

Optometry Associations and the Free Rider Problem Revisited

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Abstract

Members of professional associations pay dues to professional associations for a variety of reasons, including lobbying. This can lead to a free-rider problem if non-members enjoy the benefits without paying. Using 2023 data from 30 states, we revisit earlier work on the free-riding problem by analyzing how continuing education requirements, number of optometrists, benefit salience, and legal services affect membership rates. We find no significant relationship between continuing education hours or total optometrists and membership percentages. We introduce two variables measuring selective incentives: salience of advertised benefits and availability of legal services. Legal services exhibit a negative association with membership in certain specifications. While we find no evidence of free-riding, differences in sample size and measurement challenges mean that further research is needed.

Keywords

Free Rider Problem, Professional Associations, Optometry, Public Choice

1. Introduction

The free rider problem refers to the tendency of individuals within a group to benefit from a collective good without contributing their fair share to its creation (Olson, 1965). For example, an optometrist who is not a member of her state's optometric association could free ride off benefits flowing from the optometric association's successful lobbying efforts. Kilbane and Beck (1990) test this theory and find that the total number of optometrists in a state and a state's continuing education requirement are significant predictors of the percent of optometrists in a state's optometry association. This is taken as evidence of the free-rider behavior in action because continuing education is only available to paid members, unlike the benefits from lobbying which is available to all optometrists.

In this note, we revisit the research by Kilbane and Beck (1990). We do so because recent literature suggests that associations are important for gaining rents for medical professionals (Larkin, 2015). McMichael (2017) finds practitioner's associations lobbying efforts can impact state legislation. Hull et al. (2010) find that the number of members in an association impacts free riding. Finally, it is important to revisit empirical results of public choice models because of legal, political, and economic changes that change the underlying political economy dynamics (Hall & Pokharel, 2017). For example, all states now mandate continuing education for optometrists, so associations may extend their services to other areas to minimize free riding. We extend the work of Kilbane and Beck (1990) by exploring additional ways optometric associations try to minimize free riding by potential members.

2. Data

Kilbane and Beck (1990) collect the majority of their data on the optometry profession from an industry publication called *Blue Book of Optometry*. This publication was produced by The Professional Press, a now defunct publishing company. We therefore had to hand collect data.

Table 1 details estimated members of the AOA, total number of optometrists in a state, then divides the two to find the percentage of optometrists in the AOA. In the fourth column, we note how each observation for a state's estimated membership was collected.

The amount of members in a state's optometric association was collected in one of two ways. First, for 16/50 observations, it was hand-collected from a state's optometric association's website. For 14/50 observations, we find total revenue from membership dues in 2023 from Propublica (ProPublica, 2024). We then hand-collect yearly cost of membership from a state's website. Then, we divide the total revenue from membership dues by yearly cost of a membership to find an estimate of total members in a states optometric association in 2023. In total, we observe number of optometrists in a state's optometry association in thirty out of fifty states. After we get a states estimate for number of members, we divide this number by total optometrists, leading us to find our dependent variable, Percent of Optometrists in the Association (PCAOA). PCAOA is measured as a proportion on the unit interval (0, 1), where a value of 0.918 indicates that 91.8% of optometrists in a state are members. Kilbane and Beck (1990) find the dependent variable for all 50 states. This is our biggest limitation. Additionally, because our hand collected measure is an indirect proxy, this could introduce measurement error in PCAOA, because not every member may pay the same amount of dues. **Table 2** contains a summary of our estimates.

Data on total number of optometrists per state in 2023 were collected from the Bureau of Labor Statistics (U.S. Bureau of Labor Statistics, 2023). Optometrist continuing education requirements were collected from the West Virginia University Knee Regulatory Research Center database (Knee Regulatory Research

Center, 2023).

Information on benefits and legal council were hand-collected on each state's optometric association's website. These variables help us observe unique significance

Table 1. Summary of estimated members, optometrists, PCAOA, and how found by state.

