

November 2014

Hunger

Economic Perspectives – Sustainable Solutions

Provided as a Public Service by

THE PERRYMAN GROUP



510 N. Valley Mills Dr., Suite 300

Waco, TX 76710

ph. 254.751.9595, fax 254.751.7855

info@perrymangroup.com

www.perrymangroup.com

Contents

Introduction: The Economics of Hunger and the Possibility of a Solution	1
Some 17.5 million US households (almost 50 million people) had difficulty obtaining sufficient food last year.....	1
The recent recession exacerbated the problem of hunger	2
Hunger involves a substantial economic cost.....	2
The Perryman Group has implemented a more comprehensive measure of the economic cost of hunger than has been presented previously	3
Investing in food banks and the charitable food distribution networks they support both reduces the cost of hunger and serves as an economic stimulus	3
These two economic perspectives on hunger illustrate the potential gains from a solution.....	4
Hunger's Economic Costs.....	6
The economic cost of hunger stems from two primary areas: health care and education	6
Health care costs include increased incidence of disease as well as earnings losses due to poor health	7
Education effects of hunger include additional spending needs and reduced outcomes stemming from poor nutrition.....	8
Prior studies have only partially measured these economic costs	8
The economic cost of hunger in the US includes almost 2.5 million jobs on an ongoing basis	11
Economic Benefits of the Food Bank and Charitable Food Distribution Network.	13
The food bank and charitable food distribution network is an important community asset	13
Operations of food banks and distribution networks involve sizable economic benefits	13
When consumer spending effects are considered, the economic benefits of food banks and the charitable food distribution network rises to almost 772,000 jobs	14

Expanding the food bank and charitable food distribution network to meet current hunger needs would increase economic benefits.....	15
Toward a Hunger Solution	16
If food banks and the charitable networks they support expand, the economic cost of hunger is reduced	16
Economic benefits of investment in food bank network sufficient to meet hunger needs includes almost 3.1 million jobs	16
Conclusion: It Is Time to End Hunger in America!	18
In addition to enormous human costs, hunger imposes severe costs on the economy.....	18
The process of filling the gap through the private sector with support from local communities is efficient, well organized, and provides an economic stimulus.....	18
The viability of this approach was recently demonstrated in a “real world” setting.....	19
The cost to expand these networks enough to solve the problem would cost much less than the resulting economic benefits	19
APPENDICES.....	21
About The Perryman Group	22
Methods Used	23
Detailed Sectoral Results.....	34
Components of the Economic Cost of Hunger: Lifetime	35
Components of the Economic Cost of Hunger: Typical Year	43
Economic Benefits of Food Banks and the Charitable Distribution Network	47
Economic Benefits of Expanding the Food Bank and Charitable Distribution Network	52
Economic Benefits of Food Bank Network Expansion and Reduced Cost of Hunger	54

Introduction: The Economics of Hunger and the Possibility of a Solution

Hunger!! The very word brings thoughts of suffering and need – be it children leaving school on a Friday afternoon knowing they will not have a decent meal until Monday morning, parents confronting the impossible choice between buying food and providing adequate shelter or transportation to work, or seniors enduring pain and humiliation on a daily basis. Although hunger is devastating to those affected, it remains all too common. This fact alone should be sufficient to motivate lasting and permanent solutions, yet decades of heroic effort have fallen short.

As will be demonstrated below, however, there are also practical economic reasons for the elimination of hunger. While it perhaps should not be necessary to suggest solving pressing human and social concerns for pecuniary interests, the evidence is both persuasive and overwhelming. In fact, **the cost of hunger was found to include 2.5 million US jobs on an ongoing basis, with the long-term consequences of a single year of hunger being in the trillions of dollars in lost business activity.** Beyond the excruciating experiences of those directly afflicted, hunger is a pocketbook issue that adversely impacts every corner of the US economy and every individual irrespective of socioeconomic circumstances.

Some 17.5 million US households (almost 50 million people) had difficulty obtaining sufficient food last year

- **About 14.3% (17.5 million) of US households were food insecure at some point during 2013**, according to the latest US Department of Agriculture (USDA) Household Food Security in the United States in 2013 report¹ released in September 2014. At some time during the year, these households had some difficulty providing enough food for all family members due to a lack of resources.
- Of those, **6.8 million** households (5.6% of the total number of US households) had **very low food security** (the more severe range of

*In 2013, **19.5% of US households with children** had difficulty providing enough food at some point during the year.*

¹ Coleman-Jensen, Alisha, Christian Gregory, and Anita Singh, *Household Food Security in the United States in 2013*, ERR-173, U.S. Department of Agriculture, Economic Research Service, September 2014.

food insecurity) meaning at some point during the year food intake of some members of the household was reduced and normal eating patterns disrupted due to limited resources.

- Among **households with children, 19.5%** (7.5 million) were food insecure, with food insecurity for adults, or children, or both. Of the households with children, 0.9% (360,000) had at least one child that had very low food security.
- The vast majority (85.7%) of households were food secure throughout the year in 2013, meaning they had access to a plentiful, consistent supply of food. However, **in a nation as affluent as the United States, the fact that one in seven people go hungry at some point in the year is no less than tragic.**

*There was **not enough food for normal eating patterns** in 6.8 million US households at some point in 2013.*

The recent recession exacerbated the problem of hunger

- **Food insecurity increased dramatically during the severe recession of 2008-2009** and has been very slow to improve.
- The percentage of households that were food insecure jumped from 11.1% in 2007 to 14.6% in 2008 (an **increase of over 4.1 million** households).
- In 2011, **14.9%** (17.9 million) US households were food insecure.
- **Even with the slight drop in 2013, the number of food insecure households (17.5 million) is still far above the pre-recession total of 13.0 million in 2007.**
- **Federal programs have failed to deal adequately with the problem of food insecurity.** Although there was a temporary increase in some benefits within the federal Supplemental Nutrition Assistance Program (SNAP) during this period, the additional funding ceased in 2013. The more recent trend has been toward reductions in funding, a pattern that seems likely to continue.

The recession pushed millions more US households into food insecurity, but government aid programs have been scaled back.

