



EVALUATING SPENDING FOR FEEDING AMERICA PARTNERS



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Project Background

Nonprofits in the United States declare three types of expenses. The first type is program expenses, which consists of spending related to providing services related to their mission. The second type is fundraising expenses, which consists of spending related to raising donations. The third type is administrative spending, which consists of the remaining overhead for management and general expenses. These three types of expenses add up to a nonprofit's total budget, as shown by Kotsi et. al. (2022) in "Allocation of Nonprofit Funds among Program, Fundraising, and Administration".

A standard method of evaluation for a nonprofit's financial performance is based on how their budget is spent. Charity watchdogs and general belief suggests that program expenses should be prioritized, as this increases the amount of value that goes into the nonprofit's mission and aligns with donor interests. However, underspending towards administrative and fundraising expenses can have repercussions in the future. In the worst case, the nonprofit can enter a starvation cycle, where the nonprofit underspending on administrative and fundraising expenses results in further expectations to increase the percentage of the budget that goes towards program spending.

Food banks are a type of nonprofit with a mission surrounding the hunger crisis and food insecurity. Regardless of their size and location, food banks are not exempt from this scrutiny of how they spend their budget. However, one factor that could have an impact is their relationship with food bank networks. Food bank networks can help food banks find food, raise funds, and build capacity, all of which help drive the mission of the food bank. One such network is Feeding America, the United States leading nonprofit organization focused on providing food to people in need.

This project focuses on the differences in spending between two groups of food banks – those partnered with Feeding America, and those who are not partnered with Feeding America. In this study, we examine the financial performance of the two food bank groups based on their tax data in 2013-2019. We also look at how the relationship between program spending relative to the total budget and marginal returns on fundraising can be estimated.

Project Methodology

Data Collection

The data used for this project came from the IRS, specifically their IRS-990 tax filings. Every nonprofit in the United States except for nonprofits with an annual gross below \$50,000 and churches must file an annual return with the IRS called the Form 990. This form provides information on the different types of expenses for the nonprofit, donations received by the nonprofit, and the total revenue for the tax period.

The IRS-990 tax filings compiled for the project were specifically for food banks, filtered through the usage of Charity Navigator's information on nonprofits. The filings were made publicly available by the IRS through an Amazon AWS instance. Once the filings were collected and processed, a flag was created to denote filings for foodbanks partnered with Feeding America. Feeding America's tax form includes all its partners' information in Schedule I. A total of 1112 IRS-990 tax filings from 2013 to 2019 were included in the dataset. Of these filings, 772 filings were from Feeding America partners and 340 filings were from food banks not partnered with Feeding America.

Dataset Statistics

For each of the key variables, we calculated several descriptive statistics to better understand the dataset. These statistics include the mean, median, mean absolute deviation, kurtosis, skewness, IQR, minimum, maximum, standard deviation, and the range of values for each variable. These statistics can be found in Figure 1.

Variable	PROGRAM	FUNDRAISING	ADMINISTRATION	BUDGET	DONATIONS
Mean	32,852,700	778,539	751,684	34,382,924	32,036,485
Median	16,396,465	379,417	374,984	17,295,167	16,983,820
Mean Absolute Deviation	18,869,628	419,435	347,388	19,857,754	19,182,271
Kurtosis	462	8	1,048	499	7
Skewness	18	2	32	19	2
IQR	38,235,418	827,717	538,346	39,832,960	38,276,992
Min	626,720	-	2,762	631,806	639,082
Max	1,608,656,855	7,666,153	156,477,678	1,765,134,533	338,286,583
Standard Deviation	58,810,743	984,827	4,736,007	63,338,331	35,997,762
Range	1,608,030,135	7,666,153	156,474,916	1,764,502,727	337,647,501

Figure 1: Descriptive statistics for the IRS-990 dataset. 1112 filings.

The immediate items of note stem from the kurtosis and skewness values, which suggest that this dataset has high chances of outliers. This is understandable given the context – while most nonprofits are relatively small, some can expand drastically compared to others. This actually depends on the needs that foodbanks serve – in the future, this is another essential variable to collect through the Map the Meal Gap data.

We also calculated the same descriptive statistics for two subsets of the dataset. The first subset consists of tax filings for food banks that are partnered with Feeding America, and the second subset consists of tax filings for food banks not partnered with Feeding America. These statistics for the two subsets can be found in Figure 2 and Figure 3, respectively.

Variable	PROGRAM	FUNDRAISING	ADMINISTRATION	BUDGET	DONATIONS
Mean	40,234,623	1,023,076	782,277	42,039,976	41,057,485
Median	26,075,361	643,112	518,306	27,366,593	26,372,238
Mean Absolute Deviation	23,667,529	607,444	382,996	24,765,181	23,878,588
Kurtosis	5	6	9	4	6
Skewness	2	2	3	2	2
IQR	47,255,902	1,036,921	583,861	48,641,849	46,707,302
Min	2,713,258	-	14,485	2,881,407	2,574,416
Max	306,613,013	7,666,153	5,570,564	308,361,319	338,286,583
Standard Deviation	35,970,616	1,070,343	843,756	37,358,837	37,176,791
Range	303,899,755	7,666,153	5,556,079	305,479,912	335,712,167

Figure 2: Descriptive statistics the IRS-990 dataset, filtered to keep only filings from Feeding America partners. 772 filings.