State	Estimated Members	Total Optometrists	Percent in AOA	How Found
Alabama	450	490	0.918	Website
Alaska	31.77	70	0.454	Calculated
Arizona	431.90	710	0.608	Calculated
California	2936.19	6190	0.474	Website
Colorado	1050.48	960	0.729	Website
Delaware	147.05	170	0.865	Calculated
Florida	918.25	2520	0.364	Calculated
Georgia	700	1150	0.609	Website
Kansas	156.73	430	0.364	Website
Kentucky	251.53	450	0.559	Calculated
Maryland	227.71	750	0.304	Calculated
Massachusetts	541.53	970	0.558	Calculated
Michigan	600.88	1230	0.489	Calculated
Mississippi	250	280	0.893	Website
Missouri	500	800	0.625	Website
Nebraska	275.00	300	0.917	Website
Nevada	200	300	0.667	Website
New Hampshire	95.64	190	0.503	Calculated
New Jersey	682	1290	0.529	Website
New Mexico	58.53	130	0.450	Website
New York	546.97	2010	0.272	Calculated
North Carolina	501.16	1310	0.383	Calculated
Ohio	825.42	1860	0.444	Calculated
Oregon	170.37	520	0.328	Calculated
Pennsylvania	1246.40	1440	0.866	Website
Rhode Island	150	150	1.000	Website
South Carolina	67.78	480	0.141	Calculated
Texas	851.20	2880	0.296	Calculated
Virginia	1099.03	1480	0.743	Calculated
Washington	850	1010	0.842	Website

Table 2. Summary Statistics (n = 30).

Variable	Mean	Std. Dev.	Minimum	Maximum
PCAOA	0.573	0.228	0.141	1.000
Continuing Education Requirement	34.867	12.008	0.000	50.000
Number of Optometrists	1084.000	1200.197	70.000	6190.000
Log Number of Optometrists	6.521	1.025	4.248	8.731
Saliency of Benefits	0.767	0.420	0.000	1.000
Legal Services Offered	0.267	0.450	0.000	1.000

of certain selective incentives and how they may mitigate free riding in the AOA. The Saliency of Benefits variable captures the visibility of state “i’s” membership benefits to potential members. There are baseline benefits to joining a state’s branch of the American Optometric Association (AOA), but there are different levels of benefits for specific states. A value of 0 indicates that benefits are either not publicly accessible or only visible after joining, while a value of 1 means the benefits are openly advertised online. This variable serves as a measure of how prominently state “i’s” benefits are advertised, reflecting the organization’s efforts to attract and inform prospective members. Similar to the Saliency variable, the Legal variable is a binary variable indicating whether or not a state’s optometric association advertises legal council including hotlines and related legal services.

3. Estimation and Model

We are replicating the estimation procedure from the paper [Kilbane and Beck \(1990\)](#) but with model augmentations and updated data. Specifically, instead of using a binary variable for continuing education, we are using continuous data on the number of continuing education hours required by each state. We are omitting the variable Urban from our analysis because in their original study Kilbane and Beck did not find it to be statistically significant.

We estimate three regressions to analyze the determinants of professional association membership. The first regression replicates [Kilbane and Beck \(1990\)](#) by including only continuing education hours and the natural log of optometrists, serving as a baseline for comparison. The second regression adds Saliency to examine how the prominence of benefit advertising influences membership, reflecting the role of selective incentives. The third regression incorporates both Saliency and Legal to capture the effects of AOA legal support as an additional selective incentive. Including these variables helps to identify unique drivers of membership and ensures the robustness of our findings.

In a second set of three regressions, we change the measure of the dependent variable, as did [Kilbane and Beck \(1990\)](#). Since PCAOA is bounded between 0 and 1, this range may violate the assumptions of ordinary least squares (OLS), particularly the assumption of a normally distributed error term. To address this, we estimate regressions using a logistic transformation of the dependent variable.

Specifically, we define LRATIO as the logarithm of the ratio of PCAOA to $(1 - \text{PCAOA})$, allowing for a more appropriate estimation framework that accounts for the bounded nature of the dependent variable. Because this transformation is undefined when PCAOA is equal to 0 or 1, and Rhode Island reports a value of 1, we winsorize PCAOA to the interval $(\epsilon, 1 - \epsilon)$ with $\epsilon = 0.001$ prior to transformation.

