

Persistence and Profitability of New Jersey Community Banks

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The declining number of community banks and increased deposit concentration among larger interstate institutions have raised regulatory concerns about the impact on competition within the banking sector. This investigation tests whether the presence of out-of-state and large in-state banks operating within the county where a New Jersey community bank is headquartered has a positive or negative impact on their profitability and deposit rates. A panel dataset of 66 long-lived New Jersey community banks is used in this study. The empirical results suggest that the presence of large, non-domiciled banks depressed both community bank profitability and interest rates paid to depositors. Factors that exerted a positive impact on community bank profitability included the Herfindahl-Hirschman index of deposit concentration in a bank's home-office county as well as community bank size and retained earnings. Community bank profitability also benefited from a lower unemployment rate in the county where they are headquartered. However, a higher statewide share of deposits had a negative impact on profits, suggesting a trade-off between growth and profitability. Community bank deposit rates were negatively associated with deposit concentration but positively associated with community bank size and branch shares as well as a lower home-county unemployment rate. Although the presence of large out-of-state banks depressed rates paid to community bank depositors, the impact diminished as their presence increased.

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Keywords: Community Banks; Competition; Profitability

1. Introduction

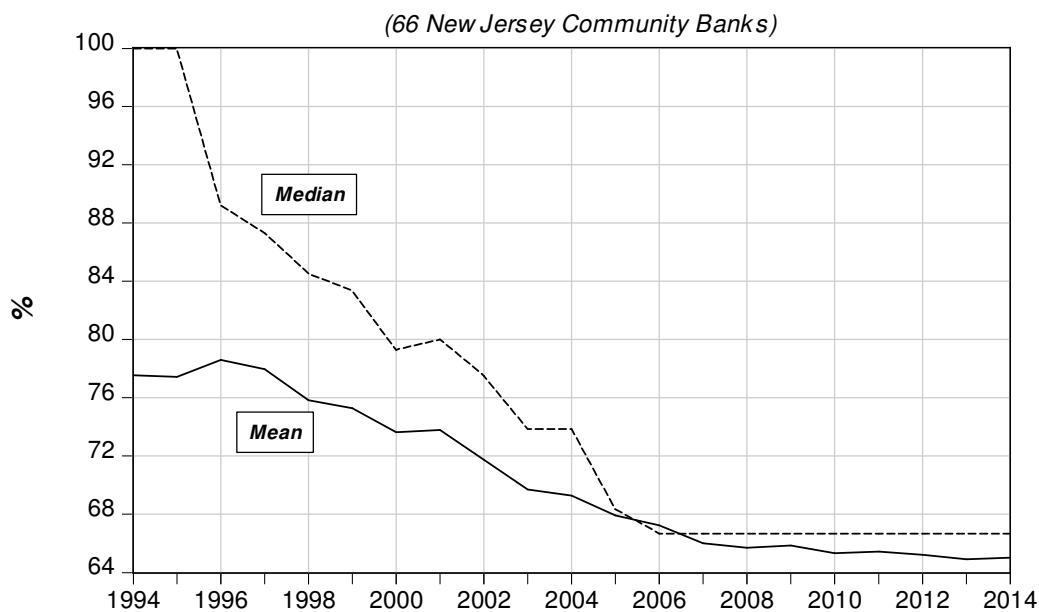
Community banks are facing a host of technological and competitive challenges that could threaten their continued viability. While Internet-based banks as well as national and regional institutions have made significant advances in the provision of mobile and on-line banking services, community banks continue to rely largely upon bank tellers and loan officers to procure deposits and issue loans. The expense, production, and distribution advantages from cybernetic banking as well as increased consolidation and geographic reach of the largest banks pose additional threats to smaller banks.¹ Community banks with limited opportunities for deposit and asset growth will likely face added competitive pressures to merge or be acquired by larger institutions who also face regulatory limits.²

¹ DeYoung et. al. (2007) found that a banking transaction performed on the Internet cost about a penny versus a little over a dollar at a bank branch.

² Under 12 U.S.C. 1842 (d) of the Riegle-Neal Act of 1994, a bank's share of FDIC-insured deposits cannot exceed 10% of the national total and 30% within any individual state. However, a bank can exceed the 10% threshold if increased deposits are due to organic growth or by acquiring a failing or

A more optimistic analysis was presented in an FDIC study that challenged the notion that size, cost and productivity improvements by national and regional institutions have permanently disadvantaged community banks. For example, the majority of community banks that operated continuously from 1985 through 2011 had assets under \$200 million with about 85% having assets under \$500 million. The authors concluded that the most efficient size for a community bank lies between \$100 and \$500 million of assets. (Jacewitz and Kupiec, 2012, p. 1). Nevertheless, efficient community banks have remained competitive – especially in rural areas - such that deposit shares in rural counties for the largest and smallest banks remained stable between 2001 and 2012 (Gilbert and Wheelock, 2013).

Figure I - Percent of NJ Bank Branches Located in Home (HQ) County



SOURCE: FDIC.gov - Summary of Deposits (SOD)

