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# ВЛИЯНИЕ ОГРАНИЧЕНИЙ НА ФИЛИАЛЫ В США
# BRANCH RESTRICTION EFFECTS IN USA

**Аннотация:** В данном исследовании эмпирически рассматриваются факторы, влияющие на прибыльность банков в США до и после смягчения ограничений на открытие филиалов, на основе данных за период с 1984 по 2005 год. С использованием модели регрессии с фиксированными эффектами установлено, что ликвидность, банковский капитал, размер банка, диверсификация доходов, кредитный риск и индекс филиалов существенно влияют на прибыльность. Дополнительный анализ с учетом временных фиксированных эффектов подтверждает в целом положительные средние показатели, тогда как анализ устойчивости прибыли показывает, что дерегулирование усилило конкуренцию между банками. В целом исследование подчеркивает, как изменения в регулировании трансформировали динамику прибыльности в банковском секторе.

**Abstract:** This study empirically investigates the determinants of bank profitability in the U.S. before and after the relaxation of branching restrictions, using data from 1984 to 2005. Employing a fixed effect regression model, it finds that liquidity, bank capital, bank size, income diversification, credit risk, and branching index significantly affect profitability. Additional analyses with time fixed effects confirm generally positive average performance, while profit persistence analysis reveals that deregulation intensified competition among banks. Overall, the study highlights how regulatory changes reshaped profitability dynamics in the banking sector.

**Ключевые слова:** банковские ограничения, ограничения в США, МакФадден, Ригл-Нил, прибыльность.

**Keywords:** Bank Restrictions, Restrictions in USA, McFadden, Riegle-Niel, profitability.

**Introduction:**

The main function of banks is to collect deposits and lend them to borrowers, aiming to grow wealth. Increased competition in the banking sector significantly influences economic activity, capital structure, and industrial competition. While technological progress and marketing tools have supported growth, genuine competition tends to be limited under strict regulatory constraints.

Over time, advancements in science and policy have reshaped the banking industry in the U.S. To protect banks from major losses, the government introduced regulatory reforms. Initially, laws like the Bank Holding Company Act of 1956 restricted bank expansion across states, which some studies found to hinder profitability. However, the 1994 Interstate Banking and Branching Efficiency Act (IBBEA) reversed this by allowing interstate operations, fostering greater efficiency and competition.

This study investigates how such regulatory changes, particularly during and after the branching restrictions, influenced U.S. bank profitability. It applies econometric panel data models, including fixed effects, time fixed effects, and lagged variables, to analyze the role of liquidity, bank capital, bank size, credit risk, income diversification, and branching regulation index. The dataset includes over 900,000 observations from 1984 to 2005, offering a robust basis for understanding these profitability drivers.

**Lawful Changes**

The McFadden Act of 1927 marked a pivotal shift in U.S. banking by easing some geographic restrictions, allowing both national and state-chartered banks to open branches within their home states. While it clarified national banks' authority and promoted local competition, it maintained limits on interstate branching and did not fully resolve the issue of branch banking (Rajan & Ramcharan, 2016; Preston, 1927).

Later, the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 further liberalized the system by permitting interstate banking. However, it gave states significant discretion in implementing this expansion. States could impose restrictions such as minimum bank age, bans on de novo branching, limits on acquiring individual branches, and caps on deposit concentration (Rica & Strahan, 2010). This created a varied regulatory landscape across the U.S., shaping how and where banks could grow beyond state borders.

**Literature Review**

Competition plays a vital role in driving innovation and efficiency in the banking sector, ultimately benefiting both institutions and the broader economy. Historically, strict regulations such as those introduced by the McFadden Act (1927) limited banks' geographic reach and operational flexibility, restricting their potential profitability (Rajan & Ramcharan, 2016). Although it allowed intrastate branching, it maintained barriers to interstate expansion. This changed with the Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) of 1994, which enabled interstate banking under specific state-defined conditions. These included restrictions such as minimum age requirements for acquisition targets, bans on de novo branches, and deposit concentration caps (Rica & Strahan, 2010). While these reforms varied by state, they generally enhanced competition and lowered inefficiencies.

