

THE IMPACT OF SERVING LOW INCOME COMMUNITIES ON CREDIT UNION EFFICIENCY

Do mission-driven financial institutions accept efficiency tradeoffs to bank underserved communities, and if so, to what extent? We examine this question using the Low-Income Designation (LID) program for U.S. credit unions, which provides regulatory benefits in exchange for serving majority low-income membership. Using a two-stage data envelopment analysis (DEA) approach with bias-corrected efficiency scores for a balanced panel of 2,067 federally insured credit unions from 2015-2024, we find LID institutions operate with 1.03 percentage points lower efficiency scores ($p < 0.01$) compared to non-LID institutions. This efficiency penalty persists after controlling for size, credit quality, growth, and state/time fixed effects. Mechanism analysis reveals the penalty operates primarily through higher operating costs rather than inefficient capital allocation. Despite lower efficiency, LID institutions experience positive member deposit growth, suggesting stakeholders accept operational costs in exchange for intangible social mission objectives. We find larger efficiency penalties for Minority Depository Institutions (-2.56 percentage points, $p < 0.01$), confirming that broader social mission commitments involve efficiency tradeoffs. Our findings contribute to the stakeholder theory and financial inclusion literature, demonstrating that institutions serving underserved markets face real resource costs that their stakeholders willingly bear.

Keywords: financial inclusion, credit union efficiency, data envelopment analysis, stakeholder theory, cooperative governance, social mission, Low-Income Designation

INTRODUCTION

As of year-end 2024, 54 percent of federally insured credit unions in the United States held the Low-Income Designation (LID), collectively serving more than 73 million members. These cooperatively owned, mission-driven institutions occupy a unique position in the financial landscape, explicitly committed to serving populations traditionally excluded from mainstream banking. Recent evidence suggests LID credit unions exhibit strong financial performance, including higher profitability, faster growth, and declining credit risk following designation (Gabor et al., 2025). Yet financial performance metrics such as return on assets (ROA) may not fully capture the cooperative mission. Credit unions exist to maximize member value through efficient intermediation of deposits into loans (Pille & Paradi, 2002; Taylor, 1971), not to generate profits for external shareholders. This raises a fundamental question: do LID credit unions achieve their financial performance at the cost of operational efficiency? If so, do member-owners accept this tradeoff as a component of the cooperative value proposition? LID credit unions provide a robust sample of financial institutions to empirically evaluate the delivery of financial services to underbanked populations.

The academic literature routinely considers ROA, or profitability, in the modeling of credit union performance (Almehdawe, Khan, Lamsal, & Poirier, 2021; Choez, Fariás, & Martínez, 2024; Gabor, Premti, & Jafarinejad, 2025). While ROA makes sense as a performance metric for evaluating bank performance, a higher ROA observed in the credit union industry may indicate a management team that is either overcharging members on loans or underpaying members on deposits. ROA is a relevant measure for the credit union industry, but only to the extent that it is achieved relative to the need to accrete and adjust the capital, or net worth, of the

institution (Rubin, Overstreet, Beling, & Rajaratnam, 2013; Taylor, 1979). How then do credit unions demonstrate maximization of member value?

A successful management team who knew exactly how to price loans and deposits to achieve an ROA of 0.00 percent with high relative operational efficiency would likely garner significant attention from both members and prospective members (Brown & Davis, 2009). The appreciation of efficient management by members and prospective members would likely result in the consumption of additional products and services and the credit union would grow accordingly. This growth would then require management to retain earnings to adjust the credit union's net worth ratio consistent with any asset growth. Given the not-for-profit, financial cooperative structure, operational efficiency has emerged as one of the leading performance measures for credit unions (Glass & McKillop, 2006; Pille & Paradi, 2002).

It follows that a financial institution's ability to serve lower income communities is consistent with higher fixed costs relative to loan and deposit product balances (Markose, Arun, & Ozili, 2022; McKillop, Colin Glass, & Ward, 2005). Financial education and counseling resources would more likely be targeted to these communities, and the institution would observe higher staffing costs per dollar of assets. For mission-driven financial cooperatives, such as LID credit unions, these higher costs are not management missteps, but rather, inherent in the mission-driven nature of the institution. Stewardship theory suggests the alignment of principals (credit union members) and agents (credit union management) can result in the accrual of non-monetary benefits to serve the altruistic nature of the organization (Byrne & McCarthy, 2014; Van Puyvelde, Caers, Du Bois, & Jegers, 2012). We empirically evaluate the tradeoff between supporting financial inclusion in low-income areas and credit union efficiency using a two-stage

data envelopment analysis (DEA) with a bootstrap bias correction and truncated regression on a balanced panel of 2,067 credit unions from 2015 through 2024.

Our results show that there is a social mission, efficiency tradeoff. We find that LID credit unions operate at 1.03 percentage points lower efficiency than non-LID peers ($p < 0.01$). This efficiency penalty persists when controlling for asset size, credit quality, deposit growth, and state and year fixed effects. Mechanism analysis shows the efficiency penalty is predominantly related to higher operating costs as opposed to inefficient capital allocation, supporting the notion that scale is more difficult to achieve when serving underserved populations. However, LID credit unions maintain average annual growth in member shares (deposits) of 6.6 percent, suggesting member-owners accept this tradeoff as part of the cooperative nature of the credit union. The notion of member acceptance of this tradeoff is supported by prior evidence showing members actively exercise depositor discipline when financial fundamentals deteriorate (Gómez-Biscarri, López-Espinosa, & Mesa-Toro, 2022). For robustness, we extend the impact evaluation of social mission on efficiency to the Minority Depository Institution (MDI) credit unions within our balanced panel, which showed a larger penalty of -2.56 percentage points ($p < 0.01$). This finding for MDI credit unions further supports the increased costs of financial inclusion efforts.

This study contributes to the literature on mission-driven financial cooperatives in several ways. First, our findings complement Gabor et al. (2025) by showing that LID credit unions can exhibit strong financial performance while forgoing some degree of efficiency to further financial inclusion initiatives. Second, through mechanism analysis, we show that financial inclusion initiatives are predominantly related to real operating costs as opposed to the misallocation of capital on the part of credit union decision makers. Third, we build on the

findings of Gómez-Biscarri et al. (2022) to suggest that consistent deposit growth at LID credit unions demonstrates members' willingness to accept less efficient operations for participation in the mission-oriented nature of the cooperative. Lastly, our findings help to inform policy considerations regarding the regulatory benefits available to LID credit unions in consideration of the efficiency costs they seem willing to bear to further their socially focused mission. Credit union boards evaluating mission-aligned designations and regulators gauging support programs to facilitate financial inclusion should find this research beneficial.

The remainder of this paper proceeds as follows. The following section provides the institutional background for the credit union movement broadly, with a focus on the U.S. credit union landscape and the use of the social mission designations of LID and MDI. We then review the literature on credit union financial performance, stakeholder and stewardship theories, mission-driven aspects of financial cooperatives, and develop our hypotheses. We then present the data as well as the two-stage DEA, truncated regression methodology. Next, we report main results and then examine robustness along with mechanism analysis. We conclude with a summary of the findings, an acknowledgement of limitations, and suggestions for future research.

INSTITUTIONAL BACKGROUND

Credit unions are steeped in the mission of maximizing member value (Smith, Cargill, & Meyer, 1981; Taylor, 1971, 1977). These financial cooperative institutions trace their roots to the latter half of the 19th century when farmers and tradespeople of modest means realized they could obtain more efficient access to capital by organizing financial institutions as cooperatives (McKillop & Wilson, 2011). Other cooperative structures had already existed, but the idea had not been applied to banking until the late 1800s. As of 2024, the World Council of Credit Unions

counts 67,137 credit unions globally consisting of approximately 413 million members (World Council of Credit Unions, 2025). The United States represents most credit union assets at \$2.31 trillion among 4,455 federally insured institutions, as of December 31, 2024 (NCUA, 2025a).

Within the United States, credit unions are formed as not-for-profit, financial cooperatives that offer similar services as for-profit banks, but with a stronger consumer focus (Goddard, McKillop, & Wilson, 2023). The common bonds that drove the earliest credit unions have evolved into many different types of affiliations, to include large geographies such as state or nationwide depending on the charter type. However, even large credit unions with broad geographic charters tout a unifying theme of “people helping people,” emphasizing the cooperative structure and member-oriented mission (SECU, 2025). The not-for-profit aspect of these financial cooperatives has made performance measurement a difficult task. With a member value maximization objective, as opposed to a profit maximization objective, credit unions have struggled to demonstrate performance (Ely, 2014; Nembhard, 2002; Van Puyvelde et al., 2012; van Rijn, Zeng, & Hueth, 2023).

