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**From Soup to Nuts**  
**The Efficiency of Non-Profits: Evidence from U.S. Food Banks**

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Department of Economics  
May 2022

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### Abstract

Nonprofits are a growing part of America's economy and play an important role in fulfilling the needs of society in addition to private firms and government agencies. Economists haven't researched nonprofits as much as other firms in the past, but this is starting to change. This project looks at the efficiency of 20 food banks in the United States using Data Envelopment Analysis. The results show that American Food Banks appear to be using their funds efficiently, but others could learn to use their inputs and outputs in a more efficient manner. As more data becomes available, this area of research will hopefully continue to grow.

*Keywords:* Nonprofits, food banks, efficiency, Data Envelopment Analysis

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# Chapter One

## Introduction

### 1.1 Introduction

In March of 2020, the COVID-19 virus began to affect the United States and many states started declaring stay-at-home orders (AJMC, 2021). These lockdowns caused some workers to lose their jobs when stores and restaurants had to close. Because of this, many people were struggling and needed extra support and generous Americans responded by giving \$471.44 billion to various charities by the end of 2020 (GivingUSA, 2021). This was a record amount of donations and an increase of over 5% from the previous year which had also been a record setting year. Out of that nearly \$500 billion in donations, 69% of the funds came from individual donors (GivingUSA, 2021). In addition to generous donations, nonprofits also received funding from government grants and some collect fees for their services. Most of the time we don't think much about these nonprofit agencies, or at least they don't gain as much attention as private firms and government spending, but nonprofits have grown both in size and value. Should researchers care about these organizations if typical research data isn't available? Nonprofits, like any other firms, have to function under the same concern of utilizing scarce resources and they must prove to their donors that they are working towards a worthy goal. One type of nonprofit that has been growing quickly recently because of the pandemic and unemployment has been U.S. food banks. How have they been doing in response to this increased need? Are they working efficiently with the food and monetary donations they've received? This research project will look into the history and

potential plans for nonprofits in the U.S. and also test the economic efficiency of some of the largest food banks in the U.S. using Data Envelopment Analysis.

## **1.2 Nonprofits by the Numbers**

Many Americans go through life not thinking very much about nonprofit organizations, but as Powel and Steinberg (2006, p. 1) explain:

Nonprofit organizations are ubiquitous. Many people are born in a nonprofit hospital, attend a nonprofit university, send their children to a nonprofit day-care center, worship at a nonprofit religious institution, watch the performances of nonprofit symphonies and dance companies, visit their parents in a nonprofit nursing home, and face the end of their life in a nonprofit hospice. Some need the services of nonprofit job-training organizations, soup kitchens, family counseling, and housing assistant agencies.

It is easy to see that nonprofits play a bigger role in our lives than we might think. Also, all these services require a large employment force. In fact, Johns Hopkins Center for Civil Society Studies (Newhouse, 2020) created a report showing that nonprofits employed 12,488,463 people in the U.S. in 2017, which makes them the third biggest workforce behind only retail and accommodation and food services. This equates to more than \$670 billion in wages nationwide in 2017 (Newhouse, 2020) which is also the third biggest creator of payroll income in the United States. In the National Center for Charitable Statistics Nonprofit Sector (NCCS) in Brief 2019 report (2020), they estimated that nonprofits added \$1.0447 trillion to U.S.'s economy in 2016 which is 5.6% of that year's GDP. Of the nonprofits that are required to complete a form 990 with the IRS, the

NCCS found that nonprofits claimed \$2.62 trillion in total revenues and held \$5.99 trillion in assets (NCCS, 2020). Both of these amounts have grown more quickly than the increase in GDP over the previous ten-year period. In addition to the financial effect of nonprofits, 64.4 million Americans donated their time to help with specific causes which is calculated to be 8.8 billion hours in volunteer service (NCCS, 2020). One nonprofit sector that has seen a large amount of growth in both financial donations and volunteer hours are food pantries and regional food banks. This has been in part because of the need caused by the COVID-19 pandemic which has meant that an estimated 60 million people needed the help of various types of food assistance programs, like food banks and food pantries (Feeding America, 2021). Feeding America, in response to this need helped to provide more than six billion meals to Americans in 2020 (Feeding America, 2021).

### **1.3 Relevance of Research**

Should Economists care about nonprofit organizations when a profit margin can't be evaluated? In addition to the size of the sector mentioned above, there are other factors that make evaluating the effects of nonprofits on the economy an important research area. For example, Frumkin and Kim (2002) explain that nonprofits have received increased funding from the government over the years since many of the human services responsibilities previously managed by government agencies have been moved to various charities and nonprofits. This funding is paid for by tax dollars, so it is important to make sure the funds are being used efficiently and effectively. Also, nonprofits want to advertise that they are using these tax dollars and donations efficiently so they can show that the investment in their goal is worthy of funds (Speckbacher, 2003). And much of

the work that nonprofits do (feeding the hungry, providing medical care to those who can't afford it) help Americans to be more productive workers because it's hard to be productive when a person is hungry or sick. Also, as previously noted, nonprofits now account for over 5% of GDP. It is important that this part of the economy continues to work effectively and efficiently.