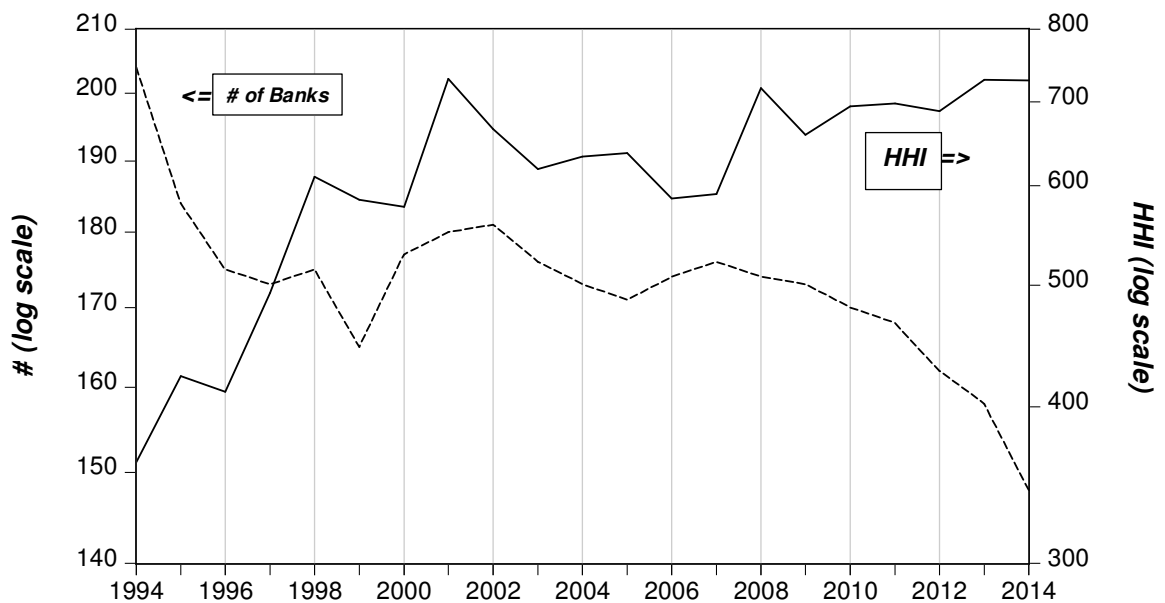
The persistence of community banks has been attributed to local informational advantages derived from longstanding customer relationships and detailed knowledge about specific businesses and local economic conditions. Community banks have also responded to the increased presence of large national and regional competitors by expanding their geographic reach outside their home-county market. For example, in 1987 nearly four fifths of US community bank branches were located in a single county with nearly all the remaining branches located within a three-county area. By 2011, just under half of all branches were located in a single county, however, just over 80% were located in three counties or less (FDIC, 2012, p. 3-3). Figure I shows the time path for the median and mean values of the share of New Jersey (NJ) community bank branches

a non-commercial entity (e.g., a Savings and Loan institution). The Act also allowed states to change or abolish the 30% statewide deposit cap which several states have done.

located in the home-office county: In 1994, over three quarters of bank branches were located in the headquartered county; by 2014, the mean and median values had dropped to about two thirds.³

Nevertheless, both state and federal banking regulators remain concerned about the growing presence of large banks headquartered outside an individual state while the number of in-state community banks decline. This is especially true in a densely populated state such as NJ that has historically been served by a range of different sized banks. Figure II displays the secular decline in the number of NJ banks from 204 in 1994 to 148 in 2014 while the state's Herfindahl-Hirschman index (HHI) of deposit concentration rose from 361 in 1994 to 728 in 2014.⁴

Figure II - Number of NJ Banks vs. NJ Herfindahl-Hirschman Index



SOURCE: FDIC.gov - SOD

Table 1 shows a similar pattern of decline in the number of banks and increased concentration across states with large populations including California, Florida, Illinois, New York, and Texas. Although the long-term point increase in the HHI in each state exceeded the Department of Justice's +200-point threshold (that might prompt a challenge to bank merger applications), every state's HHI in 2014 was well below the HHI value of 1,800 that would indicate a concentrated banking market (FRB Kansas City, 2008).

³ The sample includes all NJ community banks whose branches are limited to the state and appear in every year (1994-2014) of the FDIC Deposit Market Share Reports database.

⁴ See FDIC.gov\Industry Analysis\Bank Data & Statistics\Deposit Market Share Reports\Pro Forma\New Jersey\All Counties.

Table 1: Number of Banks and HHI Indices for Selected States

	California		Florida		Illinois		New Jersey		New York		Texas	
	#	HHI	#	HHI	#	HHI	#	HHI	#	HHI	#	HHI
1994	528	759	462	320	1124	137	204	361	332	464	1061	390
2014	256	1,142	267	773	590	642	148	728	221	1522	579	883
Loss/Gain	(272)	384	(195)	453	(534)	505	(56)	367	(111)	1059	(482)	493
Comp.												
Gr. Rate	-3.6%	2.1%	-2.7%	4.5%	-3.2%	8.0%	-1.6%	3.6%	-1.6%	6.1%	-3.0%	4.2%

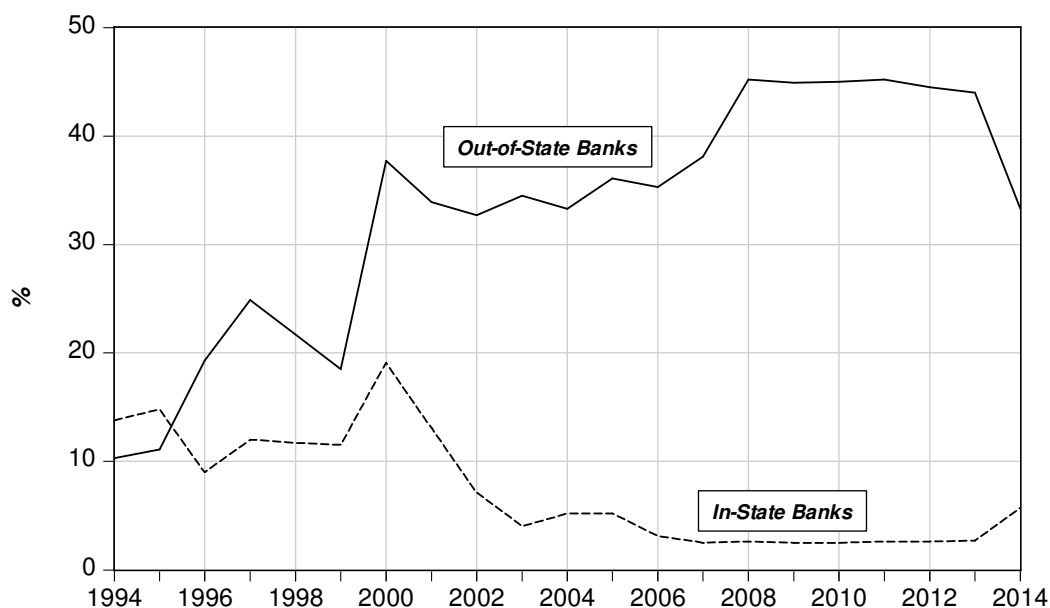
SOURCE: FDIC.gov - Summary of Deposits

Banking authorities seeking to promote competition within their jurisdictions are interested in understanding the mix and operating characteristics of out-of-market institutions, deposit concentration, and macroeconomic influences upon local community bank profitability. This is particularly true for older community banks who lend mostly to small businesses and local residents such that their diminution could curtail credit availability or affordability to these types of customers. These trends also underscore the need to monitor competitive conditions both within and across individual states.