Insert Table 1 about here

Performance for any institution should be evaluated according to its stated mission, and this is precisely how performance should be applied to credit unions. As financial cooperatives with member-owners, efficiency is a default component of performance as inefficiency is undesired by ownership of any form. Therefore, to achieve the institution’s mission in an efficient manner should embody collective performance. To evaluate an explicit mission orientation within the credit union industry, we study those credit unions with explicit social focus designations such as the LID or MDI.

Although credit unions have inherently served communities of more modest means since their founding in the late 1800s, the idea of financial institutions having an explicit focus on low-income communities in the U.S. came about in the latter half of the 20th century. The Office of Economic Opportunity (OEO) created by the Economic Opportunity Act supported credit unions specifically in need of resources to serve limited income populations (Pessin, 2025; Robinson & Gilson, 1993). With the creation of the National Credit Union Administration (NCUA) in 1970, the new regulatory agency would continue to acknowledge the benefits provided by low-income serving institutions. Regular designation of low-income credit unions became more prevalent in the 1990s and into the 2000s.

Our study period of 2015 through 2024 aligns well with the consistent application of the low-income designation. LID status is determined by the NCUA once it has gathered sufficient member data through the examination process. This formal regulatory process provides confidence in the application of the designation and avoids selection bias that may come with self-reporting. A credit union may be designated low-income if the majority of its membership earn less than 80 percent of the median income for the metropolitan area where they live or the national metropolitan area, whichever is greater. For our balanced panel covering 2,067 credit unions from 2015 through 2024, the percentage of LID credit unions consistently increases from 35.3 percent in 2015 to 56.8 percent in 2024.

To motivate the attainment of LID status, regulatory relief for federally insured credit unions includes:

- An exception to the statutory cap on member business lending, thereby expanding access to capital for small businesses within the credit union's market area;

- Eligibility for grants and low-interest loans from the Community Development Revolving Loan Fund;
- Ability to accept non-member deposits from any source; and
- Authority to issue supplemental capital (NCUA, 2025b).

The regulatory relief outlined previously is an implicit acknowledgement of incremental costs incurred to support serving populations of low to modest means. For LID credit unions, lower income and wealth results in a higher volume of lower balance accounts, putting downward pressure on average product balances per member (Cooper, 2019; Markose et al., 2022). More accounts require fixed cost infrastructure capable of handling a higher volume of accounts without the financial scale that would come with higher account balances. Incremental costs are incurred supporting financial counseling programs targeted at improving the financial well-being of credit union members with low to modest means. For the DEA model presented here, with non-interest expenses and net worth ratio as the inputs and net loans as the output, it would follow that low-income serving institutions would have lower net loan outputs relative to higher overall costs.

To further evaluate financial inclusion impact, the NCUA classifies a credit union as an MDI if a majority of its current members, board of directors, or the community it serves fall within the statutory definition of eligible minority groups¹. Although the MDI designation is obtained through a two-step self-designation process, and it has a much smaller sample size relative to the LID, we leverage the MDI data to provide an out-of-sample test of efficiency penalties arising from social mission. Combined, the LID and MDI designations provide

¹ 12 U.S.C. § 1463 (1989)

adequate samples for the evaluation of efficiency of credit unions who maintain an explicit social mission.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Credit Union Economic Theory and Performance Objectives

Flannery (1974: 55) elegantly states, “Credit unions are, by their design, peculiar institutions; in a textbook world of costless and perfect information there would be no place for them.” Flannery’s assessment came not long after Croteau (1963) had identified the inability to apply principles of economic maximization to credit unions given competing stakeholder interests inherent in their borrower/saver membership. Cooperative credit union ownership and the rights thereto are not dictated by the type of member, whether they be a borrower, saver, or both. How then do credit union owners evaluate the credit union’s performance objectives under such a dual structure? Taylor (1971) provided one of the first complete economic theories on how credit unions deliver value to their membership through efficient operations where average costs are minimized. In Taylor (1977), the author references a Member Benefit Index (MBI) as defined by John Croteau. The MBI is defined as the difference between the rate charged to borrowers and the rate paid to savers, also known as the net interest margin. The smaller the gap between these two rates, the smaller the MBI, and the more efficient the credit union is in serving the interests of its members (Taylor, 1977). Taylor posits that the optimal level of credit union output is the point at which the MBI curve, the marginal cost curve, and the average total cost curve intersect. With the inclusion of marginal costs and average total costs, Taylor’s model suggests that credit union members are best served when their economic benefit is maximized relative to costs, i.e., efficient operations. What Taylor does not address, however, is the credit union member’s opportunity cost when engaging in saving and borrowing services with the

credit union. Management may be efficient, but if credit union products are materially less attractive relative to for-profit bank products, then the cooperative is not meeting its membership's objectives.

The comparison of credit union rate decisions relative to their markets improves upon the cost minimization literature. Smith et al. (1981) identify two components of a framework to model credit union behavior. The first is the specification of an objective function to determine the degree of member value delivered. The second is to determine the degree of preference provided to savers or borrowers given the inherent conflict in the financial cooperative structure. In a riskless setting, borrower/saver value is determined by how much lower/higher the credit union sets loan/dividend rates, respectively, relative to market-based rates, with the market inclusive of for-profit banking institutions. Smith (1984) directly addresses the weakness of cost minimization objective functions as discussed previously by arguing that it does not fully address the objectives of a credit union. Rather, credit union theory must address the “unique institutional and motivational features of a credit union as a financial intermediary” (Smith, 1984: 1156). Smith (1984) concludes that optimal rates on credit union savings and loan products are significantly influenced by balance sheet composition, operating cost structure, regulatory framework, and potential borrower/saver preference. Smith (1984, 1988) both develop objective functions focused on pecuniary gains to credit union membership. Smith (1988) specifically introduced the tradeoff between benefit maximization and maintaining target net worth ratios under uncertainty, which connects to the DEA model we specify here.

Credit unions have grown significantly and evolved toward more traditional banking models in the four decades following Smith's writings (Glass & McKillop, 2006; Goddard et al., 2023). When credit unions were smaller, the connection to the community and the benefits, both

pecuniary and non-pecuniary, could be more easily understood and observed. However, with the growth and evolution toward larger, more traditional banking structures, measuring the non-pecuniary benefits remains difficult and complex. The credit union literature subsequent to the writings of Taylor and Smith has yet to fully develop performance measurement methods of a credit union's ability to deliver member value and meet members' objectives (Davis, 2007; McKillop & Wilson, 2011).

Profitability metrics such as ROA and return on equity are common measures of performance when evaluating the for-profit banking sector (van Rijn et al., 2023). However, the cooperative structure of a credit union explicitly acknowledges an organizational form where profit maximization is not a sought objective (Davis, 2007; McKillop & Wilson, 2015). The role ROA plays in a not-for-profit credit union is one of capital adjustment. Brown and Davis (2009) point out that a credit union with a net worth (capital) ratio consistent with the institution's risk profile and not growing should have an ROA of zero. In this hypothetical scenario, member wealth is maximized through higher deposit rates and lower loan rates, and net interest and non-interest revenues perfectly offset operating costs. Rubin et al. (2013) construct an inter-temporal, dynamic model of a credit union, which incorporates an optimal equity allocation influenced by member preferences. In this model, positive ROA may be generated to adjust equity upward for future member benefit. Both Brown and Davis (2009) and Rubin et al. (2013) demonstrate how ROA is not associated with a maximization objective, but rather a targeted equity adjustment objective. Therefore, to maximize member benefit, management should seek efficient operations that minimize operating costs relative to output (Fried, Knox Lovell, & Eeckaut, 1993; Glass & McKillop, 2006).