## **Chapter 2**

### **Nonprofits and Food Banks in the United States**

#### **2.1 A Brief History of Nonprofits**

When British citizens came to America to colonize a new land, they brought with them the ideas and structures they had from England. This means that the church played a large role in many of the functions we think of nonprofits handling today. In addition to providing religious services, colonial churches were also in charge of education, managing libraries, helping people “reform” their bad behaviors, and providing care to the poor (Hammack, 2002). Higher education in particular also had a strong religious beginning. In fact, out of the first 108 colleges started in America, 106 of the were founded as Christian colleges (McCalman, 2021). This trend continued well into the American Revolution years. Once the United States became independent and especially once the constitution was ratified, nonprofits and voluntary groups began to grow. Hammack (2002) believes this was because of the specific language separating church and state in the constitution, which meant the government preferred to fund nonreligious groups. Also, with the new constitution, it was becoming harder for states and federal governments to create new taxes and to fund new programs, so more nonprofits started to

search for private funds and other ways to sustain their missions (Hammock, 2002). In the mid-1800s voluntary groups were also growing. There were the obvious religious groups, but also associations to help civil war veterans and educate freed slaves, among many other groups (Powell and Steinberg, 2006). These organizations allowed members to pool their resources to provide larger benefits than anyone working alone could do (Powell and Steinberg, 2006). In addition to donations, even early nonprofits earned most of their funding from tuition and fees (library membership, museum admission or performance fees, and hospital charges) as well as government funding (Hammock, 2002).

The next big change for nonprofits began in the mid-twentieth century when in 1943 the “Current Tax Payment Act” was passed (taxhistory.com, 2009). This law required employers to withhold income tax on wages, which dramatically increased the government’s revenues and allowed them to fund many more programs and nonprofit groups (Powell and Steinberg, 2006). This increase, in addition to budget deficit spending, changed the funding system from being “a zero-sum game in which one agency’s gain was another’s loss” to a more equitable system where more programs could be funded (Powell and Steinberg, 2006, p. 51). The other side of this tax increase was a bigger incentive for the wealthy and large corporations to find ways to avoid paying large tax bills by creating foundations that could fund charities and government approved tax exempted agencies (Powell and Steinberg, 2006). This also helped nonprofits receive larger donations over time.

In 1954 a new Revenue Act was passed that created the 501(c) tax exempt structure that we know today (Arnsberger, et al., 2008). This new act combined many different tax

rules into one law which helped bring various types of associations, charities, health care agencies, schools and many other tax-exempt groups under one government regulation. Later, the Revenue Act of 1964 raised the amount that donors could deduct from their taxes for charitable donations to 30% of their adjusted gross income (AGI) (Arnsberger, et al, 2008). This gave wealthy donors more incentive to provide additional funds to those missions they found important. The result of these changes was a growing and more inclusive nonprofit sector.

## **2.2 History of Food Banks**

With America's strong religious beginnings, it's no surprise that charities have been distributing food to the poor since its founding. One of the earliest types of food charities was the soup kitchen where ready-made meals were distributed to the poor (Carstairs, 2017). Soup was very common because a variety of ingredients could be used to make a large meal to feed many people who needed help (Carstairs, 2017). There were also church organized breadlines and small food pantries that helped especially in emergency situations like the Great Depression when unemployment was high and many people needed food assistance (O'Brien, et al, 2004).

The federal government has also had a number of food programs. The most common is the food stamp program. The first food stamp program started in 1939 to help those still struggling from the Great Depression, but it ended in 1943 when the government didn't have as much agriculture food surplus and unemployment was again low (fns.usda.gov, 2018). The program came back permanently in 1964. In 1965 there were a little over 500,000 Americans benefiting from the program, but by 1974 there were 15 million receiving food stamps, mostly from expansion of the program when it became a

nationwide initiative (fns.usda.gov, 2018). In 2008, to fight the tainted view of people using food stamps, the name was changed to the Supplemental Nutrition Assistance Program (SNAP) (fns.usda.gov, 2018). Over the years the program has seen various expansions and cut backs, but it still provides many benefits to low income households. In 2017, 42.1 million people received support to supplement their food costs through SNAP (fns.usda.gov, 2018).

Another government food program is called the Temporary Food Assistance Program (TEFAP) (O'Brien, 2004). This program was similar to the depression era commodity purchase programs, where the government purchased surplus agriculture goods and gave them to state governments to distribute (O'Brien, 2004). In the beginning the surplus products were distributed from trucks or government offices, but later the commodities were given to newly formed food banks to distribute the food by mostly volunteers (O'Brien, 2004).