Hunger involves a substantial economic cost

- **Even beyond the obvious physical and mental costs of food insecurity and the incalculable toll on the stability and dignity of families across the US, there is also a tremendous economic cost.**

- **Health care needs of people who are food insecure are higher due to increased incidence and severity of disease.** Health outcomes are also worse, reducing productivity and lifetime earnings.
- **Education expenses are higher.** Food insecurity is associated with a greater need for intervention such as special education, and education and achievement levels (and, hence, lifetime earnings) are negatively affected.
- **These costs multiply as they work their way through the business complex and are largely borne by the whole of society.**

The Perryman Group has implemented a more comprehensive measure of the economic cost of hunger than has been presented previously

- **Economic aspects of hunger have been the subject of numerous prior studies.** Empirical assessments have provided valuable data regarding the effects of hunger on health care, education, and related outcomes.
- **While many of these prior efforts reflect excellent and careful scholarship that is highly useful, they are based on traditional health economics approaches and, thus, only measure certain aspects of the total cost.** Incremental outlays for excessive and avoidable health care and education is largely a net withdrawal of resources from the economy that could otherwise be used in more productive ways. Moreover, when the earnings of individuals are diminished, society is deprived of productive capacity and spending potential which causes losses in output throughout the supply chain and reduces the demand for consumer goods. The effects of these drains, which have not previously been quantified in a comprehensive manner, cascade through all aspects of business activity.
- **This more comprehensive picture of the cost of hunger sheds new light on the overall burden to society, as well as the potential benefits of solving the problem.** It also informs the policy process and assists in crafting economically sound solutions.

Investing in food banks and the charitable food distribution networks they support both reduces the cost of hunger and serves as an economic stimulus

- **The Perryman Group also analyzed the economic stimulus provided by the nation's network of food banks and the charitable distribution operations they facilitate.** These organizations provide jobs and purchase goods and services necessary to their operations. Moreover, by providing food to low-

- income households, they free up financial resources to be spent for other consumer goods. This spending leads to a notable economic stimulus.
- **Expanding this network sufficiently to address current food insecurity needs would increase this economic stimulus.**
 - **In addition, the enormous social costs of hunger could be virtually eliminated.**

These two economic perspectives on hunger illustrate the potential gains from a solution

- **Using food banks and charitable distribution networks as one aspect of a hunger solution simultaneously reduces the economic costs of food insufficiency and increases the economic stimulus from the distribution network and related consumer spending.**
- **This report, provided as a public service, highlights findings from The Perryman Group's analysis of the economics of hunger.**

SUMMARY OF FINDINGS FROM THE PERRYMAN GROUP'S ANALYSIS:

An Investment in Reducing Hunger Will More than Pay for Itself

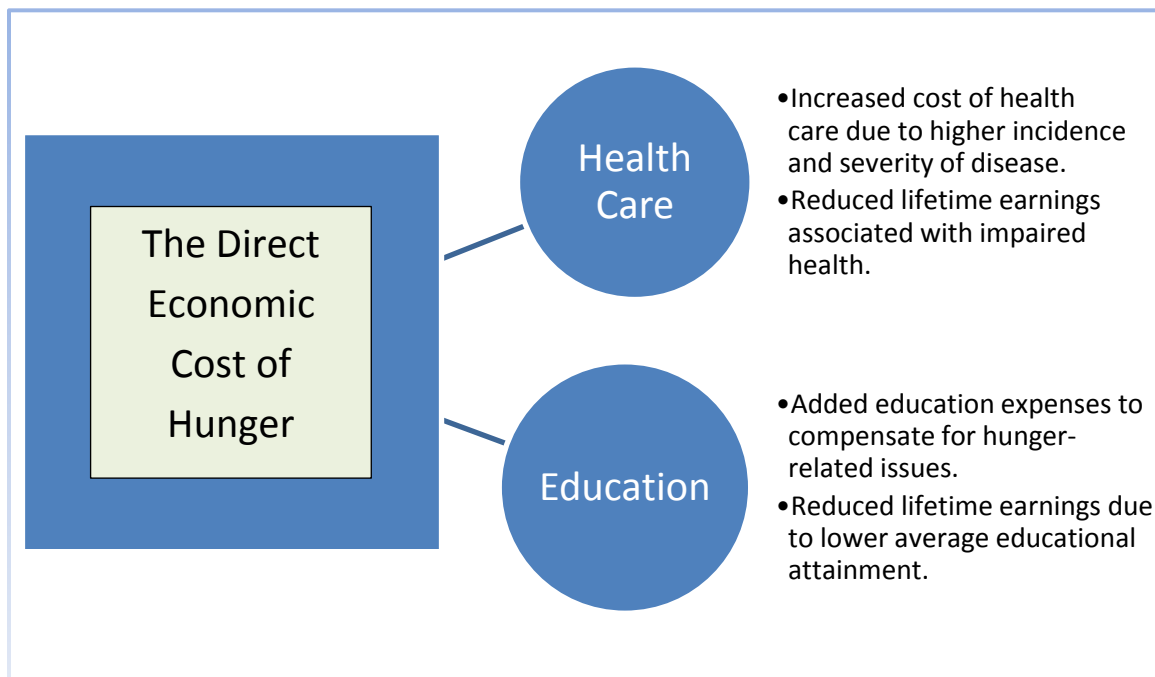
Hunger involves not only immeasurable human costs, but also economic costs stemming from higher health and education expenditure needs as well as worse health and education outcomes and resultant losses in income and production. Community-based food banks and charitable distribution systems are a beneficial economic stimulus in addition to reducing the cost of hunger. When these costs and benefits and the related multiplier effects are considered, an investment in solving US hunger generates substantial economic returns. In fact, every dollar invested in this process results in \$33.27 in incremental spending, \$15.82 in additional gross product, and \$10.31 in personal income.

KEY RESULTS: ANNUAL HUNGER COSTS, BENEFITS FROM INVESTING IN COMMUNITY FOOD BANKS, AND OVERALL EFFECTS OF A HUNGER SOLUTION		
Economic Cost of Hunger ("Steady State" Annual Cost; Lifetime Costs are Much Larger)	Total Expenditures*	(\$461.881)
	Gross Product*	(\$221.872)
	Personal Income*	(\$146.683)
	Retail Sales	(\$56.799)
	Permanent Jobs	(2,499,825)
Incremental Benefits from Expanding the Food Bank and Charitable Food Distribution Network Sufficiently to Meet Current Hunger and Food Insecurity Needs	Total Expenditures*	\$187.066
	Gross Product*	\$87.195
	Personal Income*	\$55.073
	Retail Sales	\$38.902
	Permanent Jobs	1,085,881
Overall Benefits of an Investment to Meet Current Food Insecurity Needs*	Total Expenditures*	\$556.571
	Gross Product*	\$264.693
	Personal Income*	\$172.419
	Retail Sales	\$84.341
	Permanent Jobs	3,085,741
*Monetary values are given in billions of constant (2014) dollars and discounted at a real (inflation-adjusted) rate of 3%. For definitions of these measures of business activity and terms, as well as an overview of methods used, see page 10 and the Appendices to this report. Overall benefits stem from both a reduction in the economic cost of hunger and an increase in the economic stimulus associated with expanding the food distribution network.		
Source: The Perryman Group		

Hunger's Economic Costs

The economic cost of hunger stems from two primary areas: health care and education

- **Extensive prior research indicates that the incidence and severity of disease is greater among persons who are food insecure.** There is a need for additional spending for health care, and outcomes are negatively affected.
- **Hunger is also linked to a need for additional education spending such as special education and reduced achievement.**
- Both of these effects lead to a reduction in earnings as work ability, productivity, and education levels are negatively affected. This loss, in turn, has ripple effects throughout the economy.
- The present analysis uses the “incidence” approach to measure the economic consequences of hunger in a given year (2014) as they are manifested over the life cycle of the affected individuals. This approach is commonly used in health-related studies and is appropriate for comparing costs and benefits for policy evaluation. Because the effects are felt over decades, however, the results are not readily comparable to current levels of economic activity. Thus, The Perryman Group also estimated the segment of the social costs of hunger in a given year (2014) that is observed on an annual basis, thereby permitting a perspective on “steady state” costs relative to business conditions as they are occurring.