DEA as Applied to Credit Unions

Fried et al. (1993) provided one of the first comprehensive applications of DEA to credit union performance by evaluating loan and savings outputs relative to labor and capital inputs in different operating environments. In surveying the literature subsequent to Fried et al. (1993), Dia et al. (2022) establish a track record for the use of DEA in evaluating various performance aspects of credit unions. Glass & McKillop (2006) evaluate the impact to credit union efficiency given differing environmental factors such as field of membership, regional per capita income, and unemployment level. The authors concluded that different operating environments accounted for a majority of efficiency differences among their sample credit unions. Fairchild and Jia (2014) specify multiple DEA models to evaluate the efficiency of community development financial institutions (CDFIs) relative to mainstream financial institutions (MFIs). Similar to our incorporation of the net worth ratio as a firm input, the authors use the equity to asset ratio, cost of funds, and total assets as firm inputs across their three models. CDFIs were found to be no less efficient than similarly sized MFIs when accounting for environmental factors. In evaluating the efficiency of Spanish credit unions, Sierra-Fernández et al. (2019) specify a two-stage double bootstrap DEA methodology following Simar & Wilson (2007). For the second stage, the authors examine determinants of social efficiency with variables for wealth concentration, urban concentration, asset size, capital adequacy, and number of branches. Despite the established application of DEA toward credit union efficiency, we found no evaluation of efficiency among LID credit unions, an explicit regulatory distinction for serving underserved communities.

LID Credit Unions

Literature specific to LID credit unions in the United States is sparse. Gabor et al. (2025) is one of the only comprehensive evaluations of the influence of LID status on credit union profitability, risk, and growth. The authors find that LID credit unions perform well financially

according to measures of ROA, net interest margin (NIM), and credit risk. Additionally, asset growth and membership growth showed significant positive relationships with LID status.

While Gabor et al. (2025) shows the viability of financial inclusion efforts among U.S. credit unions, the study does not address whether there is a relative cost to pursuing these financial inclusion efforts. Here, we evaluate credit union performance according to the efficiency objectives discussed previously, and test whether the strong financial performance documented by Gabor et al. (2025) may mask incremental operating costs associated with serving underserved communities.

Member Acceptance of Social Mission

Gómez-Biscarri et al. (2022) evaluate whether credit union members exhibit preferences for institutions with certain characteristics and find evidence of depositor discipline. Specifically, the authors find that credit union depositors prefer higher capital ratios and operating performance. Given this evidence of depositor discipline, persistent deposit growth despite higher costs should indicate member acceptance of a broader institutional mission. In discussing the stewardship and stakeholder aspects of cooperative membership, Van Puyvelde et al. (2012) describe benefits and rewards stemming from organizational ideology and mission. Byrne & McCarthy (2014) survey 800 credit union members regarding the value proposition of credit union membership and find that members value intangible, relationship aspects of the institution as much if not more than the tangible, monetary benefits.

Hypothesis Development

We previously established that LID credit unions perform well financially; however, the financial performance measures evaluated do not capture the member benefit objectives

discussed in the literature on credit union theory. The theory suggests that members desire pecuniary and non-pecuniary benefits provided in an efficient manner, thereby demonstrating the highest and best use of members' ownership stake in the credit union. Serving underserved, lower income communities likely delivers on aspects of the non-pecuniary benefits desired by credit union members; however, the banking relationships brought by underserved, lower-income members reduce the scalability of operating costs. These scale limitations are more likely to manifest through higher operating expenses such as employee compensation and servicing costs than through distinct differences in capital allocation.

Hypothesis 1. LID status is negatively associated with credit union efficiency.

Hypothesis 2. The efficiency penalty is predominantly related to operating costs rather than the misallocation of capital.

Hypothesis 3. Member share growth remains positive despite efficiency penalties (member acceptance).

DATA AND METHODOLOGY

Data Sources

Annual, year-end financial data for U.S. credit unions were obtained from NCUA 5300 Call Reports for the period of 2013 through 2024. Two additional years of data were pulled to precede the study period to allow for the construction of lagged variables over the 10-year study period. Merger data spanning the entirety of the study period was obtained from two sources, the NCUA's merger reporting tool available on its website and a Freedom of Information Act request to obtain merger data older than 3 years. Supplementary mortgage loan transaction data for borrowers in low-to-moderate income areas and areas with a predominant minority population were obtained from the Consumer Financial Protection Bureau and the Federal

Financial Institutions Examination Council's Home Mortgage Disclosure Act reporting platforms.

LID status is reported in the institutional profile data submitted along with the quarterly 5300 reports and is consistently available across all publicly archived quarters dating to March 1994. The MDI designation first appears in the Call Report data in December 2011. Prior to 2022, MDI status was reported in a separate Call Report schedule before transitioning to the institutional profile data consistent with LID reporting.

Sample Construction

The sample construction filters are shown in Table 2. The study period was 2015 through 2024; however, two additional years were obtained on the front-end to provide for the calculation of lagged variables. To evaluate credit unions of sufficient size and operating structure, we excluded credit unions with total assets less than \$50 million consistent with recent U.S. credit union research (Goddard et al., 2023; Gomez-Biscarri, López-Espinosa, & Mesa-Toro, 2021; Gómez-Biscarri et al., 2022). To ensure consistency in the evaluation of efficiency, we employ a balanced panel by excluding any credit unions that did not have complete data for the 10-year study period. This ultimately leads to survivorship bias since it excludes credit unions that failed, merged, or began during the study period. For the DEA analysis, the balanced panel ensures the same credit unions define the efficiency frontier each year, preventing impacts to LID efficiency evaluation due to compositional changes.

Insert Table 2 about here

DEA Model

To evaluate credit union efficiency, we employ DEA and define an input/output model with total non-interest expense and net worth ratio as the inputs and total loans net of the allowance for credit losses (ACL) as the output. Specifically, we use an input-oriented model under variable returns to scale (VRS). Non-interest expense represents the annual costs to support operations and the production of goods and services for credit union members. The net worth ratio represents the equity position that supports the membership's ownership stake in credit union assets as well as the solvency buffer to ensure continued operation. Our model aligns with the intermediation approach put forth by Sealey Jr. and Lindley (1977). In contrast with Sealey Jr. and Lindley, we focus solely on loans net of the ACL as the single output since it represents a clear product output for the credit union. Relative to for-profit banks, not-for profit credit unions are less likely to reach for total return within their investment book. Rather, the credit union's investment portfolio represents a liquidity buffer to support the mission driven aspects of the institution's loan and deposit activities. We depart from a pure intermediation approach by not using deposits as an input to the model, since for credit unions, deposits have been defined as both an input and an output (Dia et al., 2022). Fairchild and Jia (2014) include the equity ratio, a proxy for the net worth ratio, as one of three firm input variables and the value of originated loans as one of four firm output variables when studying the efficiency of community development financial institution compared to non-CDFI counterparts.

Sierra-Fernández et al. (2019) perform a two-stage double bootstrap DEA approach following Algorithm 2 developed by Simar and Wilson (2007), as we do here. The authors specify personnel expenses, amortization expenses, and interest expenses as the inputs. To focus on social impact, the authors define customer socialization and financial inclusion variables as the outputs, which deviates from our hybrid intermediation approach. As performed elsewhere in

the credit union efficiency literature, we follow Simar and Wilson (2007) specifically to address the upward bias in raw efficiency scores. In our case, the 2,000 bootstrap replications to estimate and correct the bias reduces frontier observations from 19 to 2 and lowers mean efficiency from approximately 0.516 to 0.473. Our specification with operating expense and net worth ratio inputs and net loan outputs does not address non-lending service outputs; however, with only two inputs and one output, our relatively simple DEA specification adequately addresses dimensionality thresholds with such a large dataset (Sarkis, 2007).

Second-Stage Regression

To identify the determinants of efficiency variation across credit unions, we estimate the following truncated regression model consistent with Simar and Wilson (2007) Algorithm #2:

$$Efficiency_{i,t}^{BC} = \beta_0 + \beta_1 LID_{i,t} + \beta_2 MDI_{i,t} + \beta_3 \ln(Charitable_{i,t} + 1) + \beta_4 NPL_{i,t} + \beta_5 \ln(Assets_{i,t}) + \beta_6 SharesGrowth_{i,t} + \gamma_t + \delta_s + \varepsilon_{i,t} \quad (1)$$

where:

$Efficiency_{i,t}^{BC}$ is the bias-corrected DEA efficiency score for credit union i in year t , with an upper truncation point at 1;

$LID_{i,t}$ is a binary indicator equal to 1 if the credit union holds the Low-Income Designation;

$MDI_{i,t}$ is a binary indicator equal to 1 if the credit union is designated as a Minority Depository Institution;

$\ln(Charitable_{i,t} + 1)$ is the natural log of one plus the charitable donation account balance;

$NPL_{i,t}$ is the ratio of loans delinquent two or more months to total loans;

$\ln(Assets_{i,t})$ is the natural log of total assets;

$SharesGrowth_{i,t}$ is the annual percentage change in member shares;

γ_t are year fixed effects;

δ_s are state fixed effects; and

$\varepsilon_{i,t}$ is the error term.