The first food bank was created by John van Hengel in the late 60s when he met a mother who had to rummage through grocery store trash containers to feed her family (feedingamerica.org). He thought it would be beneficial if grocery stores could donate their unsellable or perishable food so it could be banked for those who needed it and also the food wouldn't be wasted (feedingamerica.org). Today the largest organization, Feeding America, oversees 200 food banks across the U.S. and in 2020 was able to serve 6.6 billion meals (feedingamerica.org).

The biggest problem Feeding America had in the beginning was figuring out how to distribute all the food among all the food banks across the U.S. that would be equitable and fair. Feeding America receives very large donations directly from producers and

distributors that then needs to be transported all over the United States to the various food banks. Prendergast (2017) explains that since Feeding America doesn't require the banks to buy the food and an equal distribution to each food bank would be inefficient, they had to come up with a new system. After working with economists from the University of Chicago, Feeding America came up with an auction system where the food banks could use "fake" money to bid on the food they wanted and could use (Prendergast, 2017). Before 2005, they used a system where food banks would basically "wait in line" until it was their turn to receive a load of food and they had up to six hours to say if they wanted it or not (Prendergast, 2017). If they declined the food, the request would go to the next food bank who also has up to six hours to decide, potentially delaying the delivery of the food and increasing the potential of perishable food to spoil. Also, if any food bank declined the food, they would lose their place in the queue even though they couldn't use or didn't need the food. Also, this system didn't take into account products that food banks could get from local distributors that wouldn't come directly from Feeding America. For example, Idaho food banks may not need extra potatoes, or Wisconsin food banks may have plenty of dairy products (Prendergast, 2017). Feeding America knew that charging for the food could help figure out the demand the food banks had for certain items, but it may discriminate certain poorer food banks that couldn't raise funds as easily as others, so they came up with a type of money that they call "shares" that each food bank was given to "purchase" the food they needed (Prendergast, 2017). Food banks are given these shares based on the need of the area and funds are added to their accounts every day, regardless of the amount they spent that day. This also means that they have the option to save their shares, if they had enough food already (Prendergast,

2017). Also, multiple food banks could now bid together on the same truck if they wanted to split the items, which helped smaller banks who couldn't use a whole truck load (Prendergast, 2017). And one of the biggest benefits was with this new online system, individual food banks could now list their own excess items that other food banks could "buy" which helped all the food banks distributed the food more efficiently.

The benefit of this new market system was that the food was able to be quickly distributed to those who needed it the most. The food banks who could best use the food could bid on it and if the richer food banks didn't need anything, they could just save their shares. Also, with the inclusion of the food banks' surplus auctions, the total amount of food supplied increased (Prendergast, 2017). Before the system went live many were skeptical that the new auction process would work, but it has proven to be a successful system. The use of a "flexible choice-revealing allocation system" has led to more efficiency in the distribution and the timeliness of food to those who need it the most (Prendergast, 2017, p. 160).

### **2.3 Highlights of a Few Food Banks**

The Houston Food Bank in Houston, Texas, is the largest food bank both in the size of their operation and also the number of people they serve (Houstonfoodbank.org). Their service area covers 18 counties in the southeastern part of Texas and they were able to provide 207 million meals in 2021 when the need had increased because of COVID-19. They currently have a 308,000 square foot building that holds a warehouse for food distribution, a kitchen where they can make hot meals, and a conference center along with offices for employees (Houstonfoodbank.org). They have played a pivotal role in the area by not only providing food during normal times, but also helping residents as

they recover from hurricanes that affect the area and also the recent winter storm in 2021 when many lost power during historically cold weather (Houstonfoodbank.org).

On the east coast, City Harvest in New York City has another goal in addition to feeding the hungry. They use their 26 trucks to pick up unsellable food from grocery stores and restaurants and deliver it to New Yorkers who need help and can benefit from the food (cityharvest.org, 2021). City Harvest has been able to feed 1.5 million residents at the same time saving 111 million pounds of food from going into landfills (cityharvest.org, 2021). Since their beginning in 1982, they estimate that they've been able to rescue and donate more than 950 million pounds of food that has been used to feed food insecure New Yorkers (cityharvest.org, 2021).

Feeding Tampa Bay in Florida, in addition to distributing food, has a “free, full service restaurant for those in need of a healthy meal” (feedingtampabay, 2022). Another interesting feature about Feeding Tampa Bay is their workforce training program called “FRESHforce” that they organized to help those who might have trouble finding jobs (feedingtampabay, 2022). Their on-the-job training programs include opportunities to learn culinary skills (in their restaurant), or workers can learn the logistics of managing a warehouse, or train and become certified to drive semi-trucks (feedingtampabay, 2022). This program is a benefit to the workers who can gain real world training and then hopefully find other jobs with their newfound experience, but also the food bank benefits from the many extra workers who can help in various areas. Since they are in Florida, they also provide extra support during disasters such as hurricanes and other weather-related emergencies (feedingtampabay, 2022).