This study examines how key financial and legislative variables affect U.S. bank profitability between 1984 and 2005. Using panel data and fixed effects regression, we analyze the impacts of liquidity, bank capital, bank size, income diversification, credit risk, and branching deregulation. Prior literature provides mixed evidence on the influence of these variables, suggesting context-dependent outcomes. For instance, while liquidity may increase loan capacity, excessive lending can erode returns (Chronopoulos, 2015). Similarly, while higher capital can improve solvency, it may reduce returns (Berger, 1995). Larger banks might benefit from economies of scale but also face bureaucratic inefficiencies (Naceur & Kandil, 2009). Income diversification can reduce risk or dilute focus, depending on context (Sanya & Wolfe, 2011). Credit risk, when managed properly, may enhance profitability, but high non-performing loans increase vulnerability (Sukma, 2013). Finally, legislative changes, particularly branching deregulation, have been linked to improved efficiency and profitability by fostering greater competition (Chronopoulos, 2015; Celerier & Matray, 2019).

Hypotheses:

- **$H0_1$**: Liquidity has an insignificant effect on bank profitability.
- **$H0_2$**: Bank capital has an insignificant effect on bank profitability.
- **$H0_3$**: Bank size has an insignificant effect on bank profitability.
- **$H0_4$**: Income diversification has an insignificant impact on bank profitability.
- **$H0_5$**: Credit risk has an insignificant impact on bank profitability.
- **$H0_6$**: Legislative changes have an insignificant influence on bank profitability.

In sum, while individual bank-specific variables may show inconsistent effects across contexts, regulatory reform–especially branching deregulation–emerges as a consistent positive force influencing U.S. bank profitability during the study period.

**Methodology and Data**

Building on the literature, this study adopts an empirical framework to examine how bank-specific and regulatory factors influence U.S. bank profitability between 1984 and 2005. The methodology follows panel data techniques similar to Chronopoulos et al. (2015), enabling the analysis of both cross-sectional and temporal variations among banks. The key dependent variable is Return on Assets (ROA), preferred over Return on Equity due to its lower susceptibility to accounting manipulation (Berger, 1995).

The model specification uses a fixed-effects regression, selected via the Hausman test, to control for unobserved heterogeneity. The model is structured as:

$$\gamma_{it} = a + BX_{it} + Bd_{it} + e_{it}$$

where γ_it is ROA, X_it represents bank-specific factors, d_it is the branching restriction dummy, and ε_it is the error term. Time-fixed effects are included to control for macroeconomic shocks.

The dataset comprises an unbalanced panel of U.S. banks across two periods: 1984–1993 (pre-regulation) and 1994-2005 (post-regulation). Data were initially compiled in Excel and analyzed using STATA, a standard econometric software.

Variables:

- Bank Size: Natural log of total assets, capturing scale effects. Previous research shows mixed effects (Goddard et al., 2010; Kosmidou, 2008).
- Credit Risk: Net loan charge-offs to total loans. High levels may hurt profitability unless managed effectively (Petria et al., 2015).
- Liquidity: Total loans to total assets ratio, indicating lending capacity (Abreu & Mendes, 2003).
- Capital Adequacy: Total equity to total assets. Effects are mixed, with Berger (1995a) showing positive influence, while Modigliani & Miller (1963) note potential downsides.
- Income Diversification: Non-interest income to total operating income, reflecting reliance on non-traditional income (Lepetit et al., 2008).
- Branching Regulation: Dummy variable capturing whether a state enforced branching restrictions. A value of 1 indicates the presence of at least one restriction; 0 indicates none. This variable identifies the regulatory environment's influence on profitability (Celerier & Matray, 2019).

Sample Segmentation and Data Handling

The sample is divided into pre- and post-IBBEA periods to isolate the impact of branching deregulation on bank profitability. This temporal segmentation provides a robust framework to assess how internal bank characteristics and external regulatory changes jointly influence financial performance.

Unlike prior studies (DeYoung, 2003; Chronopoulos et al., 2015) that exclude smaller banks or those with low capital ratios, this study retains the full sample. This approach preserves statistical power and generalizability, as bank-level variables since 1984 exhibit consistent trends with minimal outliers. Following the Central Limit Theorem, a larger sample enhances the reliability of estimates.

