrs after the merger

Variable		Estimated Coefficient	
		Fixed ROA	
Trgt Br. Rev	-0.00766472 (0.0297)		Trgt Fee Inc. -0.0100186 (0.0108)
Acqr Br. Rev	0.029725 (0.0076)	***	Acqr Fee Inc. 0.02394914 (0.0044)
Trgt Br. Cost	-0.00006055 (0.0006)		Trgt Br. Int. 0.00013021 (0.0000)
Acqr Br. Cost	-0.00213275 (0.0004)	***	Acqr Br. Int. -7.99E-06 (0.0000)
Mkt Overlap	-0.00073001 (0.0019)		
Region F.E.			Yes
R-squared			0.16447965

Std errors in parentheses; *** significant at p=0.01; ** significant at p=0.05

Implication: Sources of Performance Improvement

- Robustness of results:
 - hold even when including timing dummies and size controls
 - Implications
 - Acquirer's pre-merger business ability matters
 - Target's pre-merger business ability does not matter
 - But, branch network of the target has significant impact on merger performance
 - Branch network refers to extent physical capacity of a bank
- ⇒ "Good foods is made better with good wine and good wine is made better with good food"
- Assortative Matching (Rhodes-Kropf and Robinson(2008))
 - Like-buys-like
 - Asset complementarity determines how surplus is created
 - Mergers will create greater surplus if the partners are a 'better match' along one or more dimensions