All the food banks play an important role in solving the hunger crisis across the United States, especially when there is plenty of food available that could potentially go to waste without a system to collect and distribute it.

## **Chapter 3**

### **Literature Review**

#### **3.1 Literature Review**

Why do we need nonprofit organizations in addition to private and public sectors?

Weisbord (1988) explains that nonprofits play a role when there are “informational inequalities” in the market. When consumers have enough information about the suppliers and their options, then the private market works well, but if consumers can’t find the information they need, such as the quality of day cares or nursing homes, then nonprofits do well (Weisbord, 1988). Also, this lack of information can go the other way. Consumers may really like a certain service, but there can be an incentive for them to be a “free rider” and let others pay for the service especially when others can’t be excluded (Weisbord, 1988).

Nonprofits play a role in our economy along with public and private agencies, but that doesn’t mean that they can all be evaluated the same. Weisbord (1988) breaks down the three major ways that that nonprofits differ from private profit maximizing firms.

- (1) No one owns the right to share in or any profit or surplus of a nonprofit;
- (2) nonprofits are exempt from taxes or corporate income; (3) some nonprofits receive a variety of other subsidies – donations to them are tax deductible and

they are exempt from many other forms of taxation in addition to the tax on corporate profits. (Weisbord, 1988, p. 14)

This means that other criteria must be used to evaluate nonprofits. Wirtz (2006) points out that when the motivation to make the largest profit is taken away, the nonprofit's mission replaces the goal of financial maximization. Once the mission is known, then research can be performed to see how efficient the organization is achieving this goal.

Previously when oversight organizations wanted to rank nonprofits and their level of efficiency, they would look at the ratio of the nonprofit's expenditures spent on overhead compared to the total costs. This is how the nonprofit ranking website Charity Navigator (2018) present their data. But as Coupet and Berrett (2018) argue this type of measurement may not provide the most accurate information to determine efficiency. For example, if a nonprofit would like to buy a new type of software that would help them run more efficiently in the future, they may be reluctant to raise their overhead costs to pay for the equipment even in the short term. Or they may try to cut their current costs to decrease the overhead ratio, but it may not improve their overall efficiency of producing more output (Coupet and Berrett, 2018). Efficiency in nonprofits shouldn't be as concerned with the lowest costs as much as reaching the most people or communities with the resources available (Coupet and Berrett, 2018).

Golden, et al. (2012) tested nonprofits efficiency by looking at how well they used marketing tools to raise funds. But as Polonsky (2012) points out, if marketing is the benchmark for nonprofit efficiency, they may change their priorities from meeting their specific needs to simply finding more money. Golden, et al. (2012) used Data Envelopment Analysis (DEA) to evaluate various nonprofits and compare their levels of

efficiency. They looked at both a nonprofit's efficiency at fundraising and also how efficiently they delivered on their specific services (Golden, et al, 2012). They narrowed their research to nonprofits specifically categorized as "Arts, Culture and Humanities" and found that some organizations were more efficient at raising funds and others were better at providing services (Golden, et al, 2012). As more research looks at nonprofits' strengths and weaknesses in fundraising and providing services, these organizations can learn from each other and gain efficiencies where others might be deficient in certain areas (Golden, et al., 2012).

Tofallis and Sargeant (2000) evaluated British "Not for Gain Organizations (NGOs)" by using DEA. They were also looking at levels of fundraising and administrative costs. They used the expenses each charity spent on fundraising and administration as inputs and evaluated the output of "voluntary income" (Tofallis and Sargeant, 2000). Using this benchmark, it appears that quite a few British charities are not spending their income wisely to earn more donations. In fact, of the 327 organizations they reviewed, only 15% scored more than 50% efficient (Tofallis and Sargeant, 2000). They explain this might have more to do with the type of funding each charity receives. For example, if they receive more government grants or endowments, then they may not rely as much on private donations and they may appear more efficient compared to a charity that needs more donors to make up their total income (Tofallis and Sargeant, 2000). They assumed that the charities with the most income would be found to be the most efficient, but this was not the final outcome (Tofallis and Sargeant, 2000).

Looking specifically at Food Bank efficiency research, Gonzalez-Torre, et al. (2017) looked at food banks in thirteen different European countries and evaluated them using

DEA. The researchers noted that there has previously been little research on food banks and whether they are functioning at an efficient level (Gonzalez-Torre, et al., 2017). To evaluate food banks as successful, they believe the best measurement is how much food the organizations are able to distribute to those in need (Gonzalez-Torre, et al., 2017). They chose the foundation year of the organization, the number of volunteers and the number of employees as the inputs, and the tons of food managed along with the number of people who were helped as the outputs (Gonzalez-Torre, et al., 2017). They noted that American food banks are managed differently than those in Europe and different inputs and outputs would mostly likely need to be considered if the same research was done in the U.S. (Gonzalez-Torre, et al., 2017). With the selected inputs and outputs, they found many European food banks were less efficient than they could be. If these food banks were able to increase their efficiency, they would be able to help more people and distribute more food and potentially keep more food from being wasted in the future (Gonzalez-Torre, et al., 2017).