Health care costs include increased incidence of disease as well as earnings losses due to poor health

- **Incremental health care needs among the food insecure population stem from issues ranging from frequency of common illnesses such as colds and stomach aches to mental health conditions such as depression and even suicide.** These relationships have been the subject of various studies of the problem.²
- **Higher spending for care is only part of the economic cost associated with health care.** There are significant multiplier effects associated with this use of resources, because in most cases the health care costs are funded by government programs (such as Medicaid), not paid at all and thus manifested in higher insurance premiums, or provided by public hospitals (which rely on funds from local taxpayers). They thus represent net

The economic cost of hunger in the United States includes almost 2.5 million jobs on an ongoing basis.

² Shepard, Donald S, Elizabeth Setren, and Donna Cooper, Hunger in America: Suffering We All Pay For, Center for American Progress, October 2011; Brown, J. Larry, et al., The Economic Cost of Domestic Hunger: Estimated Annual Burden to the United States, June 5, 2007.

- withdrawals from the system.³
- **Lifetime earnings and productivity losses from health issues stemming from food insecurity also involve a social cost.** As the potential output from workers not available due to health issues is lost, society also loses the total output the worker would have produced including its effects through the supply chain and reduced consumer spending stemming from lower payrolls.

Education effects of hunger include additional spending needs and reduced outcomes stemming from poor nutrition

- **Education expenditures are higher for persons who are food insecure because poor nutrition leads to a greater need for special education and other costlier methods of instruction.**
- Research has shown that hunger among students leads to higher absenteeism and greater probability of repeating grades, both of which impact dropout rates. Hunger also affects academic achievement as measured by standardized test scores, which is linked to lifetime earnings.
- Incremental educational requirements in this population are funded primarily through publicly supported school systems, and their provision also represents an avoidable diversion of economic resources that has ripple effects throughout the economy. TPG adjusted prior estimates of these costs to reflect median 2014 earnings as well as linkages among hunger, test scores, earnings, and overall economic activity.⁴

Prior studies have only partially measured these economic costs

- **Many prior studies have provided valuable insights into economic aspects of hunger.** Various studies have sought to measure the economic impact of hunger. These studies (referenced in the Appendices to this report) served as a partial basis for this analysis.

³ Because virtually all of the incremental health care in this population is funded through uncompensated care, federal programs, and local tax revenues, its provision represents an avoidable diversion of economic resources that has ripple effects throughout the economy. This direct cost is estimated and allocated using the incidence of health outlays across industrial sectors as measured by the relevant coefficients of the US Multi-Regional Impact Assessment System (net of the direct health expenditures).

⁴ Since education is funded primarily by public resources, the direct education cost is estimated and allocated using the incidence of overall output and, hence, tax burden across industrial sectors as measured by the relevant coefficients of the US Multi-Regional Impact Assessment System (net of the direct educational expenditures).

- **However, the studies do not consider all economic aspects of the problem, thus understating its magnitude.** Most importantly, many of the “multiplier” effects through the economy are not included.
- **The cost of food insecurity to society includes the ripple effects through the economy as well as productivity losses, and foregone consumer spending not fully considered in previous studies of the issue.** The Perryman Group’s analysis seeks to build upon prior work on the topic to obtain a more comprehensive perspective on the full magnitude of the economic costs of hunger to society.

Measuring Economic Impacts

Any economic stimulus, whether positive or negative, generates multiplier effects throughout the economy. In this instance, the overall cost of hunger is based on (1) increased health care costs and income effects from poor health and (2) increased educational costs and decrease outcomes stemming from poor nutrition. (These outcomes have been the subject of prior empirical study, as noted above, though prior studies did not fully capture the associated ripple effects through the economy.)

Once the direct stimulus was quantified, the associated multiplier effects were measured using The Perryman Group's input-output assessment model (the US Multi-Regional Impact Assessment System, which is described in further detail in the Appendices to this report) developed by the firm some 30 years ago and consistently maintained and updated since that time. The model has been used in hundreds of analyses for clients ranging from major corporations to government agencies. It uses a variety of data (from surveys, industry information, and other sources) to describe the various goods and services (known as resources or inputs) required to produce another good/service. This process allows for estimation of the total economic impact (including multiplier effects) of the health care and educational costs stemming from hunger. The model used in the current analysis reflects the specific industrial composition and characteristics of the US economy.

These total economic effects are quantified for key measures of business activity:

- **Total expenditures** (or total spending) measure the dollars changing hands as a result of the economic stimulus.
- **Gross product** (or output) is production of goods and services that will come about in each area as a result of the activity. This measure is parallel to the gross domestic product numbers commonly reported by various media outlets and is a subset of total expenditures.
- **Personal income** is dollars that end up in the hands of people in the area; the vast majority of this aggregate derives from the earnings of employees, but payments such as interest and rents are also included.
- **Job gains** are expressed as permanent jobs because the study is evaluating ongoing annual effects.