We employ truncated regression given the bounded nature of DEA efficiency scores, which violate standard OLS assumptions (Simar & Wilson, 2007). Two observations remain on the frontier post bias-correction (efficiency=1), and they are subsequently removed from sample since they maintain no information regarding inefficiency determinants. To control for a social mission not explicitly related to LID or MDI status, we use the natural log transformation of charitable donation account funding (NCUA 5300 ACCT_789H) plus 1. We purposefully exclude non-member shares to isolate the membership's potential response to inefficiency related to mission orientation. OLS specifications are presented as confirmatory evidence.

Summary Statistics

The balanced panel of our data is evenly represented between LID credit union observations at 49.2 percent of the sample and non-LID credit union observations at 50.8 percent of the sample. Table 3 presents summary statistics for the key variables used in the DEA and second stage regression. Table 4 shows there are statistically significant differences between the mean size of LID vs. non-LID credit unions with LID credit unions smaller in assets and relatedly, member shares and loans. There is no significant difference among means of non-interest expenses or net worth ratios, the two inputs used in the DEA model; however, our DEA framework reveals a significant efficiency differential when modeled in terms of net loan output. The temporal trends presented in Table 5 demonstrate the growing percentage of LID credit unions over time with an overall increasing efficiency gap relative to non-LID credit unions.

Insert Table 3 about here

Insert Table 4 about here

Insert Table 5 about here

RESULTS

DEA Efficiency Scores

The credit unions observed during our sample period operate well below the efficiency frontier, with a mean, bias corrected efficiency score of 47.3 percent (Table 6). Prior to bias correction, 19 observations (credit union-year combinations) were on the frontier, and post bias correction, only 2 observations remained on the frontier. The decline in frontier observations from 19 to 2 reflects the upward bias inherent in the finite-sample DEA scores that the Simar and Wilson (2007) bootstrap procedure addresses. For the uncorrected and corrected efficiency score outputs, the mean efficiency score for LID credit unions is less than non-LID credit unions by 2.50 percent and 2.26 percent, respectively, with a p-value of less than 0.001. The bias corrected scores show that no LID credit unions lie on the frontier.

Insert Table 6 about here

Insert Figure 1 about here

Main Regression Results

Results of the truncated regression are presented in Table 7. Model 1 confirms the efficiency penalty for LID credit unions compared to non-LID credit unions. For model 2, we add MDI, charitable funding (log CDA), credit quality (ratio of non-performing loans to total

loans), and size (log Assets) to isolate the mission-oriented impact on efficiency. The efficiency penalty for LID is reduced by 0.28 percent, but remains statistically significant at negative 1.97 percent. Notably, the MDI efficiency penalty in Model 2 is negative 2.04 percent, consistent with the LID efficiency penalty and supportive of the notion that serving underserved populations is resource intensive. Model three incorporates state fixed effects and model 4 incorporates both state and year fixed effects. The efficiency penalties remain with the inclusion of the fixed effects, but the LID penalty reduces to negative 0.98 percent while the MDI penalty worsens to 2.55 percent, indicating the concentration of MDI institutions within specific states where within-state comparisons emphasize the efficiency gap relative to the national pooled estimates. For our preferred specification, model 5 incorporates year-over-year growth in member shares to assess the potential impact for depositor discipline for less efficient institutions (Gómez-Biscarri et al., 2022). Interestingly, the coefficient for member share growth is positive with a p-value <0.01. This finding suggests that LID credit union membership is supportive of their respective credit union's mission to promote financial inclusion as both LID and MDI coefficients remain statistically significant and negative.

Insert Table 7 about here

Temporal Analysis

The negative coefficient for LID credit unions persists throughout the study period (Table 8). Statistical significance increases from marginally significant in 2017 through 2019 to highly significant 2021 onward. Also consistent throughout the study period is the year-over-year percentage increase of LID credit unions relative to the balanced sample. As the percentage of LID credit unions increases, the efficiency penalty bottoms in 2022 before moderating in 2023

and 2024; however, the broad linear trend over the 10-year study period is -0.002 percent ($p < 0.01$). The 2020 to 2024 period brought with it significant monetary and financial stimulus related to the COVID-19 pandemic, leading to volatility in both deposit and loan growth over this sub-period. The pandemic period brought with it severe economic shocks to low-income households, whether it was families coping with a need for childcare given school closures, or a reduction in wages given shutdowns. It is plausible that one aspect of the LID economic penalty during the pandemic period were increased operational costs incurred supporting lower-income households who are more impacted by economic shocks such as the COVID-19 pandemic (Colarieti, Mei, & Stantcheva, 2024; Westbrook, 2024).

Insert Table 8 about here

Insert Figure 2 about here

ROBUSTNESS AND MECHANISMS

Robustness

Baseline truncated regression results for model 5 along with robustness specifications are shown in Table 9. The LID coefficient remains negative for nine of nine non-placebo model specifications and significant for eight out of nine. The negative LID coefficient is significant at $p < 0.01$ for OLS, size quartile specifications from the second quartile through the fourth quartile (largest quartile). State fixed effects for a concentration of LID credit unions in select states lead to the lack of significance for the smallest quartile. When evaluating sample sub-periods, the LID effect remains consistent and significant for each sub-period. Removing outliers at the 1st and 99th percentile reduces the impact, but the direction and significance of the LID effect persist.

Random assignment of LID status confirms that the estimated efficiency penalty is specific to LID credit unions and not the model specification. Lastly, consistent with Gabor et al. (2025) who find that financial performance improves post-designation, we find no adverse impact to efficiency post-designation for the 489 credit unions within our sample that gained LID status during our sample period.

Insert Table 9 about here

Insert Figure 3 about here

Mechanism Analysis

To better understand the efficiency penalty effect for LID credit unions, we break down non-interest expenses into its component parts provided by the NCUA 5300 report. Table 10 shows that for our sample period, LID credit unions have significantly higher expense categories for nine of ten of the non-interest expense sub accounts, when comparing non-interest expenses to total assets. The largest differential is for employee compensation and benefits, supportive of the notion that LID credit unions require relatively more human resources to manage the operational aspects of higher quantities of lower balanced accounts. Figure 4 shows expense differentials for LID versus non-LID credit unions for the top four expense categories over the sample period. As shown in Figure 4, employee compensation and benefits are persistently higher at LID credit unions versus non-LID credit unions from 19 to 23 basis points of assets over the sample period. The decline in the employee compensation and benefits differential during the pandemic period is most likely related to rapid asset growth spurred by COVID era fiscal and monetary stimulus. The compensation and benefits differential expands to a period

high in 2024 along with post-pandemic economic normalization. To further the point that the efficiency penalty operates through the operating expense input, the other input, net worth ratio, is statistically indistinguishable between LID and non-LID credit unions (11.23 percent vs. 11.28 percent, $p=0.256$, Table 4). This confirms that LID credit unions operate with capital levels similar to peers, and the efficiency differential is driven by higher operating costs incurred serving lower-income populations.

Insert Table 10 about here

Insert Figure 4 about here

Member Acceptance

Following Gómez-Biscarri et al. (2022), we evaluate whether depositors punish LID credit unions for the relative inefficiency. Gómez-Biscarri et al. (2022) suggest that LID indicates a lower degree of financial literacy, which suggests less depositor discipline. The findings shown in Table 11 and Figure 5 are consistent with the notion that members are accepting of the mission orientation to serve lower-income populations. While the data cannot isolate individual member deposit decisions, the aggregate deposit growth is dollar-weighted and therefore disproportionately reflects the behavior of members with meaningful balances; these members are more likely to have viable alternatives to the credit union. Table 11 shows three specifications of OLS models with annual percentage growth of member shares as the dependent variable. Model 1 shows that share growth is positively correlated with loan production efficiency while controlling for asset size, credit quality, and fixed effects for year and state. Without considering LID status, members appear to favor efficient operations, which is

consistent with Gómez-Biscarri et al. (2022). Model 2 introduces LID status, which is significant and positively correlated with share growth given the same controls. Model 2 does not alone determine whether or not the LID status growth premium is due to a lack of financial literacy or a conscious acceptance of the social mission. Model 3 restricts the sample to credit unions with below median efficiency and the positive correlation with LID status persists with significance. Even for the least efficient institutions, member share growth remains statistically discernible and positive for LID credit unions. This finding suggests that it is not purely a lack of financial literacy leading to higher overall member share growth, as significant inefficiency would likely become apparent to those with a minimal degree of financial literacy. Figure 5 graphically breaks out mean member share growth among efficiency quartiles.