### **3.2 Goal of New Research**

The goal of this research project is to add to the existing research on the impact of nonprofits on the U.S. economy and to determine the efficiency of current regional food banks. Since research has only been completed on European food banks, this will be a new area of research. As the size of food banks have grown and their budgets increased, it will become more important to verify that they are efficiently using the resources they are responsible for. The objective is to see what factors help a food bank become more efficient and to see if less efficient food banks can learn from others who have shown efficiency in their level of inputs and outputs.

## Chapter 4

### Methodology, Results and Discussion

#### 4.1 Methodology

Data Envelopment Analysis (DEA) uses a “data-oriented” approach to compare the management of similar agencies that are called “Decision-Making Units (DMUs)” (Cooper, et al., 2011). The evaluation is performed by reviewing various inputs and their effect on selected outputs. The concept of DEA was first discussed by Charnes, et al. (1978) where they explained that they specifically chose the term DMU (Decision Making Unit) because they were interested in looking at efficiency and decisions made by nonprofits in addition to the typical government agency or business. Since then, DEA has been used to evaluate all types of industries including government agencies and the private sector. A DMU is found to be efficient compared to other DMUs if there is no way to improve the inputs or outputs without making some other inputs or outputs worse (Cooper, et al., 2011). The most efficient DMUs are rated a 1 (100%) and the others are “enveloped” behind that benchmark frontier (Tofallis & Sargeant, 2000).

The benefit of DEA is that the DMUs being evaluated are compared to the “best in class” instead of typical regression models which only compares to the average (Shewell & Migiro, 2016). Shewell and Migiro (2016) also explain that DEA has been used to find inefficient agents that are otherwise quite profitable, so comparing organizations to each other is seen as a better benchmark than just looking at maximized profits. By comparing

similar agencies, those who are found to be less efficient can review and learn from those who are using their inputs to reach an optimum level of outputs.

## 4.2 Data

The purpose of the research project is to evaluate the efficiency of the top twenty regional food banks based on the size of their annual budget. The top food banks were found using Food Bank News' (2021) report on the top 100 food banks ranked by revenue.

This report was based on 2019 tax forms. Table 1 shows the food banks along with their number of employees, volunteers and annual budget for 2020.

**Table 1- Top 20 Regional Food Banks by Annual Budget**

	2020		
	Employees	Volunteers	Annual Budget
Houston Food Bank - Houston, TX	540	88,061	\$321,020,841
St. Mary's Food Bank Alliance - Phoenix, AZ	230	69,653	\$198,375,278
Food Bank of Central & Eastern NC - Raleigh, NC	149	31,000	\$169,408,393
Atlanta Community Food Bank - Atlanta, GA	207	14,428	\$168,987,977
Second Harvest Heartland - Brooklyn Park, MN	232	14,247	\$236,949,005
North Texas Food Bank - Plano, TX	236	14,198	\$202,605,139
City Harvest - New York, NY	227	6,297	\$209,408,208
San Antonio Food Bank - San Antonio, TX	325	72,168	\$178,446,449
Greater Chicago Food Depository - Chicago, IL	293	18,595	\$205,874,058
Second Harvest of Silicon Valley - San Jose, CA	232	26,213	\$214,466,106
Los Angeles Regional Food Bank - Vernon, CA	164	15,900	\$378,473,326
Second Harvest Food Bank of Central Florida - Orlando, FL	169	39,467	\$180,895,532
Northern Illinois Food Bank - Geneva, IL	187	22,436	\$174,517,189
Community Food Bank of Southern Arizona Tucson, AZ	182	6,012	\$128,599,875
Feeding America Tampa Bay - Tampa, FL	129	46,752	\$155,209,329
Food Lifeline - Seattle, WA	115	27,556	\$147,819,082
Food Bank of the Rockies - Denver, CO	139	20,411	\$143,204,094
The Greater Boston Food Bank - Boston, MA	145	8,840	\$177,373,101

Community Food Bank of New Jersey -Hillside, NJ	222	39,985	\$170,586,407
San Francisco Food Bank - San Francisco, CA	192	53,000	\$152,299,074

As previously mentioned, the top 20 regional food banks listed are part of the Feeding America system which had an annual budget of over \$3.5 billion in 2020 (feedingamerica.org, 2021). This amount was a 20% increase from their previous year's budget. During the year, Feeding America distributes food and monetary donations to 200 regional food banks who then distribute their food and funds to 60,000 meal programs and local food pantries (feedingamerica.org, 2021).