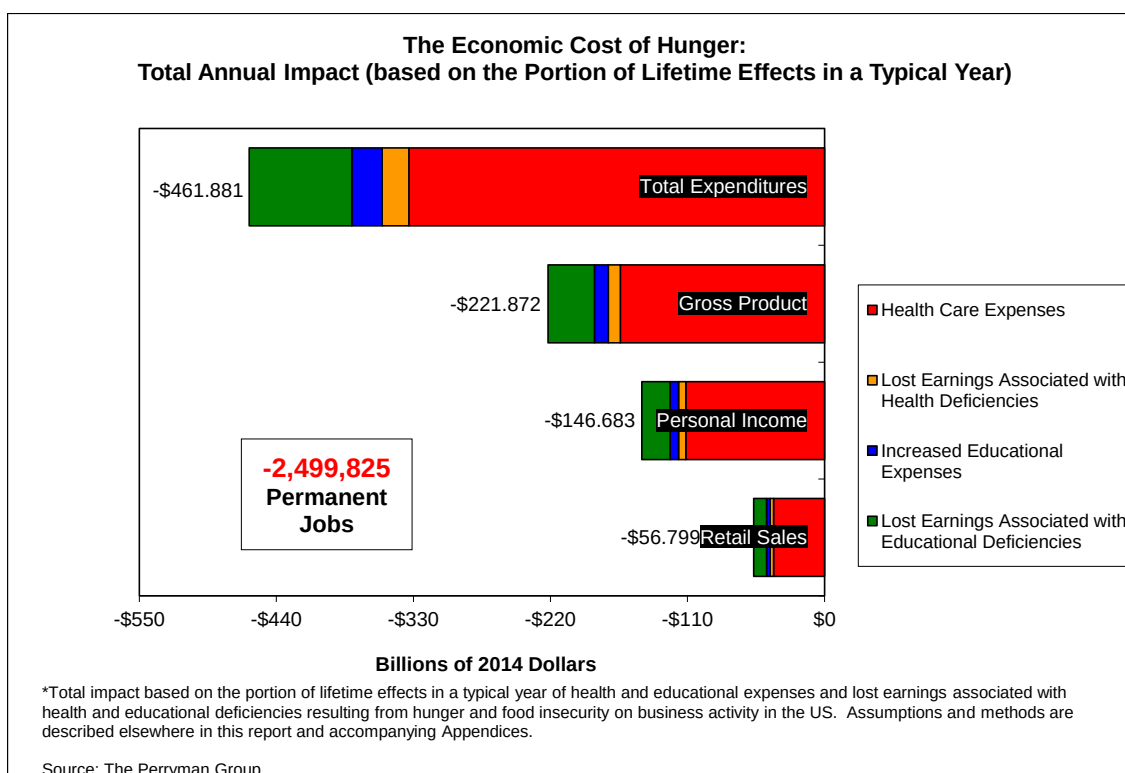
Monetary values were quantified on a constant (2014) basis on a net present value basis. See the Appendices to this report for additional information regarding the methods and assumptions used in this analysis.

The economic cost of hunger in the US includes almost 2.5 million jobs on an ongoing basis

- **The Perryman Group estimates that hunger costs the economy \$461.9 billion in total expenditures, \$221.9 billion in gross product each year⁵ and nearly 2.5 million permanent jobs.⁶** These overall losses stem from the following major sources:
 - **Incremental spending for health care** due to higher disease incidence and severity leads to economic losses including \$163.8 billion in gross product and 1.9 million permanent jobs.
 - The **reduction in earnings stemming from hunger-related health problems** leads to losses of an estimated \$9.7 billion in gross product and 98,700 permanent jobs.
 - **Increased costs of education** lead to losses of an estimated \$11.1 billion in gross product each year and 112,400 permanent jobs.
 - The **reduction in earnings associated with lower educational attainment** due to hunger-related problems causes losses of an estimated \$37.2 billion in gross product and 379,100 permanent jobs.
 - These amounts represent **about 1.3% of total output in the US and 1.8% of total domestic employment**, thus reflecting a significant drain on current business activity.
 - It should be noted that the **lifetime effects** of hunger occurring in 2014 alone are much larger and include **almost \$3.4 trillion in aggregate spending, over \$1.5 trillion in gross product, and 15.9 million years of employment.**

⁵ Earnings effects are based on the portion of lifetime earnings reductions observed in a typical year.

⁶ Values are given in constant (2014) dollars and are discounted at a 3% real (inflation-adjusted) rate. They are fully adjusted for (1) the likelihood of substitution among workers (which reduces the amount reflected in individual losses), (2) the production losses associated with a reduced supply of labor, and (3) the spinoff effects on suppliers and consumer spending of the reduced productive capacity. The lifetime amounts stemming from current levels of hunger are separately estimated and reported.



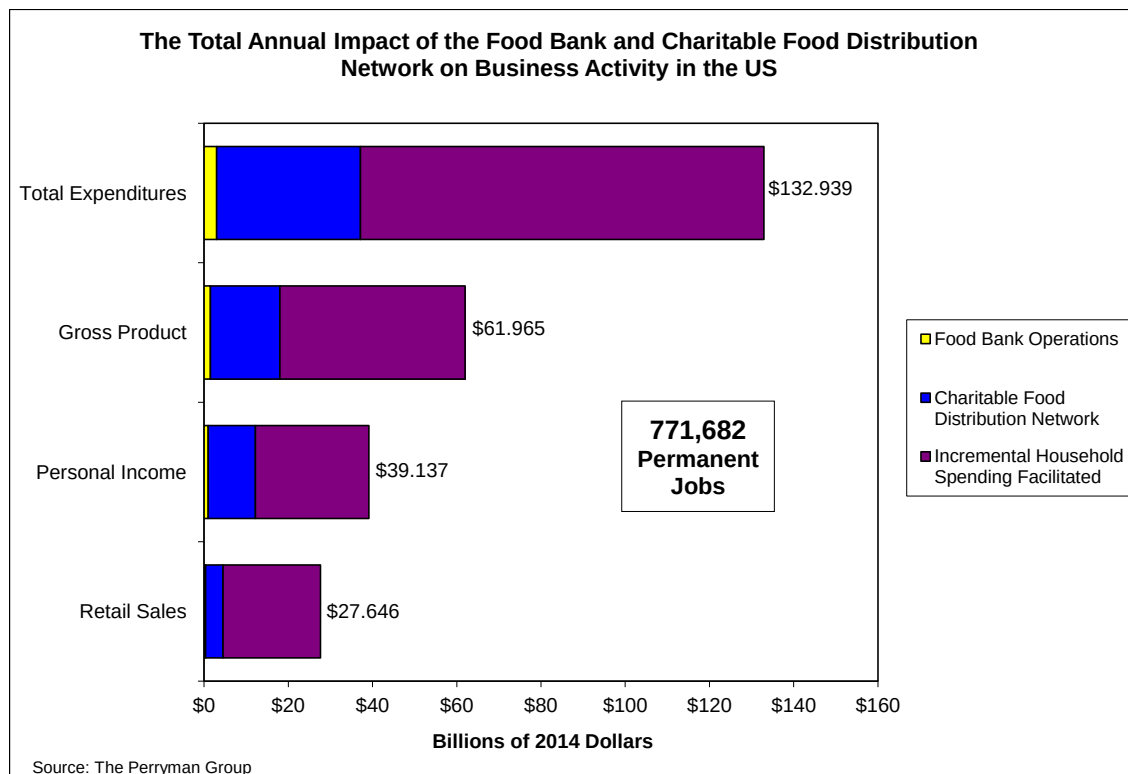
Economic Benefits of the Food Bank and Charitable Food Distribution Network

The food bank and charitable food distribution network is an important community asset

- **Food banks and the charitable food distribution centers they support provide much-needed assistance to those who are food insecure. They also generate substantial economic benefits.** They have evolved into a very effective and efficient part of the US economy.
- **Feeding America is a large network of food banks across the United States which are essentially warehousing and distribution operations.** They receive and process inventory and deliver it to thousands of distribution centers, most of which are non-profit charitable organizations. The Feeding America network and other food banks offer employment opportunities and purchase goods and services from local businesses.
- Data describing operations of these facilities was used as a starting point for this phase of the analysis, adjusting for other food banks not in the network.