This paper seeks to understand whether the increased concentration of bank deposits and presence of both large in- and out-of-state banking institutions in NJ have had a deleterious impact on community bank profitability as well as rates paid to depositors. Figure III displays the notable increase in the share of NJ bank branches owned by banks with at least \$10 billion in assets.⁵ A panel econometric model specification will be employed to test hypotheses about the impact of different-sized banks that are headquartered inside and outside NJ on the profitability of the state's long-lived community banks. The model will also control for county-level deposit concentration, community bank size, retained earnings, statewide deposit share, and share of community bank branches located in their home county; a similar specification will be used to model rates paid to depositors. Finally, since the time series data used in the econometric analyses span parts of three complete business cycles (1994-2014), the county unemployment rate is introduced as a macroeconomic determinant of banking profitability. Prior studies have found that bank profitability is pro-cyclical where economic measures such as real GDP growth (Albertazzi and Gambacorta, 2009) as well as population and income were found to have a significant impact on bank returns (Hannan and Prager, 2009).

This paper is organized as follows: Section 2 contains the literature review followed by the model description and a priori reasoning (section 3); the descriptive statistics and results from the return-on-equity (ROE) and return-on-asset (ROA) panel econometric models (section 4); deposit rate models and results (section 5) and conclusions and implications (section 6).

⁵ Park and Pennacchi (2009) assume that any bank with more than \$10 billion in deposits operates in more than one market.

Figure III - Share of NJ Branches Owned By Banks: > \$10 Bil. Deposits

SOURCE: FDIC.gov - SOD

2. Literature Review

Community banks that operate in local markets typically have a number of competitive advantages over larger competitors who operate in many markets. First, local banking institutions generally have more stable net interest margins because they fund loans with low-turnover "core" deposits that are generally inelastic to rate changes.⁶ A second advantage is that community bank managers have lower monitoring costs because of their close physical proximity to, and detailed knowledge about borrowers and depositors. Loan officers that have banking relationships with borrowers are better able to obtain and assess "soft" information, especially regarding small business loans and lines of credit (Stein, 2002). Berger, Bouwman, and Kim (2017) found that community bank comparative advantage exhibits a counter-cyclical pattern by providing "liquidity insurance to relationship borrowers" during recessions (p. 3416). Thirdly, smaller banks are generally less complex to manage compared to larger institutions because pricing decisions about deposits and loans can be quickly implemented, monitored and revised based on market outcomes. Finally, compensation and other input costs tend to be relatively lower at community banks compared to larger institutions. In this way, efficient management, rather than market share growth is an important strategic competitive advantage of community banks (DeYoung, Hunter, and Udell, 2004).

⁶ Cyree and Spurlin (2012) observe that large banks pay a premium to acquire banks with a significant amount of core deposits.

Alternatively, there are a number of reasons why large banks with a significant interstate presence are likely to have advantages that impinge on community bank growth and profitability. A banking organization with a large network of branches and a significant on-line presence can efficiently offer a broad range of personal and commercial banking products to achieve a highly diversified base of deposits and loans. Mobile banking and other internet-based service platforms can provide additional economies of scope and scale that can enable greater loan diversification as well as reduced variable and fixed expenses. Money-center banks with access to low-cost wholesale and international short-term funding is an additional option to control interest expenses. Park and Pennacchi (2009) found that large banks with lower interest costs over smaller competitors will offer both lower deposit and loan rates to their customers.

Hannan and Prager (2009) observed that banks with a diverse geographic presence tend to offer lower deposit rates due to either lower funding costs or the provision of highly valued products to a niche set of customers in a given market. However, they also acknowledged that lower wholesale funding costs result in lower rates paid to depositors which is also "consistent with the hypothesis that operation in several local markets entails less efficiency in the provision of retail deposit services" (p. 265). Furthermore, the presence of large banks in single-market bank territories reduce the latter's sensitivity in pricing deposits due to market concentration (Hannan and Prager, 2004, 2009; Hannan, 2006). Radecki (1998) and Heitfield (1999) both found that banks that operate across different markets in a given state offered the same interest rates on deposits. Thus, the presence of outside-market competitors is likely to make community banks deposit and loan rates less sensitive to market concentration. The weakening of the expected positive association between pricing power and market concentration could therefore occur independently of the size of a community bank's competitor or its cost advantage.

Park and Pennacchi (2009) analyzed how in unconcentrated markets for deposits, the presence of large multi-market banks with lower funding costs could raise a community bank's profitability if these larger institutions did not aggressively compete for local deposits. However, they also recognized that community banks operating in concentrated markets could be hurt if multi-market competitors with lower funding and lending rates decide to aggressively compete on price. The profitability of community banks could therefore be either positively or negatively associated with the presence of larger statewide or out-of-state banks.

Berger et al. (2007) undertook a comprehensive analysis of small single-market community bank profitability across the US banking sector with special focus on urban areas from 1982 through 2000. They aggregated county deposit share data into MSA and non-MSA locations in order to calculate the impact of market shares for large multi and single-market banks as well as small multi-market institutions on the profitability and cost efficiency of small community banks. The authors also included a measure of bank-level technological change and found that "on net, technological progress allowed

large, multimarket banks to compete more effectively against small, single-market banks in the 1990s than in the 1980s." (p. 349) While the presence of large multi-market bank increased community bank profitability in the first period, it had a negative impact in the second.⁷ Moreover, Berger et. al (2007) controlled for survivorship bias by modeling only those community banks that appear for at least 5 years in both periods. The results were consistent with the full-sample estimates demonstrating how technology gave a significant competitive edge to large-market bank lending during the 1990s.

Retained earnings also play a positive role in funding asset growth to increase community bank profitability. Between 1985 and 2011, community banks retained nearly three-fifths of their profits with mortgage and commercial real estate lending specialists retaining 68.9% and 58.2% of net income, respectively (FDIC 2012, p. 6-6). Community banks headquartered in metropolitan counties retained about 60% of net income in order to fund a higher rate of asset growth during this period (ibid., p. 6-7). Goodard et. al. (2004) analyzed the dynamic linkages between growth and profitability among European banks and confirmed that retained earnings are a "principal source of capital" to meet regulatory standards as well as to fund the growth of risky portfolio assets. (p. 1071).