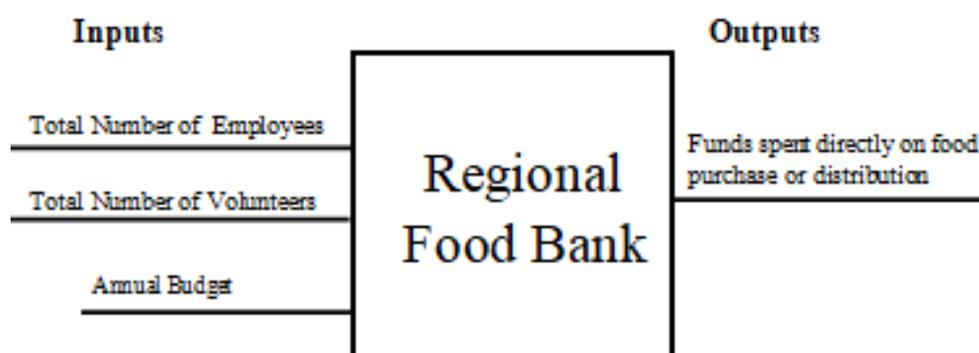
### **4.3 Inputs and Outputs**

Based on the literature review, the inputs that were chosen to test the food banks' efficiency are the total number of employees, the number of volunteers, and also their total annual budget. The output is the amount spent directly on the mission of providing food to those who need it. The data was obtained using ProPublica's Nonprofit Explorer website (2013) that provides tax reports, specifically Form 990, which presents the nonprofits' income and expenses along with other financial information. Revenue was found under Part I, line 12 for Total Revenue. The number of employees and volunteers are also found under Part I, in the Activities & Governance section. The output chosen of funds spent directly on their mission was found under Part IX. The form provides a detailed list of "Program Service Expenses" but this amount can include items in addition to direct distribution of food, like salaries for employees, fundraising, and any other charges that they can claim as support for their program. These costs are important to the overall management of the food banks, but this research evaluation is only concerned

with how well they're meeting their main mission of food distribution. Therefore, the only costs included in the output amount are funds found under the “grants and other assistance to domestic organizations and domestic government”, line 1 and/or any food purchases listed under line 24 “other expenses” that specifically lists purchasing food. The ultimate goal is for no one to go hungry, so it would be informative to use an additional output variable that could determine levels of food insecurity in a certain area or health outcomes from the donated food, but these data are sometimes hard to quantify. Because of the limited quantifiable data, there is only one output in this model. Also, Gonzalez-Torre, et al. (2017) recommended using the number of groups each food bank partnered with as an output, but this information was also difficult to find.

Figure 1 shows the model previously described that will be used to perform the Data Envelopment Analysis on the 20 food banks.

**Figure 1 – Inputs/Outputs model to test efficiency at each regional food bank**



The number of employees and volunteers illustrate the level of human capital each food bank uses to achieve their goal. The total budget includes monetary donations,

government grants, program revenue, investment income, and also food donations converted into a cash value equivalent. Ten years of data were collected for each food bank to provide an overview of how they have performed over time.

The computer program DEAP (Data Envelopment Analysis (Computer) Program) was used to perform the evaluation (Coelli, 1996). This is an open source program that is widely used in many areas of DEA evaluation (Coelli, 1996).

#### 4.4 Data Results

Table 2 provides the results of the Data Envelopment Analysis.

**Table 2 Efficiency Scores (Malmquist DEA Model)**

DMU	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	0.922	1	0.905	0.946	0.920	0.911	0.912	0.778	0.916	0.902
2	0.987	0.937	0.909	0.931	0.917	0.898	0.928	0.898	0.906	1
3	1	0.981	1	0.972	1	1	0.958	0.959	1	0.984
4	0.844	0.891	0.898	0.896	0.966	0.927	0.951	0.951	0.817	0.878
5	0.965	0.922	0.943	0.898	0.893	0.888	0.890	0.865	0.905	0.823
6	0.866	0.817	0.837	0.879	0.888	0.760	0.863	0.839	0.870	0.913
7	0.873	0.954	0.927	0.967	1	1	0.853	0.862	0.864	1
8	0.832	0.897	0.810	0.915	0.894	0.870	0.934	0.904	0.862	0.905
9	0.745	0.817	0.833	0.898	0.844	0.796	0.931	0.766	0.777	0.746
10	1	1	1	0.827	0.845	0.831	0.844	0.828	0.833	0.783
11	0.882	0.794	0.895	0.898	0.882	0.878	0.952	0.910	0.910	1
12	0.965	0.942	0.917	1	0.974	0.913	0.975	0.954	0.974	0.956
13	0.894	0.926	0.952	0.971	1	1	1	0.967	0.982	1
14	1	0.878	0.905	0.907	0.886	0.937	1	1	1	1
15	1	1	1	1	1	1	1	1	1	1
16	1	1	0.983	0.872	1	1	0.999	1	0.985	1
17	0.871	0.920	0.929	0.966	0.976	0.930	0.963	0.969	0.976	0.960
18	0.806	0.836	0.846	0.862	0.872	0.875	0.877	0.857	0.872	0.912
19	0.737	0.884	0.894	0.874	0.889	0.894	0.916	0.863	0.820	0.855
20	0.932	0.896	0.896	0.900	0.864	0.886	0.892	0.852	0.800	0.690