Operations of food banks and distribution networks involve sizable economic benefits

- **Through their operations, food banks lead to an increase in business activity** of an estimated \$1.5 billion in gross product each year as well as 16,100 permanent jobs in the United States.
- **The impact of charitable food distribution networks is even larger,** and is estimated to include \$16.5 billion in gross product each year and 220,100 permanent jobs in the United States.



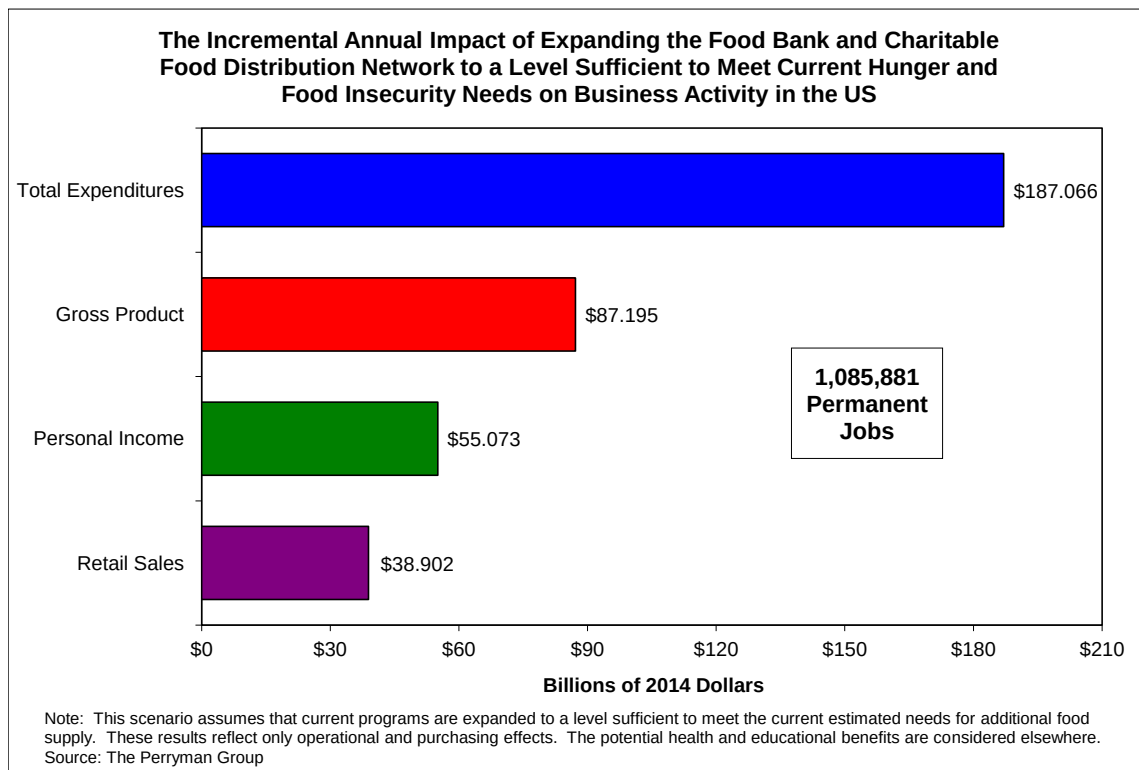
When consumer spending effects are considered, the economic benefits of food banks and the charitable food distribution network rises to almost 772,000 jobs

- **Food banks and food distribution networks free up funds to be spent for other purposes.** As low-income families are provided food, they have additional money to spend for other purposes.⁷ The Perryman Group estimates that the incremental household spending facilitated by food banks and the charitable distribution network includes \$44.0 billion in annual gross product and 535,500 permanent jobs in the United States.
- **The overall economic benefits of the food bank and charitable distribution network for the US economy are thus estimated to include \$62.0 billion in gross product each year and 771, 682 permanent jobs.**

⁷ Low-income families typically pay little or no tax and have limited spending. TPG allocated spending across categories based on standard patterns for households in the relevant income group based on the *Consumer Expenditure Survey* compiled by the Bureau of Labor Statistics, US Department of Labor.

Expanding the food bank and charitable food distribution network to meet current hunger needs would increase economic benefits

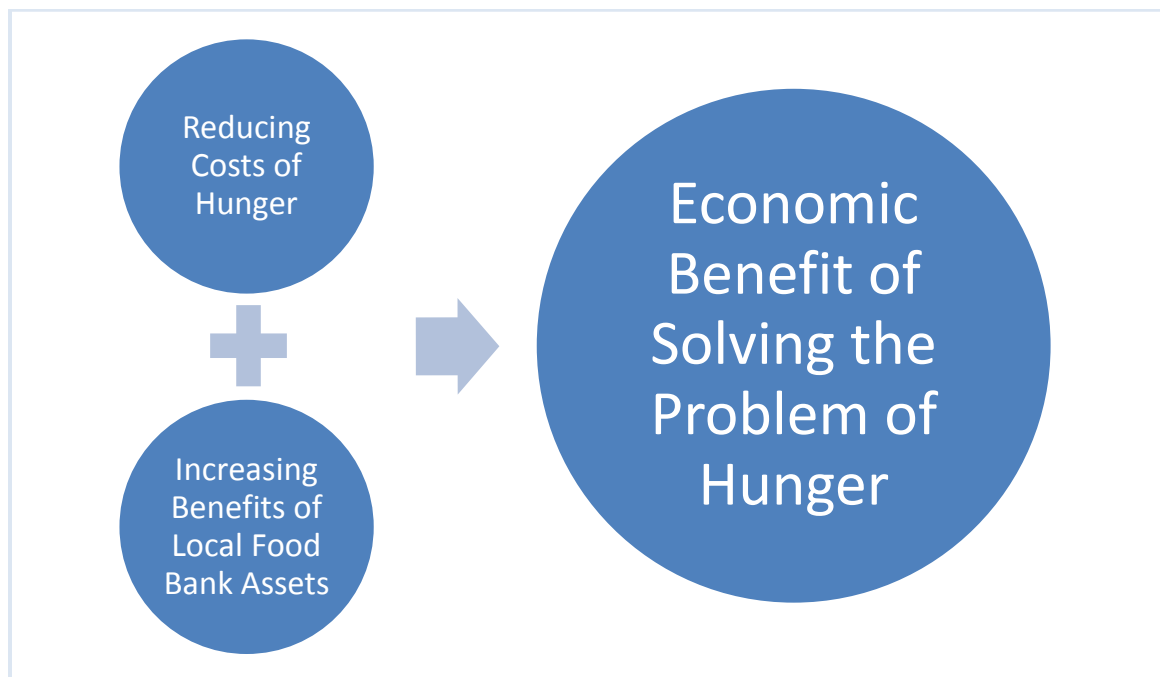
- **The Perryman Group estimated the amount by which the food bank and charitable distribution network would need to be expanded to meet current hunger needs.** This estimate was based on the unmet needs for meals in 2014 considering federal programs and the existing food bank and charitable apparatus.
- **The incremental economic benefits for the US economy include \$187.1 billion in annual spending, \$87.2 billion in gross product, and almost 1.1 million jobs.**