Market (deposit) share is another determinant of community bank profitability. Several studies have included a community bank's statewide share of deposits to explain return on equity (ROE). Berger (1995a) included a one-year lag on market share as a control variable in multivariate Granger Causality tests between ROE and the capital-to-asset ratio. Theoretically, a bank with greater market power, should have higher earnings for reasons associated with superior efficiency (Smirlock, 1985; Demsetz, 1973) and thus a positive coefficient on lagged market share is expected. However, the coefficient on lagged market share was consistently negative and significant over several specifications.⁸ Goodard et. al. (2004) attribute the negative coefficient on the market share variable in their dynamic panel profit regressions where high profits stimulate future growth which increases competition and reduces future profits. Fillbeck, Preece, and Zhao (2012) also found a negative association between both the level and change in a community bank's market share and subsequent profit rate. Community banks may be more willing than larger institutions to trade-off market growth for increased profitability due to better management (DeYoung, Hunter, and Udell, 2004).

Hannan and Prager (2009) included the share of a community bank's branches in their profit equation to control for "bank-specific market power" (p. 267). They found

⁷ Although the net interest margin of community banks consistently exceeded that of non-community banks from 1985-2011, the latter group's return on assets have been greater due to a higher share of non-interest income from trading activities and other income sources (FDIC, 2012, p. 4-3).

⁸ In tests of the market power and efficient-structure hypotheses in banking, Berger (1995b) continued to find a negative association between profitability and market share for some years.

a significant positive impact on profitability for small banks located in urban markets but not in rural markets.

3. Modeling Community Bank Profitability

The econometric specification of community bank profitability draws upon the theoretical model of competitive interactions between large multi-market and small local-market banks described in Hannan and Prager (2009) and Park and Pennacchi (2009). Their paradigm of bank competition assumes that small banks set deposit and loan rates according to competitive conditions in a single local market. Large banks who operate across geographically diverse markets with different funding and operating costs, prefer to standardize rates, products, and services to minimize administrative complexity while maximizing economies of scale and scope. Park and Pennacchi formally show how a market comprised of both large multi-market banks and small local banks can establish Bertrand-Nash equilibrium loan and deposit rates that depend not only on the degree of deposit concentration but also on the presence of larger banks. An increased presence of these larger banks is associated not only with more competitively priced retail loan rates but also lower rates paid to retail depositors. The net impact on a community bank's profit rate from the presence of a larger multi-market bank in its primary market will depend upon the relative magnitudes of each effect. The panel econometric specification is as follows:

$$\begin{aligned} \text{PROF}_{it} = & \beta_0 + \beta_1 \text{HHI}_{ct} + \beta_2 \ln\text{ASSETS}_{it-1} + \beta_3 \text{RETRNEQ}_{it-1} + \beta_4 \text{LRGOUTNJ}_{ct-1} + \beta_5 \\ & \text{LRGNJ}_{ct-1} + \beta_6 \text{SMLOUTNJ}_{ct-1} + \beta_7 \text{HHI}_{ct} * \text{LRGOUTNJ}_{ct-1} + \beta_8 \text{HHI}_{ct} * \text{LRGNJ}_{ct-1} \\ & + \beta_9 \text{HHI}_{ct} * \text{SMLOUTNJ}_{ct-1} + \beta_{10} \ln\text{ASSETS}_{it-1} * \text{LRGOUTNJ}_{ct-1} + \beta_{11} \ln\text{ASSETS}_{it-1} \\ & * \text{LRGNJ}_{ct-1} + \beta_{12} \ln\text{ASSETS}_{it-1} * \text{SMLOUTNJ}_{ct-1} + \beta_{13} \text{RUNC}_{ct-1} + \beta_{14} \text{MKTSHR}_{it-1} \\ & + \beta_{15} \text{BRSHR}_{it-1} + u_{it} \end{aligned} \quad [1]$$

where PROF is net income divided by net worth (or assets) for the i^{th} NJ community bank in the t^{th} year. HHI is the Herfindahl-Hirschman index (HHI) for the c^{th} NJ county where a bank is headquartered in the t^{th} year (HHI values are normalized to take on values between 0 and 1). The lagged value of the natural log of a bank's total assets, $\ln\text{ASSETS}_{it-1}$ is used to control for bank size. The lagged ratio of retained earnings to bank equity, RETRNEQ_{it-1} will be used to control for the impact of internal accumulation on profitability. To control for competitor size and geographic orientation, LRGOUTNJ_{ct-1} denotes the share of bank branches in a NJ county belonging to an out-of-state (i.e. non-resident) bank with deposits greater than \$10 billion, lagged one year; LRGNJ_{ct-1} is the share of branches in a NJ county belonging to a bank that is headquartered in NJ with assets greater than \$10 billion; and SMLOUTNJ_{ct-1} is the share of branches belonging to a non-NJ bank with deposits under \$1 billion. RUNC_{ct-1} is the lagged value of the civilian unemployment rate for the NJ county where a community bank is headquartered. MKTSHR_{it-1} is the community bank's statewide share of NJ deposits and BRSHR_{it-1} is the lagged value of a community bank's share of branches in its home county; u_{it} is the panel residual error term.

The expected positive association between profitability and market concentration is a core proposition in the structure-conduct-performance theory of industrial organization (Tirole, 1994). A NJ county with a high HHI will have relatively less competition and thus higher community bank returns such that $\beta_1 > 0$. Berger, Bowman, and Kim (2017) found that increased deposit concentration is associated with greater financing constraints in a given county. Bank size is proxied by the natural log of total bank assets and should be positively related to profitability such that $\beta_2 > 0$. Retained earnings as a share of net equity are a significant source of internally financed growth and thus should have a positive expected sign such that $\beta_3 > 0$.

The expected sign on the share of branches owned by both large (β_4) and small (β_6) non-resident banks as well as large NJ banks (β_5) is difficult to predict. Park and Pennacchi (2009) found that large, multi-market banks tend to offer depositors lower savings rates and borrowers lower lending rates. Thus, a community bank with more competitively-priced deposit offerings could generate additional loan volume and higher revenues. On the other hand, an increased presence of large banks who offer lower mortgage rates would reduce community bank loan income and profits. Thus, the outcome on community bank profitability depends upon the balance between the two effects.

The interaction variables between the HHI index and the share of branches owned by different sized banks that are headquartered outside of NJ (β_7 $HHI_{ct} * LRGOUTNJ_{ct-1}$; β_9 $HHI_{ct} * SMLOUTNJ_{ct-1}$) are included to account for the possibility that these banks will price their products with respect to competitive interactions between market concentration and the size of the competitor. The signs on β_7 and β_9 are expected to be negative because their presence will cause NJ community bank deposit rates to rise by less, and their loan rates to fall by more as market concentration increases (Park and Pennacchi, 2009). Thus, the increased presence of out-of-state banks is expected "to reduce the strength of the relationship between local market structure and firm performance" (Hannan and Prager, 2009, p. 266). On the other hand, the expected sign on β_8 ($HHI_{ct} * LRGNJ_{ct-1}$) is expected to be ambiguous because large NJ banks are inherently exposed, and subject to changes within the state's market environment.