Insert Table 11 about here

Insert Figure 5 about here

CONCLUSION

Given the not-for-profit, financial cooperative organizational structure of credit unions, member benefit maximization delivered in an efficient manner is a well-supported theoretical objective of these financial institutions. Employing a two-stage DEA with Simar and Wilson (2007, Algorithm #2) bootstrap truncated regression for a balanced panel of 2,067 credit unions from 2015 through 2024, we find that LID credit unions operate 1.03 percentage points lower, bias-corrected efficiency than non-LID credit unions. Non-interest expenses differ significantly between LID and non-LID credit unions as a percentage of assets, while net worth does not. This finding along with a trend analysis of operating costs subcomponents reveals that the efficiency

penalty is predominantly borne through expenses, rather than poor capital allocations, with employee compensation and office operating costs comprising the material differences (see Table 10 and Figure 4). Deposit growth analysis (Table 11 and Figure 5) shows that average annual deposit growth at LID credit unions is almost 1 percentage point higher than non-LID credit unions. This significant growth differential suggests some degree of member acceptance or non-monetary value accrual to the membership, thereby offsetting some portion of the operating efficiency penalty.

The estimated dollar cost of the LID efficiency penalty is shown in Appendix Table A1. Over the 10-year sample period, LID credit unions incurred inefficiency costs of approximately \$2.4 billion based on the two-stage DEA truncated regression estimates. This quantification of the costs incurred to promote financial inclusion has meaningful implications. Policymakers and regulatory agencies, such as the NCUA, now have empirical cost estimates for the efficiency burden that LID credit unions bear in serving underserved communities. Given the material cost differentials in employee compensation and office operations, policymakers should consider targeted support such as training grants or technology subsidies. Without targeted support in these areas, particularly amidst rapid technological change in financial services, the social mission value proposition may eventually become insufficient to offset the efficiency tradeoff for members.

Although our results prove robust through several alternative model specifications, limitations remain. As Gabor et al. (2025) appropriately document, the NCUA modified the LID eligibility criteria and application process in 2012 to proactively identify LID eligibility through the examination process. This proactive designation approach helps to reduce self-selection of the designation, but the designation remains non-random, and unobservable credit union

characteristics correlated with LID status may influence the efficiency estimates. Our balanced panel comes with inherent survivorship bias. Intuition would suggest that credit unions that merged or failed were not likely high efficiency institutions, but the efficiency aspects of these failed or merged institutions are not discernible from the surviving institutions with which they combined. The DEA is cross-sectional within each year, so efficiency scores are not directly comparable across time. A widening of the efficiency gap, as shown in Table 5, provides an observable trend for the efficiency penalties incurred by LID credit unions; however, there is also a clear trend of the prevalence of LID credit unions over the sample period. We do not evaluate whether the widening gap reflects compositional change from increasing LID prevalence or a genuine worsening of the efficiency channel; future research may consider this specific question. Our DEA specification only contains two inputs with one net output, which is limited relative to many of the DEA specifications in the literature (Dia et al., 2022). Future research could assess a broader set of inputs and outputs relative to LID status. Lastly, Davidson et al. (2025) find significant relationships between local religiosity and the same expense categories identified in this study, suggesting that interactions between mission designations and operating environment may further explain efficiency variation across credit unions.

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TABLES

Table 1. Social Designation Prevalence by Year

Year	Total_CUs	LID_N	LID_%	MDI_N	MDI_%
2015	2,067	729	35.3	148	7.2
2016	2,067	852	41.2	148	7.2
2017	2,067	909	44.0	150	7.3
2018	2,067	971	47.0	154	7.5
2019	2,067	1,037	50.2	157	7.6
2020	2,067	1,084	52.4	169	8.2
2021	2,067	1,113	53.8	176	8.5
2022	2,067	1,153	55.8	179	8.7
2023	2,067	1,153	55.8	183	8.9
2024	2,067	1,175	56.8	104	5.0
Total	2,067	10,176	49.2	1,568	7.6

Notes: LID = Low Income Designated. MDI = Minority Depository Institution.

Table 2. Sample Construction

Step	Description	Observations	Credit_Unions
1. Initial raw data	Complete 5300 Call Report data (Year-end, 2013-2024)	66,045	6,719
2. Filter to study period	Restrict to 2015-2024	52,956	6,171
3. Asset size filter	Assets > \$50 million	23,979	2,730
4. Balanced panel	10 complete years (2015-2024)	20,720	2,072
5. Data quality filters	Remove problematic CUs + valid efficiency scores	20,720	2,072
6. Final analysis sample	Analysis-ready balanced panel	20,670	2,067

Notes: Initial data from NCUA 5300 Call Reports.

Table 3. Descriptive Statistics (N = 2,067 CUs, 20,670 observations)

Variable	N	Mean	Std_Dev	Min	P25	Median	P75	Max
Total Assets (\$)	20,670	815,478,438	3,470,815,435	50,011,867	109,832,062	224,955,253	633,151,806	180,813,031,049
Member Shares (\$)	20,670	684,463,542	2,855,667,218	37,622,189	95,547,089	195,062,259	535,993,341	151,836,184,391
Member Loans (\$)	20,670	559,428,608	2,427,327,662	2,938,482	62,997,088	140,170,722	421,542,561	134,833,788,602
Non-interest Expenses (\$)	20,670	23,534,330	99,017,230	404,466	3,663,030	7,734,935	20,758,616	6,029,874,140
ACL (\$)	20,670	5,605,985	60,544,584	-34,753	380,746	982,880	3,212,576	4,942,254,045
Net Loans (\$)	20,670	553,822,623	2,373,364,623	2,906,089	62,449,136	138,860,428	417,973,016	129,891,534,557
Net Worth Ratio	20,670	0.11	0.03	0.03	0.09	0.11	0.13	0.44

Table 4. Descriptive Statistics by LID Status

LID: N = 1,196 CUs, 10,176 observations (49.2%)

Non-LID: N = 1,360 CUs, 10,494 observations (50.8%)

Variable	Mean (LID)	SD (LID)	Mean (Non-LID)	SD (Non-LID)	Diff.
Total Assets (\$)	710,744,115	1,422,887,312	917,038,993	4,663,151,451	**
Member Shares (\$)	597,599,654	1,196,770,142	768,695,192	3,828,843,433	**
Member Loans (\$)	505,620,101	1,069,693,909	611,606,555	3,238,941,539	**
Non-interest Expenses (\$)	22,468,890	40,125,627	24,567,484	133,226,074	
ACL (\$)	4,679,186	12,605,637	6,504,699	84,052,512	*
Net Loans (\$)	500,940,914	1,058,600,157	605,101,856	3,162,836,206	**
Net Worth Ratio	0.11	0.03	0.11	0.03	

† p < .10, * p < .05, ** p < .01. Significance based on two-sample t-test of LID vs Non-LID means.

Table 5. Temporal Trends (2015-2024)

YEAR	N_Total	N_CUs	N_LID	Pct_LID	Mean_Efficiency	Mean_Eff_LID	Mean_Eff_NonLID	Efficiency_Gap
2015	2,067	2,067	729	35.3%	0.49	0.48	0.49	0.01
2016	2,067	2,067	852	41.2%	0.48	0.48	0.49	0.01
2017	2,067	2,067	909	44.0%	0.48	0.47	0.49	0.01
2018	2,067	2,067	971	47.0%	0.47	0.46	0.47	0.02
2019	2,067	2,067	1,037	50.2%	0.46	0.45	0.47	0.02
2020	2,067	2,067	1,084	52.4%	0.49	0.48	0.50	0.02
2021	2,067	2,067	1,113	53.8%	0.49	0.48	0.51	0.03
2022	2,067	2,067	1,153	55.8%	0.48	0.46	0.50	0.03
2023	2,067	2,067	1,153	55.8%	0.46	0.44	0.47	0.03
2024	2,067	2,067	1,175	56.8%	0.44	0.43	0.46	0.03

Notes: Shows growth in LID prevalence and widening of efficiency gap over time.