4. Empirical Results

Table 3 presents Models 1-3. Model 1 shows that neither LOPT nor CE are statistically significant in relation to PCAOA, suggesting no measurable impact on AOA membership rates. This contrasts with [Kilbane and Beck \(1990\)](#), who found significant effects for both variables, though their measure of continuing education was binary, while ours is continuous. Model 2 also finds no significant effects for any regressors, including Saliency, indicating that advertising AOA membership benefits may not significantly influence membership rates. In Model 3, LOPT, CE, and Saliency remain insignificant, but Legal is statistically significant with a negative coefficient of -0.208 , suggesting that legal support as part of AOA membership may decrease membership rates. This relationship should not be interpreted as causal due to the potential of reverse causality. Associations with lower membership rates may be more likely to advertise legal services in an effort to attract members. Given the cross-sectional nature of the data, we therefore interpret this result as associational rather than causal. The other variables do not appear to impact membership rates in this model.

Table 3. OLS regression results for PCAOA.

Variable	Model 1	Model 2	Model 3
Log Total Optometrists (LOPT)	-0.0637 (0.0408)	-0.0484 (0.0468)	-0.0254 (0.0453)
Continuing Education (CE)	-0.0021 (0.0035)	-0.0017 (0.0036)	-0.0034 (0.0034)
Saliency of Services		-0.0778 (0.1126)	-0.0244 (0.1089)
Legal Services offered			-0.2079* (0.0993)
Residual Std. Error	0.2250	0.2272	0.2137
Multiple R-squared	0.0959	0.1122	0.2447
Adjusted R-squared	0.0289	0.0097	0.1239
F-statistic	1.432 (p = 0.257)	1.095 (p = 0.369)	2.025 (p = 0.122)

Note: Dependent variable: the percentage of optometrists in association. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4 presents Models 4-6. For Models 4 and 5, none of the variables, including Saliency, are statistically significant in relation to the logistic transformation of PCAOA, LRATIO. This suggests that the number of optometrists, continuing

education requirements, and the prominence of benefit advertising do not significantly influence the transformed measure of AOA membership rates, reinforcing the lack of significance observed in previous models. In Model 6, the statistical significance for Legal from Model 3 is lost, though the negative coefficient suggests that legal support may still be associated with lower membership rates, despite the lack of significance.

Robustness

Column 1 in **Table 5** includes an indicator for whether membership counts were obtained directly from association websites rather than calculated. The positive

Table 4. OLS regression results for LRATIO.

Variable	Model 4	Model 5	Model 6
Log Total Optometrists (LOPT)	-0.1059 (0.0822)	-0.0613 (0.0933)	-0.0235 (0.0930)
Continuing Education (CE)	-0.0026 (0.0070)	-0.0015 (0.0071)	-0.0043 (0.0071)
Saliency of Services		-0.2268 (0.2247)	-0.1392 (0.2234)
Legal			-0.3416 (0.2036)
Residual Std. Error	0.4536	0.4534	0.4384
Multiple R-squared	0.0634	0.0988	0.1900
Adjusted R-squared	-0.0059	-0.0052	0.0604
F-statistic	0.9144 (p = 0.413)	0.9498 (p = 0.431)	1.466 (p = 0.242)

Note: Dependent variable: the percentage of optometrists in association. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5. Robustness checks: Measurement specification.