The interaction between the natural log of a community bank's assets with the share of branches belonging to large and small non-resident and large resident NJ banks is included to control for the possibility that the impact of different size competitors on community bank profitability could vary with community bank size. For example, profitability could be either positively or negatively affected by differences in efficiency, product offerings, and/or other unmeasured factors associated with size. Thus, the expected signs for β_{10} , β_{11} , and β_{12} are ambiguous (Hannan and Prager, 2009).

The importance of local, regional, and national economic activity to influence community bank profitability has been widely noted in the literature. Residential and commercial construction as well as automobile and consumer durable sales all depend upon the ready availability of bank financing. As has been noted, specific measures have been used to capture the impact of economic factors on bank profits including

aggregate economic growth as well as population and personal income. For example, Berger, Bouwman, and Kim (2017) include the county unemployment rate in their model of rural bank comparative advantage which increased by about 40% during periods of poor economic performance. Thus, the lagged unemployment rate in the county where a NJ community bank is headquartered ($RUNC_{ct-1}$), is included to account for the cyclical impact of economic fluctuations on banking profitability. An inverse relationship is expected between the unemployment rate and a community bank's profit rate such that $\beta_{13} < 0$.

A community bank's share of statewide deposits, $MKTSHR_{it-1}$ could be positively or negatively related to profitability. If bank managers seek to grow deposits to fund new loans, then β_{14} is expected to be > 0 . The presence of large banks with access to cheaper deposits would reinforce this effect because they will not compete aggressively for smaller bank deposits (Park and Pennacci, 2009, p. 34) However, deposit growth could come at the expense of profitability, especially if they expand into new geographic markets with more competitive (i.e., lower) loan rates. Thus, there could be a significant trade-off between growth and profitability and thus a negative relationship could be expected (DeYoung, Hunter, and Udell, 2004; Goddard et. al., 2004;).

The lagged share of bank branches wned by a NJ community bank in its home county, $\beta_{15} BRSHR_{it-1}$ is expected to be positively related to profitability due to a greater presence and visibility in their primary market. Alternatively, increased costs associated with servicing a larger branch network could lower profits and lead to a lower return on equity. Thus, the expected sign on this variable could be either positively or negatively associated with profitability.

4. Descriptive Statistics and Econometric Results

The mean panel values and sample sizes for the dependent and explanatory variables for the full sample from 1994-2014 as well as for two sub-periods (1994-2003; 2004-2014) are displayed in Table 2. For most values, there is an increase during the second half of the time series, with some notable exceptions such as ROE and ROA and a few other variables. The sample sizes for individual variables differ due to some missing values for individual bank-year observations. Table 3 displays the correlation coefficients between all the explanatory variables used in the econometric models. The relatively high correlation coefficients between some branch share variables (along with interacted regressors) is partly due to the persistence in the gain and loss of branch shares among different sized banks located inside and outside NJ.

Table 4 displays the panel econometric estimates of the profitability equations for the 66 NJ community banks used in this study. All models are estimated with bank fixed effects and are corrected for first-order panel serial correlation using STATA (2009) *xtregar* procedures. The coefficients on the HHI and natural log of assets are positive and statistically significant and imply that increased concentration of deposits as well as community bank size leads to higher returns on bank capital. The latter result is consistent with Hannan and Prager (2009), suggesting that larger community banks are

indeed more profitable. However, they did not find a significant effect from deposit concentration in urban markets. Although greater deposit concentration has been found to have different effects on profitability for rural (positive) and urban (negative) community banks, in NJ, many banks are located suburban locations with mixed population densities.

Table 2 - Panel Statistics for 66 New Jersey Community Banks

	1994-2014		1994-2003		2004-2014	
	Mean	N	Mean	N	Mean	N
ROE (%)	7.6	1,518	10.2	792	4.7	726
ROA (%)	0.7	1,518	0.9	792	0.5	726
Herfindahl Index	1084.5	1,386	865.6	660	1,325.4	726
Assets (000 \$'s)	3,036,843	1,518	1,337,483	792	4,890,691	726
RetainEarn/Equity (%)	75.3	1,518	81.2	792	68.9	726
Branch Shares (%)						
Large Out-of-State	31.9	1,282	23.3	568	38.8	714
Large In-State	7.6	1,083	12.1	487	4.0	596
Small Out-of-State	3.2	1,007	2.9	431	3.4	576
Market Share (%)	0.51	1,385	0.45	659	0.57	726
Branch Share, County HQ (%)	70.4	1,386	75.1	660	66.17	726
Unemployment Rate (%)	6.7	1,518	6.2	792	7.2	726

The ratio of retained earnings to bank capital had a positive and significant effect and confirmed a conclusion noted in the FDIC (2012) report that "a stable balance between growth and earnings has been the surest path to long-term viability" for community banks (p vii). The negative coefficient on $LRGOUTNJ_{ct-1}$ is consistent with prior results and implies that for each percentage point increase in the share of branches owned by large out-of-state banks, NJ community bank ROE declines by about 0.34 percentage points; large in-state banks also exerted a negative but insignificant impact on profitability. The interaction terms between the HHI_{ct} and $LRGOUTNJ_{ct-1}$ and the HHI_{ct} and $LRGNJ_{ct-1}$ were both negative with only the later having a statistically significant coefficient.