Variable	PROGRAM	FUNDRAISING	ADMINISTRATION	BUDGET	DONATIONS
Mean	16,091,393	223,297	682,221	16,996,911	11,553,508
Median	4,080,057	121,805	143,421	4,436,081	4,382,801
Mean Absolute Deviation	3,563,537	86,157	99,662	3,801,888	3,523,077
Kurtosis	294	16	332	299	41
Skewness	17	4	18	17	6
IQR	8,957,138	126,431	143,134	9,002,599	8,843,918
Min	626,720	-	2,762	631,806	639,082
Max	1,608,656,855	2,450,711	156,477,678	1,765,134,533	237,187,328
Standard Deviation	89,367,584	357,284	8,478,363	97,656,020	22,300,922
Range	1,608,030,135	2,450,711	156,474,916	1,764,502,727	236,548,246

Figure 3: Descriptive statistics for the IRS-990 dataset, filtered to remove filings from Feeding America partners. 340 filings.

Both subsets have a similar outlier issue to the complete dataset, as evidenced by the similar kurtosis and skewness values. The total budget and donations for food banks not partnered with Feeding America is much smaller than for food banks partnered with Feeding America. We can also look at fundraising expenses in terms of donations received. Using the median values, the donations to fundraising ratio for Feeding America partners is 41 dollars, while the donations to fundraising ratio for food banks not partnered with Feeding America is 35.98 dollars.

Finally, we look at the ratio of each expense type to the overall budget for the entire dataset and the two subsets. On average, Feeding America Partners have a higher percentage of their budget go towards program spending compared to food banks not partnered with Feeding America. However, food banks not partnered with Feeding America tend to have a larger percentage of their budget go towards fundraising and administrative spending compared to Feeding America partners. Since administrative spending is often examined in terms of financial performance, this may create the perception that food banks not partnered with Feeding America are less efficient in their spending. Another method for evaluating nonprofit financial performance is its overhead ratio. This can be calculated by dividing the program expenses by the fundraising and administrative spending. These ratios can be found in Figure 4.

Financial Performance Ratios	All IRS-990 Filings	Only Feeding America Partners	Only Non-Feeding America Partners
Program Spending Ratio	94.64%	95.30%	93.14%
Admin Spending Ratio	2.63%	2.16%	3.69%
Fundraising Spending Ratio	2.72%	2.53%	3.16%
Overhead Ratio	27.35	26.11	30.17

Figure 4: Average Percentage of Budget for Expense Types in the IRS-990 dataset. 1112 filings.

Estimating Donations and Marginal Returns on Fundraising

The previously referenced paper “Allocation of Nonprofit Funds among Program, Fundraising, and Administration” by Kotsi et. al. (2022) provides a case study that includes an estimation for donations using program spending, fundraising spending, and discretionary

administration spending. Using this case study as a framework, we build a model to understand how program spending relative to the total budget impacts donations and marginal returns on fundraising.

While program spending and fundraising spending are already a part of the dataset, discretionary administrative spending is not. There are two types of administrative spending. The first type is required spending, based on the current capacity of the food bank. The second type is discretionary spending, based on the capacity expansion from one year to the next. Since there is no explicit way to calculate discretionary administrative spending, we can estimate required spending and subtract it from the total administrative spending.

To estimate required spending, which is equivalent to capacity multiplied by a coefficient, we used the coefficient γ found in the case study, which is 0.00158. A regression model could be built to estimate this coefficient for the dataset specifically with the administrative spending function $a' = \beta * \delta^{(1 + \theta)} + \gamma * k$, where a' is administrative spending, δ is capacity expansion, k is capacity, and β , θ , and γ are coefficients.

Using this coefficient, we can find the discretionary administrative spending for every filing, and thus can estimate the donation function. The donation function is equivalent to $D(p, a, f) = (1 + \zeta * (p / (p + a + f))) * f$, where p is program spending, a is discretionary administrative spending, and f is fundraising spending. The remaining step is to estimate the coefficient ζ .

Three linear regression models were created using 100-fold cross-validation to model the donation function. One model was trained on the entire IRS-990 dataset, one model was trained on the subset of Feeding America partners, and one model was trained on the subset of food banks not partnered with Feeding America. The estimated ζ coefficients can be found in Figure 5.

Filing Segements	Zeta (ζ)
All IRS-990 Filings	29.4
Only Feeding America Partners	27.9
Only Non-Feeding America Partners	26.5

Figure 5: Estimated ζ coefficient using the IRS-990 dataset. 1112 filings.

There are two interpretations of ζ . The first is that it can identify the marginal return on fundraising for donations relative to the program spending ratio. For example, if the program spending ratio is equal to 0.9, the marginal return on fundraising for donations for Feeding America partners is 25.11. For a food bank not partnered with Feeding America, the same program spending ratio of 0.9 would result in a marginal return on fundraising for donations of 23.85. Note that food banks may incorrectly estimate their fundraising effectiveness or their fundraising expenses, which could create differences between the donations to fundraising ratio and the marginal return on fundraising for donations.

The other interpretation is that it measures the volatility of fundraising relative to the program spending ratio. The higher ζ is, the larger a change in marginal returns to fundraising will be created by a change in the program spending ratio. For example, a 5% change to the program spending ratio for a Feeding America partner will result in a change of 1.39 to the marginal return on fundraising. Compare this to a 5% change to the program spending ratio for a food bank that is not a Feeding America partner, which would result in a change of 1.33 to the marginal return on fundraising.