DMUs:

- 1 Houston Food Bank - Houston, TX
  - 2 St. Mary's Food Bank Alliance - Phoenix, AZ
  - 3 Food Bank of Central & Eastern NC - Raleigh, NC
  - 4 Atlanta Community Food Bank - Atlanta, GA
  - 5 Second Harvest Heartland - Brooklyn Park, MN
  - 6 North Texas Food Bank - Plano, TX
  - 7 City Harvest - New York, NY
  - 8 San Antonio Food Bank - San Antonio, TX
  - 9 Greater Chicago Food Depository - Chicago, IL
  - 10 Second Harvest of Silicon Valley - San Jose, CA
  - 11 Los Angeles Regional Food Bank - Vernon, CA
  - 12 Second Harvest Food Bank of Central Florida - Orlando, FL
  - 13 Northern Illinois Food Bank - Geneva, IL
  - 14 Community Food Bank of Southern Arizona - Tucson, AZ
  - 15 Feeding America Tampa Bay - Tampa, FL
  - 16 Food Lifeline - Seattle, WA
  - 17 Food Bank of the Rockies - Denver, CO
  - 18 The Greater Boston Food Bank - Boston, MA
  - 19 Community Food Bank of New Jersey - Hillside, NJ
  - 20 San Francisco Food Bank - San Francisco, CA
- 

The first item to note is that those food banks with the largest budgets does not seem to show they will have an easier time finding ways to be efficient. The top two largest food banks were only rated 100% efficient one year each in the ten-year term. Also, all of the returns are generally high (in the 80 to 90% efficiency range) so it appears that most food banks are working efficiently using as much of their funds towards their stated goal as possible. This might have something to do with the various charity rating systems, since charities are scored based on a ratio of their administration costs in relation to their total income, among other factors, many charities try to stay comparable to other similar organizations and use this information in their fundraising materials. These high efficiency scores might also be affected by the different type of donations. If a food bank receives mostly food donations, then they will directly distribute the food and will look very efficient, but if they receive more monetary donations, then they can use those funds

in any way that is needed. Some may use the funds to buy more food, but others may increase their fundraising budgets or hire more employees or even purchase needed equipment to store food. Food Bank News (2021) predicts that food banks will most likely purchase more food rather than rely of donations of food in the future. They explain that at the beginning of the pandemic in 2020, consumers stocked up on groceries and supermarkets didn't have as much food to donate to food banks (foodbanknews.org, 2021). This happened at the same time that demand for food at food banks was increasing because of increased unemployment, so the food banks had to purchase more food than they had in previous years. The benefit of this change is that food banks are able to purchase more nutritious food items instead of relying only on what has been donated (foodbanknews.org, 2021).

There are a number of food banks that achieved 100% efficiency with their level of inputs and outputs over the ten-year period, but only one reached that score in every year. The food bank in Tampa, Florida seems to be doing quite well in reaching their goal of providing food to needy Floridians. It appears they have fewer full-time employees relative to other similar sized food banks and are able to rely more on volunteers which helps decrease their overhead costs. Also, their on-the-job training program most likely helps to lower their employment costs which can allow them to spend more on direct food costs. They also have a large number of volunteers working at the food bank. In 2020 they claimed they had 46,752 volunteers helping to collect and distribute food (Propublica.org, 2021). They may benefit from a high number of retirees living in the area who have more free time to volunteer and support the food bank and other worthy causes. Also, the Community Food Bank of Southern Arizona in Tucson, AZ has done

quite well over the last few years. They don't report nearly as many volunteers as the Tampa food bank, but they cover a large rural area that may have limited grocery and produce opportunities. They have received recognition for their efficient work by receiving the Feeding America "Food Bank Member of the Year" award in 2018 (communtiyfoodbank.org, 2022).

On the other end of the spectrum one of the lowest scoring food banks was the San Francisco Food Bank. Their worst year was in 2020 with only 69% efficiency. This means that with the inputs they had they could have had a much higher level of outputs. Looking closely at their Form 990 (Propublica.org, 2022), they had a 46% increase in their total revenue from the previous year and ended the year with almost \$39 million in cash on hand. This could have been a late donation or they may have plans to purchase some large dollar equipment in the future. One might wonder if the geographic area of this and other food banks has an effect on their level of efficiency. It's hard to say exactly what is happening, but this might be a food bank that should be watched more closely in the future.