Table 3 - Correlation Coefficients

Col.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) HHI *			(9) lnAssets *			(10) RUNC	(11) MKT SHR	(12) BR SHR
	ROE	HHI	ln ASSET	RE/ EQ	LG OUT NJ	LRG NJ	SML OUT NJ	(5)	(6)	(7)	(5)	(6)	(7)			
(1)	1.00															
(2)	-0.06	1.00														
(3)	0.08	0.01	1.00													
(4)	0.12	-0.57	-0.31	1.00												
(5)	-0.16	0.09	0.19	-0.20	1.00											
(6)	0.17	-0.07	-0.22	0.11	-0.66	1.00										
(7)	-0.12	0.21	-0.03	-0.00	0.04	-0.05	1.00									
(8)*(5)	-0.83	-0.03	0.22	-0.06	0.74	-0.65	-0.02	1.00								
(8)*(6)	0.09	-0.15	-0.05	0.18	-0.56	0.65	-0.13	-0.16	1.00							
(8)*(7)	-0.93	0.06	0.12	0.12	0.01	-0.34	0.48	0.47	0.24	1.00						
(9)*(5)	-0.18	0.08	-0.05	-0.09	0.93	-0.62	0.03	0.75	-0.50	0.01	1.00					
(9)*(6)	0.08	-0.09	-0.46	0.21	-0.64	0.88	-0.06	-0.57	0.70	-0.25	-0.52	1.00				
(9)*(7)	-0.18	0.20	-0.51	0.16	-0.04	0.03	0.77	-0.10	-0.06	0.43	0.10	0.14	1.00			
(10)	-0.11	0.01	0.05	-0.03	0.04	-0.11	0.03	-0.16	-0.15	-0.14	-0.03	-0.10	-0.02	1.00		
(11)	0.06	-0.08	0.77	-0.25	0.05	-0.08	-0.03	0.13	0.06	0.11	-0.14	-0.26	-0.41	0.05	1.00	
(12)	0.01	-0.13	-0.65	0.18	-0.06	0.11	0.02	-0.07	0.01	-0.07	0.12	0.27	0.35	-0.11	-0.48	1.00

Note: All variables lagged one-year except HHI (no lag) and RUNC (two-year lag)

These results are consistent with the hypothesis that the presence of large banks reduces the positive impact of deposit concentration on community bank profitability. Cyree and Spurlin (2012) observe that although larger banks in rural possess significant market power, smaller banks can persist due to lower average efficiency and thus higher average profitability.

The hypothesis that the impact of larger competitors on community bank profitability would vary with the size of the community bank was tested by interacting the natural log of lagged bank assets and county branch shares for large and small out-of-state banks and large NJ banks. For large in-state and out-of-state NJ banks, there was a small but significant positive effect on ROE supporting the hypothesis that larger community banks are more efficient or have better product offerings compared to their smaller competitors. In contrast, the negative coefficient on the interaction term between community bank size and branch shares for small out-of-state banks, suggests that their presence increases price or product competition and thus reduces NJ community bank profitability. Either of these outcomes are consistent with previous findings in Hannan and Prager (2009) who note that the theoretical expectations on these interactions terms are "unclear, *a priori*." (p. 266)

The lagged unemployment rate was both negative and significant although the magnitude of the effect on profitability was rather small. Thus, greater home-county demand appears to have a salutary impact on community bank earnings (a result consistent with a procyclical pattern of bank profitability). Statewide market share for a community bank, $MKTSHR_{it-1}$ was negatively correlated with ROE indicating a significant trade-off between profitability and growth. This is not unexpected given the increasing share of a community banks' branches located outside its headquartered county (see figure III) and thus less likely to have informational advantages in more remote locations. To that extent, the share of branches owned by a community bank in its headquartered county ($BRSHR_{it-1}$) was also negatively associated with profitability but not significantly so. Branch costs could be expected to rise if the customer base does not increase as fast after controlling for bank size.

The results for the return-on-assets (ROA) equation are displayed on the right-hand side of Table 4. The signs and significance levels are similar to the ROE equation although the magnitudes of the ROA coefficients are about one tenth the size reflecting the differences between their average values (7.1% vs. 0.7%). The only notable differences with the ROE equation was the insignificance of the market and branch share variables. The Baltagi-Wu statistics indicate that neither profitability equation suffers from significant panel serial correlation.

Table 4 - Profitability Models of New Jersey Community Banks

	ROE	ROA
	<i>B</i>	β
Intercept	- 0.018	0.002
HHI_{ct}	0.157 **	0.016 **
lnAssets_{it-1}	0.022 ***	0.002 ***
ReturnEq_{it-1}	0.074 ***	0.005 ***
LRGOUTNJ_{ct-1}	- 0.338 ***	- 0.037 ***
LRGNJ_{ct-1}	- 0.091	- 0.013
SMLOUTNJ_{ct-1}	0.108	- 0.001
HHI_{ct} * LRGOUTNJ_{ct-1}	- 0.067	- 0.014
HHI_{ct} * LRGNJ_{ct-1}	- 0.465 ***	- 0.065 ***
HHI_{ct} * SMLOUTNJ_{ct-1}	0.253	0.022
lnAssets_{it-1} * LRGOUTNJ_{ct-1}	0.005 *	0.000
lnAssets_{it-1} * LRGNJ_{ct-1}	0.003 ***	0.000 ***
lnAssets_{it-1} * SMLOUTNJ_{ct-1}	- 0.003 **	0.000
RUNC_{ct-1}	- 0.004 **	- 0.000
MKTSHR_{it-1}	- 0.076 ***	- 0.001
BRSHR_{it-1}	- 0.053	- 0.003
<i>N</i>	726	726
<i>Fixed-Effects F-Statistic</i>	5.86 ***	3.38 ***
<i>R² (Within)</i>	0.317	0.186
<i>Baltagi-Wu Statistic</i>	1.34	1.52
<i>Mean</i>	7.6%	0.7%