Table 6. DEA Efficiency Scores

Statistic	Full Sample	LID	Non-LID	Difference	P-Value
Original DEA Efficiency					
Mean	0.52	0.50	0.53	-0.03	< .001
Median	0.50	0.49	0.52		
Std. Dev.	0.11	0.10	0.11		
Min	0.18	0.18	0.21		
Max	1.00	1.00	1.00		
P25	0.44	0.43	0.45		
P75	0.58	0.56	0.59		
On Frontier (N)	19	3	16		
On Frontier (%)	0.1%	0.0%	0.2%		
Bias-Corrected DEA Efficiency					
Mean	0.47	0.46	0.48	-0.02	< .001
Median	0.46	0.45	0.47		
Std. Dev.	0.10	0.09	0.10		
Min	0.19	0.19	0.22		
Max	1.00	0.98	1.00		
P25	0.41	0.40	0.42		
P75	0.53	0.52	0.54		
On Frontier (N)	2	0	2		
On Frontier (%)	0.0%	0.0%	0.0%		
Observations	20,670	10,176	10,494		
Credit Unions	2,067	1,196	1,360		

Notes: Original DEA efficiency computed using input-oriented VRS specification. Bias-corrected efficiency from Simar and Wilson (2007) Algorithm #2 bootstrap bias correction (2,000 replications).

Table 7. The Effect of Low-Income Designation on Credit Union Efficiency*Dependent Variable: Bias-Corrected DEA Efficiency Score*

Variable	Model_1	Model_2	Model_3	Model_4	Model_5
Low Income Designation	-0.0225** (0.0014)	-0.0197** (0.0013)	-0.0100** (0.0013)	-0.0098** (0.0013)	-0.0103** (0.0013)
Minority Depository Institution		-0.0204** (0.0024)	-0.0234** (0.0026)	-0.0255** (0.0026)	-0.0256** (0.0026)
Log(Charitable Donations + 1)		0.0002 (0.0002)	0.0003† (0.0002)	0.0004* (0.0002)	0.0004* (0.0002)
NPL Ratio		0.1019 (0.0819)	-0.0235 (0.0819)	0.1785* (0.0821)	0.2036* (0.0821)
Log(Assets)		-0.0276** (0.0005)	-0.0287** (0.0005)	-0.0287** (0.0005)	-0.0292** (0.0006)
Member Shares Growth (%)					0.0005** (0.0001)
State FE	No	No	Yes	Yes	Yes
Year FE	No	No	No	Yes	Yes
Observations	20,668	20,668	20,668	20,668	20,617
Pseudo R ²	0.01	0.13	0.19	0.21	0.21

† p < .10, * p < .05, ** p < .01. Standard errors in parentheses. Truncated regression following Simar and Wilson (2007). Frontier observations excluded.

Table 8. LID Efficiency Penalty by Year

Year	N	LID_Coef	Std_Error	P_Value	Sig
2015	2,067	-0.0029	0.0045	0.51	
2016	2,067	-0.0046	0.0043	0.29	
2017	2,067	-0.0074	0.0042	0.08	†
2018	2,067	-0.0072	0.0041	0.08	†
2019	2,067	-0.0077	0.0040	0.05	†
2020	2,067	-0.0094	0.0042	0.02	*
2021	2,067	-0.0176	0.0043	< .001	**
2022	2,067	-0.0195	0.0043	< .001	**
2023	2,067	-0.0176	0.0041	< .001	**
2024	2,065	-0.0143	0.0040	< .001	**

Linear trend: -0.001745 per year (p< .001)

Table 9. Robustness of LID Efficiency Penalty

Category	Specification	LID_Coef	Std_Error	P_Value	Sig	N
Baseline	Truncated Reg., Full FE	-0.0103	0.0013	< .001	**	20,668
Size Quartiles	Q1 (Smallest) [OLS]	-0.0011	0.0027	0.68		5,168
Size Quartiles	Q2 [OLS]	-0.0168	0.0023	< .001	**	5,168
Size Quartiles	Q3 [OLS]	-0.0074	0.0019	< .001	**	5,167
Size Quartiles	Q4 (Largest) [OLS]	-0.0110	0.0023	< .001	**	5,167
Time Periods	2015-2017 [OLS]	-0.0054	0.0025	0.03	*	6,201
Time Periods	2018-2020 [OLS]	-0.0085	0.0024	< .001	**	6,201
Time Periods	2021-2024 [OLS]	-0.0183	0.0021	< .001	**	8,268
Sensitivity	Exclude 1st/99th pctl. [OLS]	-0.0060	0.0012	< .001	**	20,256
Placebo	Random LID Assignment [OLS]	0.0002	0.0012	0.87		20,670

† p < .10, * p < .05, ** p < .01. Standard errors in parentheses. Baseline estimated via truncated regression following Simar and Wilson (2007); robustness checks use OLS to demonstrate result stability across estimation methods. All specifications include state fixed effects, year fixed effects, and member share growth consistent with Model 5. Frontier observations (efficiency = 1) excluded from truncated regression.

Table 10. Operating Expense Decomposition by LID Status*Values in basis points of total assets*

Category	LID_Mean_bps	NonLID_Mean_bps	Difference_bps	Sig
Employee Compensation & Benefits	177.9	158.8	19.1	**
Office Operations	67.7	59.0	8.7	**
Professional & Outside Services	37.8	33.6	4.2	**
Office Occupancy	23.2	21.3	1.9	**
Loan Servicing Expense	23.8	22.1	1.8	**
Educational & Promotional	11.8	10.7	1.1	**
Travel & Conference	3.6	3.0	0.6	**
Miscellaneous Operating	8.0	7.5	0.5	**
Operating Fees (Exam/Supervision)	1.8	1.7	0.1	**
Member Insurance	0.2	0.2	-0.0	

Notes: ** $p < .01$, * $p < .05$, † $p < .10$. Sorted by absolute difference.

Table 11. Member Acceptance of Efficiency Costs*Dependent Variable: Member Shares Growth (%)*

Variable	Model 1	Model 2	Model 3
Efficiency Score	2.1415** (0.5033)	2.4248** (0.5030)	--
LID	--	0.9299** (0.0973)	0.8110** (0.1465)
Log Assets	1.4054** (0.0406)	1.4052** (0.0405)	1.4688** (0.0671)
NPL Ratio	-27.7200** (5.9319)	-33.7680** (5.9526)	-4.7778 (11.6292)
Observations	20,619	20,619	10,329
R2	0.444	0.446	0.415
Year FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Sample	Full	Full	Low Eff
Mean Dep. Var (LID)	6.60%	6.60%	6.42%
Mean Dep. Var (Non-LID)	5.70%	5.70%	5.80%

Notes: ** $p < .01$, * $p < .05$, † $p < .10$. Standard errors in parentheses. Model 3 restricts sample to below-median efficiency CUs.

APPENDIX

Table A1. Dollar Cost of LID Efficiency Penalty

Year	N (LID CU-Yrs)	Excess OpEx (\$M)	Cost/CU (\$)	Cost/Member (\$)
2015	729	\$ 104.0	\$142,715	\$3.70
2016	852	\$ 132.6	\$155,596	\$3.81
2017	909	\$ 151.1	\$166,184	\$3.92
2018	971	\$ 179.0	\$184,364	\$4.09
2019	1,037	\$ 218.8	\$211,040	\$4.32
2020	1,084	\$ 247.6	\$228,385	\$4.41
2021	1,113	\$ 276.2	\$248,166	\$4.60
2022	1,153	\$ 316.4	\$274,398	\$4.87
2023	1,153	\$ 349.2	\$302,845	\$5.20
2024	1,175	\$ 382.1	\$325,184	\$5.49
Total	10,176	\$2,357.0	\$223,888	\$4.44

Notes: Based on LID efficiency penalty of 1.03 pp from Table 7, Model 5. Excess costs = penalty x non-interest expenses. Total row: cumulative for Excess OpEx; average for Cost/CU and Cost/Member.

Table A2. Minority Depository Institution Comparison (N = 197 CUs, 1,568 observations)

Variable	N	Mean	Std_Dev	Min	P25	Median	P75	Max
Total Assets (\$)	1,568	606,833,419	1,832,646,721	50,311,097	101,141,590	198,430,380	544,722,596	29,222,243,466
Member Shares (\$)	1,568	515,124,287	1,558,179,195	38,714,796	86,389,644	169,267,275	456,014,648	24,285,244,632
Member Loans (\$)	1,568	388,514,849	1,117,312,832	8,188,296	53,155,845	122,825,508	333,673,742	19,062,620,185
Non-interest Expenses (\$)	1,568	18,788,640	41,186,888	669,142	3,971,837	7,218,148	17,307,836	593,916,618
ACL (\$)	1,568	3,986,912	10,435,196	19,159	457,569	1,110,046	3,182,536	151,973,197
Net Loans (\$)	1,568	384,527,937	1,107,736,848	7,786,630	52,410,484	121,856,617	331,170,813	18,910,646,988
Net Worth Ratio	1,568	0.12	0.04	0.05	0.09	0.11	0.13	0.28

Notes: Confirmatory evidence that broader social mission commitments face efficiency tradeoffs. MDI institutions show -2.56 pp efficiency penalty ($p < 0.01$), consistent with LID findings.