Comparing the results of this study and the European study, we find that the U.S. food bank efficiency results are generally higher than the results found in the European study with many of their efficiency scores in the .4 - .6 range. One reason for this might be that Gonzalez-Torre, et al. (2017) were comparing different countries and since each country handled food distribution very differently, it might be more difficult to compare them. Also, European countries have different economic and social programs that might affect the distribution and organization of food banks. We will also find different levels of

poverty and social outcomes in the United States, but the food banks most likely run very similarly which allows for a better comparison.

Overall, the results seem to show that most regional food banks are doing quite well, but some could do better to meet their mission of feeding the hungry more efficiently.

## **Chapter 5**

### **Conclusion**

#### **5.1 Recommendations: Looking to the Future for Nonprofits**

As previously noted, nonprofits play a large and growing role in the American economy and the also a vital role in fulfilling public needs. It is beneficial for the economy and society that nonprofits continue to be successful in the future and continue to find efficient ways of functioning. With this in mind, there are certain areas that nonprofits should consider when striving for efficient and sustainable practices:

a) *Finding the right balance of overhead costs and direct project costs.* Nonprofits are routinely judged on their level of funds spent on overhead. Specifically, donors want to know that their donations are going to fund the selected cause, and not to give the CEO of the company a raise. But nonprofits are in the same job market as for-profit employers so they need to be somewhat competitive with other firms to keep the best workers (councilofnonprofit.org, 2020). At the same time, nonprofits have to follow federal rules to keep their tax-exempt status and can't be found paying "excessive" salaries (councilofnonprofit.org, 2020). Nonprofits should compare their overhead costs to similar agencies with the similar missions. This should help them stay in a good range of

being competitive and finding worthwhile employees, but at the same time, not taking away from the overall goal of the nonprofit.

b) *Investing in capacity building for greater future levels of outputs.* Another aspect of the balance of direct and indirect costs is the need for investment to be able to grow and reach more people who need help in the future. If these nonprofits are only concerned about their overhead ratio, they may either delay large purchases that could increase their outreach, or they may not report their costs correctly on tax forms (Tian, et al., 2020). Tian, et al. (2020) believe that this issue could be relieved if nonprofits spent more time explaining to donors the importance of investing in future needs to grow the impact of the mission. Specifically, food banks are limited by the storage space they have and their ability to keep food at the proper temperature. If they purchase these needed items in one year, their efficiency score may decrease, but they will be able to reach many more people in the future. Nonprofits may want to look for partners that can provide land for warehouses, or donations of refrigerators or other needed equipment. It's important to keep in mind current needs, but also look for ways to build capacity in the future.

c) *Evaluating donation fund breakdowns and fundraising success.* Nonprofits receive funding from a number of sources. On average, government funding makes up about 33% of all of nonprofits' budgets and about 20% comes from private donations (Brooks, 2004). The rest of the income is generally earned from service charges and various fees (Salamon, 1999). The percentage from private donations has increased over the years and many nonprofits have increased their fundraising budgets to try and grow their donations when government funding has decreased. Nonprofits should evaluate the

best use of their fundraising budgets to garner new funds or check if it would be better to look for more government grants to add to their income. Food banks receive many food donations, but that means they get whatever is being donated. Some food banks may have better health outcomes if they have more cash donations to purchase more nutritious foods, or they may be able to use more government funded commodity programs. Each nonprofit should evaluate the best use of their time and money to be able to expand their outreach and the increase funds they have available.

*d) Find ways to increase volunteerism.* As the research shows, volunteers play a large role in helping nonprofits run efficiently. If nonprofits had to replace all their volunteers with paid staff, it is estimated that it would cost them an additional \$100 billion in payroll (Salamon, 1999). Nonprofits may want to look for ways to encourage more Americans to volunteer. They could potentially partner with college students who could include the volunteer time on their resumes for future jobs, or allow off hour times to volunteer. The nonprofits might also look for small incentives to provide to the volunteers, like t-shirts or other merchandise to reward those who have given their time. It seems like any investment in growing the volunteer sector will be worthwhile to the future of programs.

## **5.2 Conclusion**

Nonprofits in the past haven't received nearly as much attention as for-profit firms and government agencies, but researchers are starting to pay more attention. The sector is a large part of the American economy and is continuing to grow as governments are willing to pay nonprofits to handle more public needs programs. It is beneficial both for the economy and those in need for nonprofits to continue to be successful. One way to make

sure they are sustained in the future is to examine their level of efficiency. Food banks in particular have grown in recent years and many people are willing to donate both their money and time to the mission of feeding those who are hungry and save food from being wasted. The data show that many food banks are doing well with what they have. Some may need to increase their capacity to sustain and expand their outreach and others may need more human capital to provide for those in need. Providing information to those who are interested in donating will help Americans make informed decisions and help nonprofits know that their efforts to be efficient will be rewarded.

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