Data were primarily sourced from Wharton Research Data Services (WRDS), covering quarterly balance sheet and income statement data for U.S. commercial banks across all states from 1984 to 2005. The branching regulation index, sourced from Johnson and Rice (2008), aligns policy changes with financial outcomes. Variation in the timing and extent of branching restrictions across states strengthens econometric identification, enabling a detailed analysis of how institutional and regulatory factors affected bank profitability over time.

| | |
|---|---|
| ROA | Return on Asset |
| LIQ | Liquidity |
| BC | Bank Capital |
| BS | Bank Size |
| CR | Credit Risk |
| INDIV | Income Diversification |
| BRDUM | Branching Dummy |

Table 1 Descriptive Statistics from 1984 to 1993

| Variable | Observation | Mean | Standard Dev | Min | Max |
|---|---|---|---|---|---|
| Roa | 531306 | 0.062 | 0.061 | -0.04 | 24665 |
| Liq | 531306 | 0.533 | 0.155 | 0 | 1.185 |
| BC | 531306 | 0.092 | 0.058 | -1.47 | 1 |
| BS | 531306 | 10.79 | 1.268 | 4.97 | 18.99 |
| CR | 530102 | 0.08 | 0.137 | -85.4 | 2.39 |
| Indiv | 531256 | 0.007 | 0.184 | -0.01 | 92.59 |

Table 2 Descriptive Statistics from 1994 to 2005

| Variable | Observation | Mean | Standard Dev | Min | Max |
|---|---|---|---|---|---|
| Roa | 445072 | 0.118 | 31.778 | -0.17 | 16149 |
| Liq | 445072 | 0.599 | 0.161 | 0 | 1.213 |
| BC | 445072 | 0.11 | 0.072 | -5.2 | 1 |
| BS | 445072 | 11.43 | 1.337 | 0 | 20.8 |
| CR | 442851 | 0.003 | 0.161 | 0 | 83.97 |
| Indiv | 444988 | 0.11 | 0.382 | -17.2 | 240.7 |
| Brdum | 445073 | 0.454 | 0.498 | 0 | 1 |

**Analysis and Results**

This chapter presents the regression findings, evaluating the impact of bank-specific characteristics on profitability across regulatory periods. A Hausman test indicated the fixed effects model was appropriate ($p < 0.05$), allowing control for unobserved heterogeneity. To assess long-term trends, a profit persistence model was also applied.

**Main Regression Results (Table 5)**

**Bank Capital**

Bank capital is negatively and significantly associated with ROA across both periods. This aligns with Altunbas et al. (2007) and Goddard et al. (2013), who argue that excess capital limits reinvestment and tax efficiency. Highly capitalized banks may also prioritize dividends over profitable projects, reducing performance (Boyd & Runkle, 1993; Naceur, 2003; Francis, 2013, as cited in Islam, 2020).

**Liquidity**

Liquidity (loans to assets) shows a strong positive relationship with profitability, suggesting sound liquidity management enhances stability and investor appeal. The dataset's ratio of 3.2 is within a healthy range. Unlike Chronopoulos et al. (2015), who found a negative relationship after excluding small banks, this broader dataset supports a positive link.

**Bank Size**

Bank size, proxied by the logarithm of total assets, is negatively linked to ROA. Larger banks may face inefficiencies or higher credit risk from aggressive lending. This finding is consistent with Alkassim (2005), who reported similar results in Jordanian commercial banks.

TABLE 3 – REGRESSION ANALYSIS RESULT OF BANK SPECIFIC CHARACTERISTICS ON ROA

| Independent variables | edicted Signs | 1984 – 1993 | 1994 – 2005 |
|---|---|---|---|
| Liquidity | +/- | 0.032<br>0 | 0.011<br>0 |
| Bank Capital | +/- | -0.004<br>-0.005 | -0.046<br>0 |
| Bank Size | +/- | -0.002<br>0 | -0.012<br>0 |
| Income Diversification | +/- | 0.009<br>0 | 0.001<br>0 |
| Credit Risk | +/- | 0.185<br>0 | 0.076<br>0 |
| Branch Dummy | + | N/A | 0.026<br>0 |
| R-Squared | | 0.434 | 0.039 |
| Observations | | 530062 | 442785 |