* Significant at 0.10 Confidence Level

** Significant at 0.05 Confidence Level

*** Significant at 0.01 Confidence Level

5. Deposit Rates

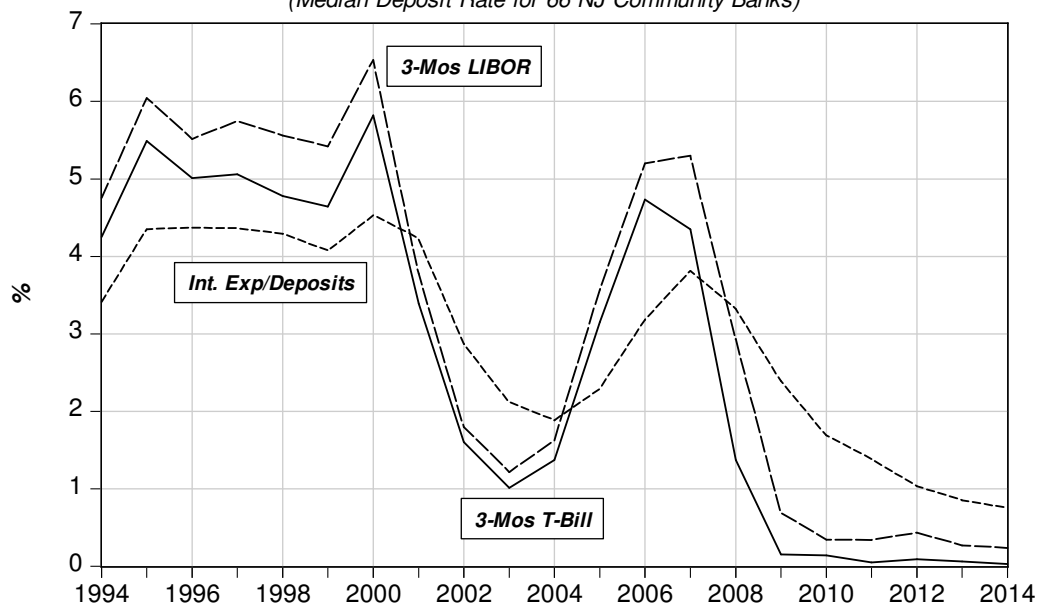
The literature on the impact of large geographically diversified banking organizations on local community banking markets has found that the former institutions are less sensitive to differences in market concentration when pricing their products and services. Park and Pennachi (2009) observed that "large multimarket banks [LMBs] tend to use more standardized lending and deposit-taking technologies that may produce cost differences relative to smaller banks and ultimately affect the interest rates faced by retail customers." (p. 2) The greater scale and scope of LMBs allow them to make extensive use of advanced automation and information technologies that results in greater standardization in the setting of deposit and loan rates. Hannan and Prager (2009) found that the presence of large banking organizations (or their subsidiaries) offered lower rates to depositors and that statewide deposit concentration was inversely associated with multimarket bank deposit rates. Radecki (1998) used Bankrate, Inc. survey data to show a pattern of uniform statewide pricing for a given bank product or service. Biehl (2002) found that LMBs in New York offered uniform deposit rates within given cities. Although smaller banks set rates with respect to local market conditions, LMBs applied more uniform rates across a state or region (Heitfeld,

1999; Heitfeld and Prager, 2004). Since the market for retail banks deposits is relatively unconcentrated in New Jersey, the presence of more uniform loan and deposit rates by larger banks is expected to have less of an impact on smaller community bank deposit rates. Moreover, if larger banks have a funding advantage (e.g., by borrowing at the LIBOR rate), then smaller bank deposit rates will be set closer to those of LMBs.

Hannan and Prager (2004) modeled deposit rates of small single-market banks for 1996 and 1999 as a function of local market deposit concentration, bank size, income, market size, distance between bank branches in the local market, transportation costs and the share of branches owned by a multimarket bank. Their study also controlled for interactions between the concentration ratio and branch shares and multimarket deposit rates and branch shares. The authors found that the presence of multimarket banks does not negate the influence of local market deposit concentration on single-market bank deposit rates. However, the impact of deposit concentration diminished as the share of multimarket branches increased in the local market.

Figure IV: Interest Expense/Deposits

(Median Deposit Rate for 66 NJ Community Banks)



SOURCE: FDIC.gov - Institution Directory; FRB FRED

Although we do not have historical data on community bank deposit rates by type of savings instrument (e.g., a 6-month certificate of deposit), we can approximate a bank's average deposit rate by dividing interest expenses by deposits. Figure IV compares the median value of the deposit rate for 66 NJ community banks to the rate on the three-month Treasury bill and three-month LIBOR rate from 1994 through 2014. The correlation coefficient between the median community bank deposit rate and the Treasury bill rate and LIBOR is about 0.90 and suggests that this ratio is a reasonable proxy for a bank's short-term funding costs. The particular hypothesis we wish to test

is whether the increased presence of larger banks also lowered deposit rates at NJ community banks. Two deposit rate panel econometric models will be estimated using data on 66 NJ community banks from 1994 through 2014. Equation [2] is based upon variables in Park and Pennacchi (2009) and Hannan and Prager (2004; 2006):

$$\begin{aligned} \text{DEPRATE}_{it} = & \beta_0 + \beta_1 \text{HHI}_{ct} + \beta_2 \ln\text{ASSETS}_{it-1} + \beta_3 \text{LRGOUTNJ}_{ct-1} + \beta_4 \text{LRGNJ}_{ct-1} + \beta_5 \\ & \text{SMLOUTNJ}_{ct-1} + \beta_6 \text{HHI}_{ct} * \text{LRGOUTNJ}_{ct-1} + \beta_7 \text{HHI}_{ct} * \text{LRGNJ}_{ct-1} + \beta_8 \text{HHI}_{ct} * \\ & \text{SMLOUTNJ}_{ct-1} + \beta_9 \text{RUNC}_{ct-1} + \beta_{10} \text{BRSHR}_{it-1} + u_{it} \end{aligned} \quad [2]$$

where the dependent variable is the ratio of interest expense to deposits for the i^{th} bank in the t^{th} year; all other variables were previously defined above. The HHI should be inversely related to deposit rates because banks with greater market power do not have to compete as hard for deposits, *ceteris paribus*. Secondly, large banks are assumed to have wholesale funding advantages which will reduce community bank deposit rates (Hannan and Prager, 2009). The interaction between the HHI and share of bank branches owned by LMBs should be positive because the reduction in deposit rates will diminish - and may even become positive - as market concentration increases. Therefore, large banks located in NJ counties with a low HHI will exert greater downward pressure on community bank deposit rates compared to rates in less concentrated markets.

While previous research accounted for the presence of large/small out-of-market banks and community bank size (Hannan and Prager, 2004), three new variables will be added to the above specification. The rationale is to control for the possibility that the impact of out-of-state banks and large NJ banks on community bank deposit rates varies with the size of the community bank. Thus, it will be possible to control for implicit differences in savings product offerings that could vary with the size of a NJ community bank. Equation [3] will be defined as:

$$\begin{aligned} \text{DEPRATE}_{it} = & \beta_0 + \beta_1 \text{HHI}_{ct} + \beta_2 \ln\text{ASSETS}_{it-1} + \beta_3 \text{LRGOUTNJ}_{ct-1} + \beta_4 \text{LRGNJ}_{ct-1} + \beta_5 \\ & \text{SMLOUTNJ}_{ct-1} + \beta_6 \text{HHI}_{ct} * \text{LRGOUTNJ}_{ct-1} + \beta_7 \text{HHI}_{ct} * \text{LRGNJ}_{ct-1} + \beta_8 \text{HHI}_{ct} * \\ & \text{SMLOUTNJ}_{ct-1} + \beta_8 \ln\text{ASSETS}_{it-1} * \text{LRGOUTNJ}_{ct-1} + \beta_9 \ln\text{ASSETS}_{it-1} * \text{LRGNJ}_{ct-1} + \\ & \beta_{10} \ln\text{ASSETS}_{it-1} * \text{SMLOUTNJ}_{ct-1} + \beta_{11} \text{RUNC}_{ct-1} + \beta_{12} \text{BRSHR}_{it-1} + u_{it} \end{aligned} \quad [3]$$

where $\ln\text{ASSETS}_{it-1} * \text{LRGOUTNJ}_{ct-1}$, $\ln\text{ASSETS}_{it-1} * \text{LRGNJ}_{ct-1}$, and $\ln\text{ASSETS}_{it-1} * \text{SMLOUTNJ}_{ct-1}$ are the additional interaction terms between NJ community bank assets and the county-level share of bank branches owned by small and large out-of-state banks as well as large in-state banks.