Toward a Hunger Solution

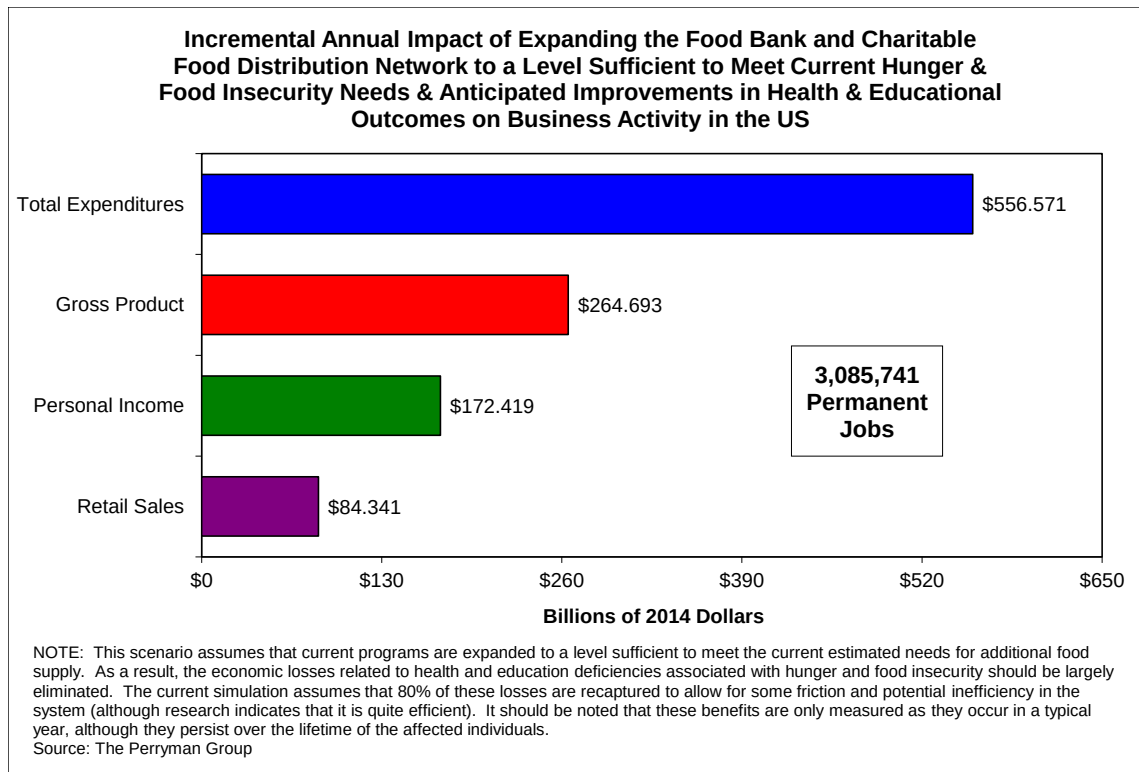
If food banks and the charitable networks they support expand, the economic cost of hunger is reduced

- In addition to reducing the tragic human cost of hunger, expanding the food bank and distribution network would lead to reductions in the economic cost of hunger.
- Economic benefits stem from both sides of the equation: the reduction in costs of hunger and the increase in benefits from food bank assets.



Economic benefits of investment in food bank network sufficient to meet hunger needs includes almost 3.1 million jobs

- The Perryman Group estimates that the incremental benefits of expanding food bank and charitable food distribution networks enough to meet current food insecurity needs include \$556.6 billion in yearly spending, \$264.7 billion in annual gross product and almost 3.1 million ongoing jobs in the United States.



Conclusion: It Is Time to End Hunger in America!

In addition to enormous human costs, hunger imposes severe costs on the economy

- **Not having sufficient food leads to a number of problems, both individually and for society as a whole.** Providing for basic food needs for all citizens is a worthy societal goal, and expanding and supporting food banks and the charitable distribution network they support can facilitate meeting this need.
- **The federal government commitment to hunger relief is focused on doing less, not more.** Although there has been some improvement recently, the number of US households with insufficient food is still far above the level before the recession. Federal programs have not kept pace with the problem and will likely fall further behind absent a change in philosophy.

The process of filling the gap through the private sector with support from local communities is efficient, well organized, and provides an economic stimulus

- **Expanding food banks and the charitable distribution networks they support would reduce the cost of hunger and provide additional economic stimulus.** Expansion sufficient to address current hunger and food insecurity needs would result in gains in US business activity including \$87.2 billion in gross product each year and 1.1 million jobs.
- **Improvement in core issues which contribute to poverty and food insecurity (such as education and health care) should clearly be part of any comprehensive solution, but food banks and the charitable distribution organizations they support are a viable approach to consider both nationally and at the community level.**
- **While this analysis certainly suggests that expanded federal efforts would be appropriate, it also supports expansion through local resources.**

The viability of this approach was recently demonstrated in a “real world” setting

- **A major recent fund-raising effort to significantly expand and modernize the West Texas Food Bank was successfully completed**, and construction on the new facilities is now under way. The program serves a large geographic area that encompasses the Permian Basin, which has been experiencing significant growth and expanding needs.
- Most of the funds were procured through foundations, corporations, individual donors, and other private sector entities. However, **two local economic development agencies also provided significant financial support in recognition of the facts that (1) they were supporting a large-scale distribution facility that created jobs and purchased resources in the community, (2) expanding such operations is a common goal of economic development initiatives, and (3) the resulting spillover benefits would greatly enhance the local area.**
- This project provides an example of precisely the mechanism that can be used to deal more effectively with hunger and food insecurity throughout the United States. The present study clearly demonstrates the rationale for such an approach.