FIGURES

Figure 1. Distribution of Bias-Corrected DEA Efficiency Scores by LID Status

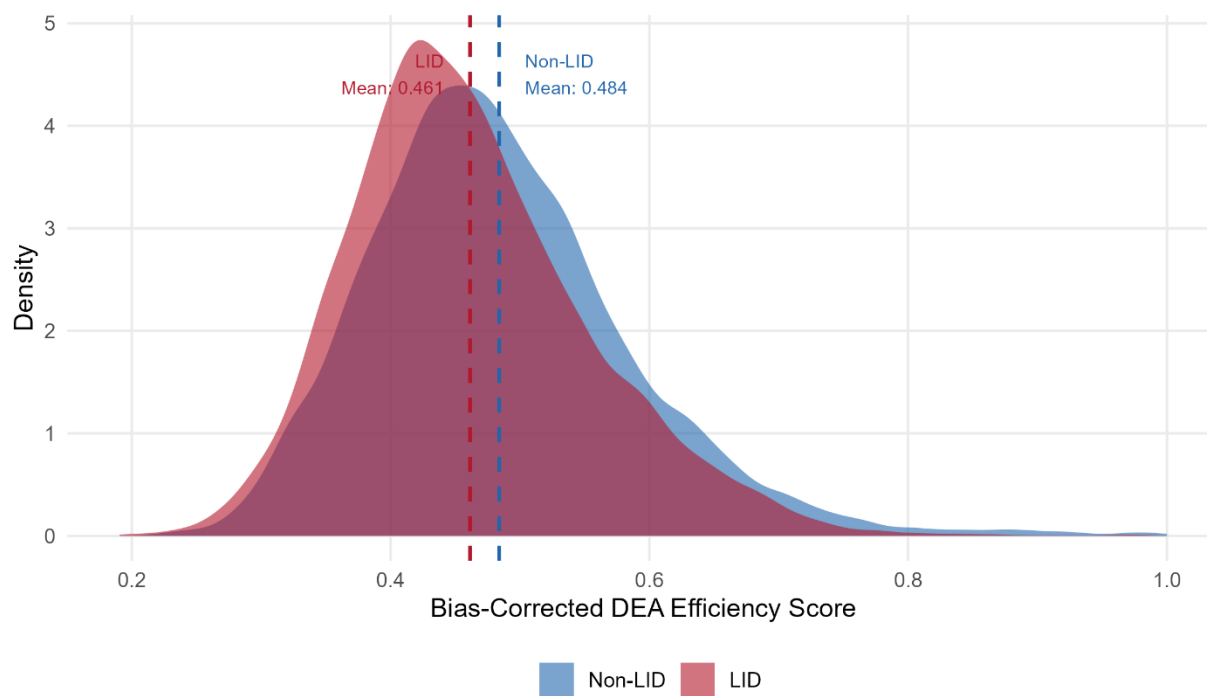


Figure 2. LID Efficiency Penalty by Year (2015–2024)