Variable	Adding Observed Indicator	Observed States Only
Log Total Optometrists (LOPT)	-0.0321 (0.0396)	-0.0548 (0.0579)
Continuing Education (CE)	-0.0047 (0.0030)	-0.0087 (0.0060)
Saliency of Services	-0.0162 (0.0952)	0.0064 (0.1261)
Legal Services Offered	-0.1062 (0.0932)	-0.0316 (0.2381)
Observed Indicator	0.2250** (0.0760)	
Residual Std. Error	0.1867	0.2079
Multiple R-squared	0.4469	0.2797
Adjusted R-squared	0.3317	-0.0404
F-statistic	3.879 (p = 0.0102)	0.8739 (p = 0.5159)

Note: Dependent variable: PCAOA. The first column includes an indicator for whether membership was directly observed from association websites. The second column restricts the sample to website-observed states only. Standard errors in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

and significant nature of this indicator suggests states with directly observed membership counts report higher measured membership rates. Once this control is included, the coefficient on *Legal* declines in magnitude and loses statistical significance. This indicates that part of the association between legal services and membership may reflect our measurement method.

Column 2 in **Table 5** indicates that when the sample is restricted to states where membership was directly observed, none of the explanatory variables are statistically significant. This specification relies on a smaller sample size, which reduces statistical power and leads to larger standard errors. These findings indicate that the relationship between legal services and membership rates is sensitive to measurement specification and should be interpreted as associational rather than causal.

5. Discussion

The results of our analysis across all six models reveal no significant relationships between the number of optometrists, continuing education requirements, and advertising of AOA membership benefits on AOA membership rates. In the context of this study, the factors typically thought to influence membership decisions within the AOA do not exhibit a clear or systematic effect. However, we were able to find statistical significance for legal support as a benefit on PCAOA (but not using LRATIO). However, this result is not robust to accounting for difference in measurement method nor is it robust to restricting the sample to states where membership is directly observed from the website. These findings suggest that the earlier negative association may reflect heterogeneity in the construction of the dependent variable rather than a substantive relationship. This may be Legal support as a benefit of joining the AOA may be associated with a decrease in membership rates because members may perceive the legal services as unnecessary or redundant, particularly if they already have access to legal support through other means. Additionally, the negative association could suggest that the inclusion of legal benefits may not be an appealing incentive for optometrists, possibly due to a lack of relevance or awareness of the value these services provide. Or, there could be a reverse causality issue, as associations with low memberships may feel the need to advertise this service more relative to associations with high membership.

The absence of significant findings in our models raises important questions about the factors influencing membership in professional organizations like the AOA. It may be the case that elements such as personal or institutional incentives, regional differences, or unobserved factors—such as the perceived quality of legal support or alternative professional benefits—are more influential than the variables we tested. Furthermore, the lack of significance could be attributed to the limitations in the data used for this analysis. For example, more granular data on the actual benefits experienced by AOA members could reveal stronger relationships between these factors and membership rates.

Kilbane and Beck (1990) may have found statistical significance for the number of optometrists and continuing education requirements due to differences in the

data and context. Their analysis used a binary measure for continuing education, which could have made it more sensitive to variations at the time. Additionally, the professional landscape has changed since 1990, with factors such as the number of optometrists and continuing education requirements potentially becoming less impactful in influencing AOA membership rates due to evolving industry standards and member expectations.

The primary shortcoming in our analysis is the dependent variable for which we only have data from 30 out of 50 states. Additionally, states report numbers including retired, part-time, or recently graduated optometrists, who pay significantly less than experienced full-time optometrists, which could create issues if states differ in the proportion of new graduates. Another limitation is the time mismatch between our independent variables (Salience and Legal), observed in 2024, and other variables from 2023. While this discrepancy might seem problematic, we expect minimal changes in these factors over the short period, so the relationship between variables should remain stable. Finally, the small sample size increases the risk of overfitting and limits statistical power, making it harder to detect significant relationships and raising concerns about the robustness and generalizability of the results.

6. Conclusion

Kilbane and Beck (1990) find continuing education requirements and total number of optometrists have a significant effect on free-riding. We do not find evidence of these variables having an impact. We also test if salience of benefits and legal benefits have an effect and find that legal benefits may have a negative association with membership, though it is not robust to different specifications. Our results differ from Kilbane and Beck (1990) may be due to a misspecification of the dependent variable or just a difference in time. However, as optometrists scope of practice comes more into focus Bae et al. (2025), optometrist lobbying associations may become more important to further the medical rights of optometrists.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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