Table 5 displays the results for deposit rate equations [2] and [3]. With the exception of the HHI, all explanatory variables have been lagged to mitigate estimation problems arising from endogenous explanatory variables; both models correct for first-order panel serial correlation and include bank fixed effects. The negative and significant coefficient on the HHI comports with earlier findings where deposit rates are found to be lower in more concentrated markets (Hannan and Prager, 2004).

Alternatively, bank size has a positive but rather small impact on deposit rates which supports the hypothesis that larger community banks have the capacity to offer depositors a slightly more competitive deposit rate. On the other hand, an increase in the share of branches owned by the largest out-of-state banks reduces community bank deposit rates by about eight basis points.

Table 5 - Deposit Models of New Jersey Community Banks

<i>Dependent Variable:</i> Interest Expense _{it} / Deposits _{it}	Equation [2]	Equation [3]
	β	β
Intercept	0.019 ***	0.019 ***
HHI_{ct}	- 0.023 *	- 0.023 *
lnAssets_{it-1}	0.004 ***	0.004 ***
LRGOUTNJ_{ct-1}	- 0.084 ***	- 0.080 ***
LRGNJ_{ct-1}	0.014	- 0.002
SMLOUTNJ_{ct-1}	0.010	- 0.011
HHI_{ct} * LRGOUTNJ_{ct-1}	0.061 ***	0.088 **
HHI_{ct} * LRGNJ_{ct-1}	0.009	- 0.014
HHI_{ct} * SMLOUTNJ_{ct-1}	- 0.026 **	- 0.030
lnAssets_{it-1} * LRGOUTNJ_{ct-1}		0.000
lnAssets_{it-1} * LRGNJ_{ct-1}		0.000
lnAssets_{it-1} * SNLOUTNJ_{ct-1}		0.000
RUNC_{ct-1}	- 0.003 ***	- 0.003 ***
BRSHR_{it-1}	0.018 ***	0.016 ***
<i>N</i>	726	726
<i>Fixed-Effects F-Statistic</i>	4.46 ***	4.21 ***
<i>R² (Within)</i>	0.464	0.470
<i>Baltagi-Wu Statistic</i>	0.849	0.852
<i>Mean</i>	3.2%	3.2%

* Significant at 0.10 Confidence Level

** Significant at 0.05 Confidence Level

*** Significant at 0.01 Confidence Level

The positive coefficient on the interaction term between the HHI and the share of branches owned by the largest non-domiciled NJ banks, confirms the Park and Pennacci (2009) hypothesis that while the presence of large multimarket banks lowers competitor deposit rates in less concentrated markets, the reduction diminishes as concentration increases. Alternatively, the significant negative sign on the interaction term between the HHI and the share of branches owned by the smallest non-domiciled NJ banks, implies additional downward pressure on community bank deposit rates. The unemployment rate has a negative coefficient because deposit rates tend to increase during the expansion phase of the business cycle but fall during recessions (Rose and Hudgins, 2013). The share of home-county branches owned by a NJ community bank has a positive impact on deposit rates due to their closer proximity and visibility to local customers.

Equation [3] includes three interaction variables between community bank size and large and small out-of-state banks and large in-state banks. Unfortunately, these new terms to capture the interaction between community bank size and competitor branch shares did not yield any statistically significant coefficients. This result may imply that community bank depositors do not discern significant differences between savings products and services offered by NJ banks.

6. Conclusions

The competitive structure of the American banking sector has been undergoing a secular transformation characterized by a decrease in the total number of institutions and an increase in the concentration of assets and deposits - especially among large interstate banks. Prior research based on national samples of banks did not find any significant association between community bank profitability and market concentration in urban banking markets. The current study focused on a predominantly suburban/urban state with a significant presence of large in-state and externally-headquartered banks. We find a significant positive impact from increased deposit concentration and bank size on NJ community bank profitability but a negative impact from the presence of larger banking institutions.

The presence of larger banking organizations also appears to provide a counterweight to local market power arising from increased deposit concentration among NJ's long-lived community banks. Antitrust regulators charged with evaluating the impact of a proposed bank merger or acquisition on a local market should thus consider the share of local bank branches owned by both large in-state and out-of-state banks. Thus, the presence of larger geographically diverse banks in NJ community banking markets will likely increase competition for deposits and loans to the benefit of both small businesses and consumers.

While increased market concentration is associated with lower deposit rates offered to community bank customers, the reduction is diminished with the presence of large, out-of state bank branches but not with the presence of smaller non-domiciled competitors. Therefore, bank regulators need to analyze the impact from the presence of both large and small out-of-market competitors on local community bank profitability.

Retained earnings were another significant determinant of NJ community bank profitability and thus underscore the importance of internally-funded growth. Secondly, this study suggests that a community bank's home (headquartered) county is a useful geographic demarcation of a local banking market. These markets are likely to be populated by older banking customers who are a significant source of a community bank's core deposits and who also place a premium on personal banking relationships. Over time, New Jersey's community banks have had to extend their branch networks beyond their immediate market area in response to both competitive and technological pressures. A greater presence of community branches within their home county is associated with higher deposit rates although their negative impact on profitability was not significant.

Community bank profitability and deposit rates were consistently pro-cyclical as evidenced by the significant negative coefficient on the unemployment rate in a community bank's home county. Finally, community bank statewide market share is inversely associated with profitability suggesting a trade-off with growth. Banks that focus on efficient management, rather than deposit growth may be pursuing a more successful competitive strategy. Therefore, while the total number of community banks may continue to shrink in NJ, the survivors are also likely to emerge as healthy competitors to both larger and similarly-sized institutions.

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