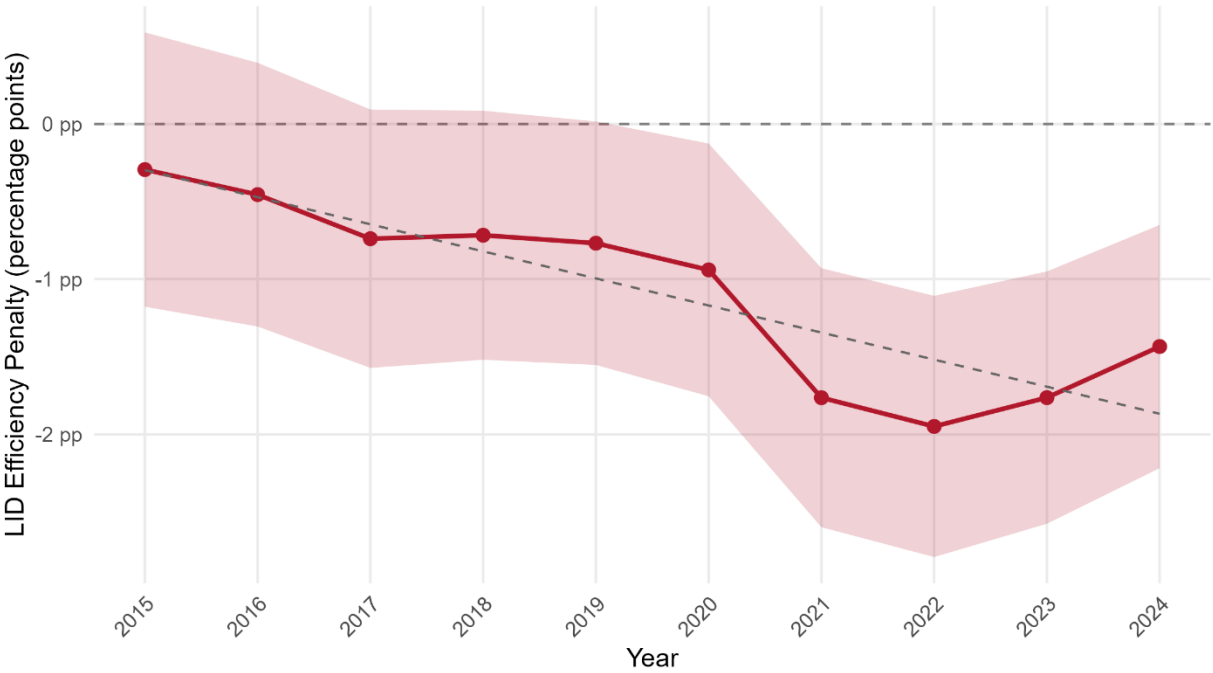
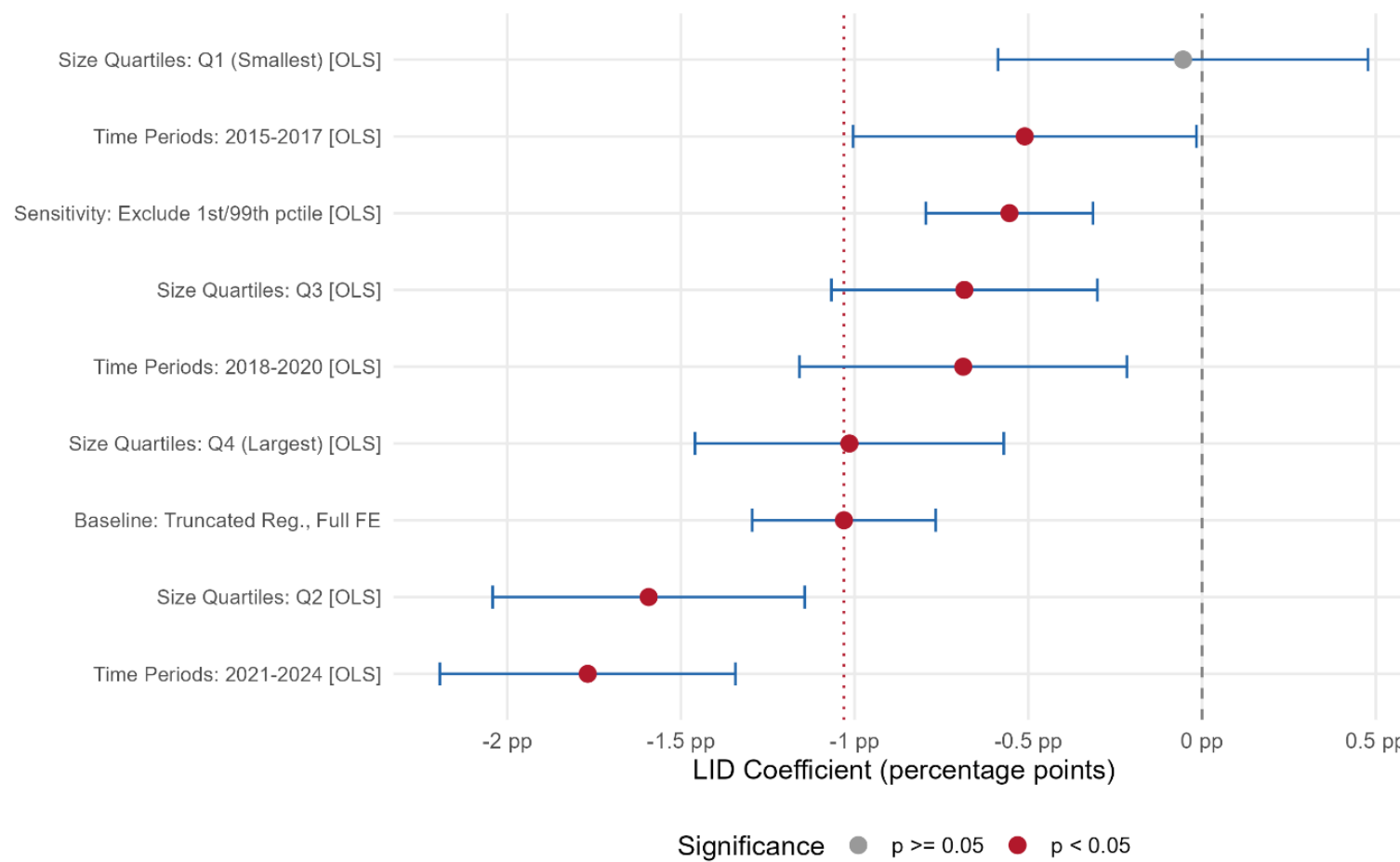
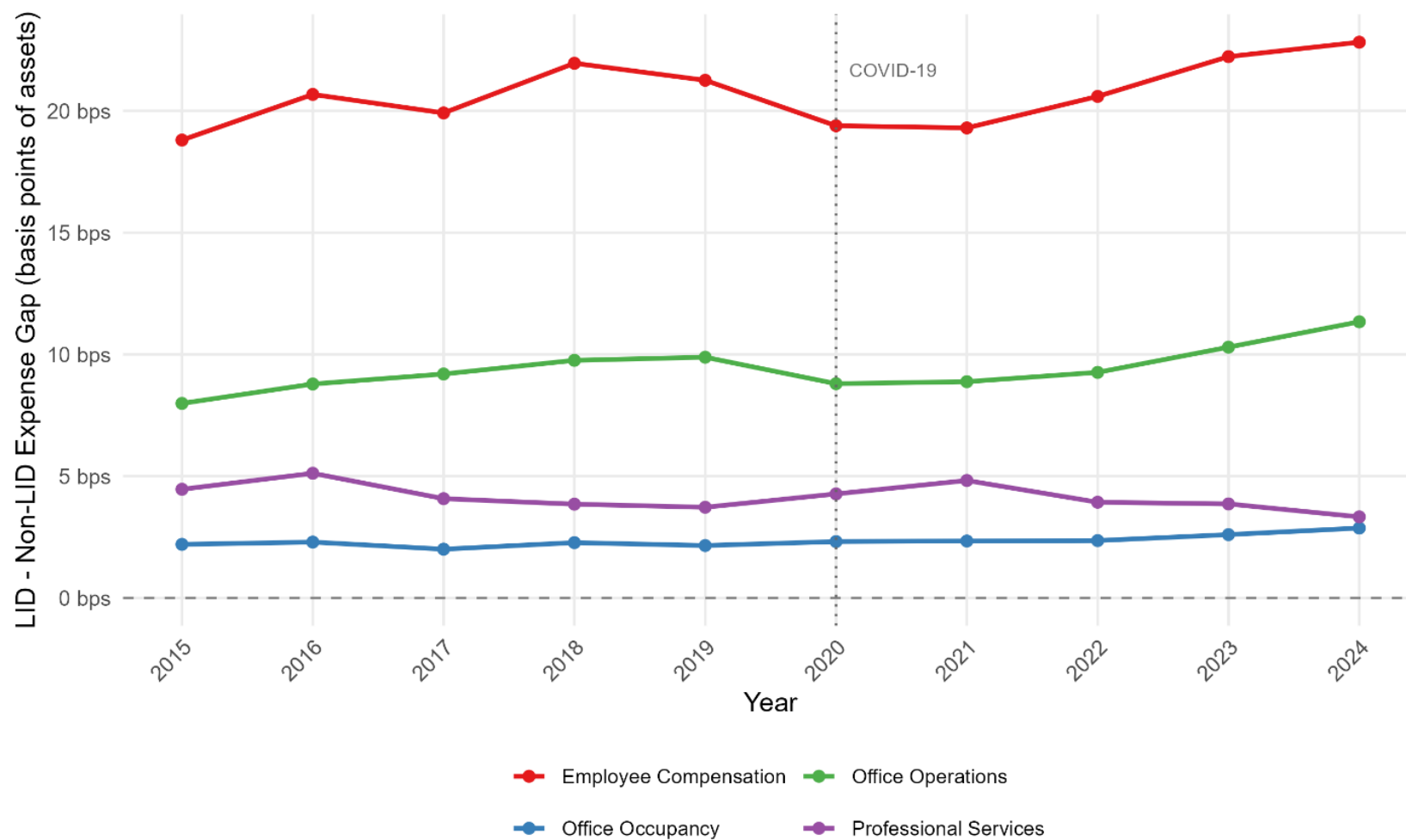


Figure 3. Robustness of LID Efficiency Penalty Across Specifications



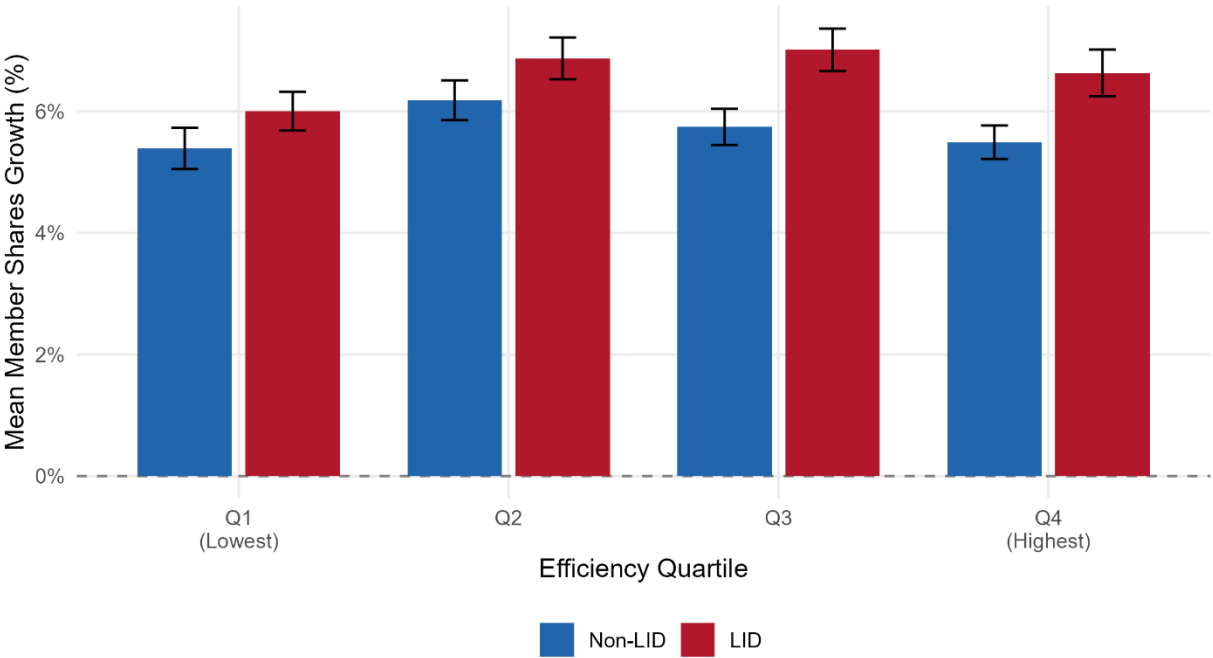
Note: Dotted line shows baseline estimate. Error bars represent 95% confidence intervals.

Figure 4. LID–Non-LID Expense Gap by Category (2015–2024)



Note: Gap = LID mean minus Non-LID mean, each normalized by total assets. Positive values indicate higher costs for LID credit unions.

Figure 5. Mean Member Shares Growth by Efficiency Quartile and LID Status



Note: Error bars represent 95% confidence intervals.