The cost to expand these networks enough to solve the problem would cost much less than the resulting economic benefits

- Based on current operations and needs, the cost for such an expansion would be approximately \$16.2 billion per year (in 2014 dollars).⁸
- The economic benefits of solving hunger and food insecurity problems would result in much greater economic returns than the corresponding costs. Every dollar invested in this process results in \$33.27 in incremental spending, \$15.82 in additional gross product, and \$10.31 in personal income. If the lifetime effects of a single year of hunger are considered, the gains are much larger.
- **Reducing and ultimately eliminating food insecurity is a worthy societal goal.** Tens of millions of Americans do not have enough food to meet basic daily needs, which is nothing short of tragic. This fact alone should be sufficient to stimulate a greater response, but to date it has not. **Unlike**

⁸ This estimate assumes that (1) no economies of scale are achieved in the expansion and (2) the portion of the existing program served by volunteers would require paid staff to accomplish. To the extent that greater efficiencies are achieved or volunteer efforts expand with the scope of the program (both of which are likely), the estimated cost is reduced and the resulting returns to society increase.

- many complex socioeconomic issues, this one has a relatively simple solution: If people have access to food, they are not hungry!!**
- This analysis suggests that taking the steps to eliminate hunger also has enormous economic benefits that transcend the human suffering. **Every year that this problem is allowed to persist literally saps trillions of dollars in long-term economic potential from the United States.**
 - **For reasons of both human dignity and pecuniary interests, it is time to stop hunger in America!!**

APPENDICES

About The Perryman Group

- The Perryman Group (TPG) is an economic research and analysis firm based in Waco, Texas. The firm has more than 30 years of experience in assessing the economic impact of corporate expansions, regulatory changes, real estate developments, public policy initiatives, and myriad other factors affecting business activity. TPG has conducted hundreds of impact analyses for local areas, regions, and states throughout the US. Impact studies have been performed for hundreds of clients including many of the largest corporations in the world, governmental entities at all levels, educational institutions, major health care systems, utilities, and economic development organizations.
- Dr. M. Ray Perryman, founder and President of the firm, developed the US Multi-Regional Impact Assessment System (used in this study) in the early 1980s and has consistently maintained, expanded, and updated it since that time. The model has been used in hundreds of diverse applications and has an excellent reputation for reliability. A major study developed using the relevant model was recently published in *The Journal of Medical Economics*. Dr. Perryman has been asked to testify before the Texas legislature, US Congress, and other major legislative and regulatory bodies on more than one hundred occasions, including invited testimony related to numerous social issues.
- The firm has conducted numerous investigations in the areas of public policy, the economics of health and wellness, and the economics of education. Health care and related studies include measuring the comprehensive cost of cancer (including treatment as well as lost productivity and premature mortality) on multiple occasions. In addition, the firm measured economic aspects of obesity including associated morbidity, mortality, and productivity. The Perryman Group has performed assessments of scores of major medical facilities, teaching institutions, and research programs. Representative efforts public policy studies related to health care issues include analyses of Medicaid and Children's Health Insurance Program (CHIP) funding, wellness initiatives, more extensive use of Advanced Practice Registered Nurses, mental health programs, and economics of Medicaid expansion. In the area of education, the firm has studied the economic impact of education and enhancing outcomes and educational attainment on dozens of occasions for major universities, the Bill and Melinda Gates Foundation, the Texas Higher Education Coordinating Board, and numerous others.

Methods Used

- The basic modeling technique employed in this study is known as dynamic input-output analysis. This methodology essentially uses extensive survey data, industry information, and a variety of corroborative source materials to create a matrix describing the various goods and services (known as resources or inputs) required to produce one unit (a dollar's worth) of output for a given sector. Once the base information is compiled, it can be mathematically simulated to generate evaluations of the magnitude of successive rounds of activity involved in the overall production process.
- There are two essential steps in conducting an input-output analysis once the system is operational. The first major endeavor is to accurately define the levels of direct activity to be evaluated.
- In this instance, an extensive process was involved in identifying and quantifying the various segments of this analysis that were subject to impact assessment. With regard to the outlays for **health care services**, the process was similar to that used in prior studies.⁹ Specifically, available academic studies which provided information on (1) the relative incidence of various health consequences among the hungry and food insecure population and (2) the costs associated with those outcomes were used to provide estimates of the incremental medical outlays resulting from hunger issues.¹⁰ All values reflect the current estimates of the number of food insecure people in the United States and are converted to 2014 dollars using appropriate medical price indices maintained by the US Department of Labor.¹¹ Note that health outlays are understated to the extent there are negative effects for which adequate data are not available.
- Although prior studies have not examined the multiplier effects of these outlays, it is appropriate to do so in that health care spending resulting from hunger is an avoidable social cost that is typically funded by public health facilities (such as hospitals and clinics supported by public resources), governmental insurance programs (such as Medicaid), local taxes, and uncompensated care which is recouped from public resources and higher private insurance premiums. This cost is allocated for modeling purposes based upon the final incidence of health

⁹ Shepard, Donald S, Elizabeth Setren, and Donna Cooper, Hunger in America: Suffering We All Pay For, Center for American Progress, October 2011; Brown, J. Larry, et al., The Economic Cost of Domestic Hunger: Estimated Annual Burden to the United States, June 5, 2007.

¹⁰ See the attached list of additional articles reviewed.

¹¹ Coleman-Jensen, Alisha, Christian Gregory, and Anita Singh, Household Food Security in the United States in 2013, United States Department of Agriculture, Economic Research Report Number 173, September 2014.

care outlays (net of direct spending) as measured by the relevant coefficients of the US Multi-Regional Impact Assessment System.¹²

- The lost income estimates resulting from adverse health outcomes were also derived to the extent possible from the available studies noted above. When such measures were not available, estimates were obtained by using the most closely related condition for which data are available and implementing a downward adjustment for conservatism. This method allows for a comprehensive, but conservative measure of direct income losses (which are often called “indirect” losses in the health economics literature, although that term has a different meaning (discussed below) within the context of dynamic input-output modeling). Income losses are also understated to the extent that there are other health consequences for which empirical data are presently unavailable. Values are expressed in 2014 dollars using appropriate prices indices and fully adjusted to the current food insecure population. They are expressed as lifetime income losses discounted at a 3% real (inflation-adjusted) rate, as recommended by the US Panel on the Cost Effectiveness of Health and Medicine.¹³
- The income estimates noted above represent the estimated lifetime losses for the food insecure individuals involved. To translate these private losses into social costs, it is first necessary to recognize that some of the lost earnings will be recouped by others as employers substitute among workers. The capacity for such substitution is constrained by capacity, which may be represented by the unemployment rate in the relevant population.¹⁴ This assumption treats the capacity for substitution as being equivalent to that of the average firm employing these workers. This level of offset modestly overstates the likely ability to reallocate (and, thus, understates the overall harm) in that a certain level of frictional unemployment, is always present in the economy.
- Once this direct social cost in terms of lost lifetime earnings has been quantified, it must be further noted that the overall impacts on the economy include not only the funds flowing to individuals, but also the associated lost production from reduced resource availability. These values may be quantified using coefficients from the US Multi-Regional Impact Assessment System to translate income into the associated losses in output, spending, and jobs. The losses are allocated across industrial sectors based on relative income patterns. Note that, in addition to providing a more complete set of economic indicators, this translation also eliminates the aggregating of non-comparable measures based on income and expenditures which frequently occurred in the prior studies. Moreover, because these production losses also bring declines in

¹² For a discussion of this system in a different context, see Perryman, M. Ray and Virginia Gleghorn, Obesity-Related Costs and the Economic Impact of Laparoscopic Adjustable Gastric Banding Procedures: Benefits in the Texas Employees Retirement System, *Journal of Medical Economics* (2010).