TABLE 4 – TIME FIXED EFFECT OF BANK SPECIFIC CHARACTERISTICS ON ROA

| Independent variables | Predicted Signs | 1984 – 1993 | 1994 – 2005 |
|---|---|---|---|
| Liquidity | +/- | 0.033<br>0 | 0.018<br>0 |
| Bank Capital | +/- | -0.012<br>0 | -0.02<br>0 |
| Bank Size | +/- | -0.005<br>0 | -0.008<br>0 |
| Income Diversification | +/- | 0.007<br>0 | 0.001<br>0 |
| Credit Risk | +/- | 0.182<br>0 | 0.075<br>0 |
| Branch Dummy | +/- | N/A | -0.001<br>0 |
| Quarter 2 | +/- | 0.023<br>0 | 0.019<br>0 |
| Quarter 3 | +/- | 0.047<br>0 | 0.039<br>0 |
| Quarter 4 | +/- | 0.069<br>0 | 0.057<br>0 |
| R-Squared<br>Observations | | 0.683<br>530062 | 0.156<br>442785 |

**Handling of Missing Data and Descriptive Statistics**

Consistent with previous studies such as Schwartz and Menon (1985), missing data issues were encountered during the data collection process, often due to distressed banks delaying or omitting financial disclosures. To preserve the integrity of the panel dataset and ensure reliable estimations, all observations with missing values were excluded from the analysis.

**Descriptive Statistics**

Summary statistics are presented in Table 1 (1984-1993, pre-legislation) and Table 2 (1994-2005, post-legislation), allowing for a comparative assessment of bank characteristics across regulatory periods.

Bank size, proxied by the logarithm of total assets, showed an increase in the post-legislation period, indicating sectoral consolidation and growth among larger institutions. Profitability, as measured by Return on Assets (ROA), also improved significantly, suggesting enhanced operational efficiency and regulatory adaptation. Nonetheless, negative ROA values in both periods highlight the continued presence of underperforming or distressed banks.

Credit risk exhibited a slight decline, pointing to modest improvements in asset quality. However, the most notable shift occurred in the standard deviation of ROA, which rose substantially in post-legislation, suggesting greater volatility in profitability. This may reflect increased competition, market liberalization, or differences in strategic responses by banks.

The average value of the branching restriction indicator rose considerably in the post-legislation period, aligning with the phased implementation of reforms across U.S. states. This shift supports the premise that external regulatory change played a pivotal role in shaping bank performance outcomes.

Other explanatory variables–such as capital adequacy, liquidity, and income diversification–remained relatively stable between the two periods, reinforcing the hypothesis that structural and policy changes, rather than internal bank strategies alone, drove the observed differences in profitability.

These descriptive findings provide context for the regression analysis in Table 3, which quantifies the influence of key bank-specific and regulatory variables. Time-fixed effects included in Table 4 further refine the model, capturing macroeconomic fluctuations and improving explanatory power across the panel dataset.

Table 5 – Profit Persistence of Return on Assets

| Independent | Predicted Signs | 1984 – 1993 | 1994 – 2005 |
|---|---|---|---|
| Liquidity | +/- | 0.080 | 0.0080 |
| Bank Capital | +/- | -0.005<br>-0.027 | -0.002<br>-0.31 |
| Bank Size | +/- | -0.001<br>0 | -0.001<br>0 |
| Income Diversification | +/- | 0.031<br>0 | 0.002<br>0 |
| Credit Risk | +/- | 0.015<br>0 | 0.03<br>0 |
| Branch Dummy | - | N/A | -0.014<br>0 |
| R-Squared | | 0.01 | 0.018 |
| Observations | | 512902 | 429514 |

**Profit Persistence Analysis (Table 5)**

In Table 7, lagged ROA is introduced to assess profit persistence. The results are largely in line with the fixed effect model, indicating robustness of the findings.

Liquidity and bank size continue to show consistent results. Bank capital, however, loses its statistical significance in the profit persistence model.

Most importantly, the branching index displays a negative coefficient, suggesting that regulatory liberalization may have weakened profit persistence. This supports findings by Chronopoulos et al. (2015), who noted that removing constraints intensified competition, diminishing long-term profitability stability.

**Conclusion**

This study examined the impact of bank-specific variables on profitability in the U.S. banking sector, with a focus on changes before and after the relaxation of branching restrictions. Unlike most prior research, it specifically highlights the effects of deregulation across states. The findings show that credit risk, liquidity, and income diversification positively influence profitability, while bank capital and size negatively impact it. Notably, the positive effects of key variables weakened after deregulation, suggesting that increased competition and regulatory freedom posed challenges for some banks, potentially reducing overall profitability. This confirms that while deregulation offered opportunities, it also intensified competition, and not all banks adapted successfully.

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