¹³ Gold, M. R., et al., (1996) *Cost-effectiveness in Health and Medicine*, New York, NY: Oxford University Press.

¹⁴ Weinfield, Nancy S., et al., Hunger in America 2014, National Report prepared for Feeding America, Westate and the Urban Institute, August 2014.

activity to both suppliers and those providing consumer goods to be purchased with the unrealized earnings, it is necessary to perform an impact analysis (described below) in order to properly characterize the total effects in this segment of the analysis. Once these calculations are completed, the sum of those associated with incremental health outlays and those emanating from corresponding losses in lifetime earnings constitute the total health-related consequences of hunger in a given year (2014 in this instance).

- In addition to the health impairments described above, hunger and food insecurity are also associated with substantial adverse effects on **education** costs, outcomes, and, hence, earnings. The direct educational costs were quantified in a prior study¹⁵ and are updated using current estimates of the number of school-aged persons suffering from hunger and food insecurity and the appropriate price indices. As a further extension, much like the incremental health expenditures described above, these outlays represent an avoidable expense that is essentially borne by taxpayers, thus diverting resources that would otherwise flow into other areas of economic activity. Thus, the net effect is again properly subject to impact analysis. In this instance, the allocation across sectors is based on overall contribution to economic activity (a proxy for tax liability) adjusted for the direct effects of the educational commitment.
- Moreover, hunger has been shown to have adverse effects on educational performance, which in turn affects lifetime earnings.¹⁶ Prior studies have examined the lost lifetime earnings resulting from dropping out of school and the impact of hunger on factors that affect this tendency. In essence, they compared the lifetime earnings of dropouts relative to high school graduates and applied those values to the incremental number of dropouts resulting from hunger and food insecurity. Although the research to date only permits the calculation of incremental dropouts resulting from specific phenomena (excess absenteeism and grade retention) and thus understates the actual extent of the problem, there is no valid basis at this point to further extend these estimates. The numbers were updated from prior studies to reflect the current number of students facing food insecurity issues¹⁷ and current earnings differentials.¹⁸ An additional modification was implemented in that the prior studies implicitly assume that the comparison group would only finish high school, when in reality they would likely perform in the labor force more like “typical” workers. Thus, the comparison was

¹⁵ Shepard, Donald S, Elizabeth Setren, and Donna Cooper, *Hunger in America: Suffering We All Pay For*, Center for American Progress, October 2011.

¹⁶ Shepard, Donald S, Elizabeth Setren, and Donna Cooper, *Hunger in America: Suffering We All Pay For*, Center for American Progress, October 2011; Brown, J. Larry, et al., *The Economic Cost of Domestic Hunger: Estimated Annual Burden to the United States*, June 5, 2007; Rouse, C. E., *Labor Market Consequences of an Inadequate Education*, Paper prepared for The Social Costs of an Inadequate Education symposium, Teachers College Columbia University, October 2005; Alaimo, Katherine, Christin M. Olson, and Edward A. Frongillo, *Food Insufficiency and American School-Aged Children’s Cognitive, Academic, and Psychosocial Development*, *Pediatrics* 108 (1) (2001).

¹⁷ Coleman-Jensen, Alisha, Christian Gregory, and Anita Singh, *Household Food Security in the United States in 2013*, United States Department of Agriculture, Economic Research Report Number 173, September 2014.

¹⁸ American Community Survey, American Fact Finder 2011-2013, 3-Year Estimates.

conducted relative to median income rather than that of those who only finished high school. The values also incorporated those who did not participate in the labor force based on educational level in order to capture the differentials in workforce habits of dropouts and other workers. In order to isolate the effects of education on earnings more precisely, a multiple regression model was used to control for gender, location, race/ethnicity, citizenship, and primary language.¹⁹ All values were discounted at a 3% real (inflation-adjusted) rate.

- In addition to the effect on dropouts, research has shown that (1) hunger leads to lower performance on standardized tests²⁰ and (2) lower test scores are linked to lower lifetime earnings.²¹ The relevant studies were analyzed and synthesized to produce lower bound estimates of the effects of hunger and food insecurity on lifetime income. Aggregating this amount over the relevant population (school-aged children with food insecurity issues net of the incremental dropouts) yields the total direct income loss from this phenomenon.
- Once the present value of the earnings losses to individuals was quantified, they were converted to full social costs by (1) reducing the values to account for substitutability in the workforce, (2) converting the income into other measures of business performance (thus eliminating the incongruity between income and expenditure concepts observed in prior studies), and (3) simulating the impact assessment model (described below) to capture the full effect of these losses through the supply and expenditure chains. This process follows the methodology described above with regard to health-related losses.
- Once this segment of the analysis is completed, the combined health and education effects provide what is commonly known as an “incidence” measure, i.e., it quantifies the overall effects from the occurrence of hunger in a given year even though many of the outcomes occur much later. This approach is common and often preferred for policy assessment purposes, as it provides a measure that can be compared with the costs in a given year to reduce or eliminate the problem. It has limitations, however, as it makes comparisons with current economic activity difficult in that decades of effects are being balanced against a single year of incremental investments. An alternative method that is used in some instances is known as a “prevalence” approach, which measures the costs in a specified period of time (one year (2014) in the current investigation). In order to approximate this approach, the lost lifetime earnings and their collateral effects were decomposed into a single year. Obviously, the income losses in any given year at least partially reflect spillover effects from prior years and the effects from the

¹⁹ Julian, Tiffany and Robert Kominski, Education and Synthetic Work-Life Earnings Estimates, American Community Survey Reports, ACS-14, U.S. Department of Commerce, September 2011.

²⁰ Alaimo, Katherine, Christin M. Olson, and Edward A. Frongillo, Food Insufficiency and American School-Aged Children’s Cognitive, Academic, and Psychosocial Development, *Pediatrics*, 108 (1), (2001).

²¹ Cohen, Philip, How Well Do Teen Test Scores Predict Adult Income? Family Inequality, April 19, 2014; Chetty, Raj, et al., How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project Star, *Quarterly Journal of Economics* 126 (4) (2011).

current year occur subsequently. Nonetheless, this approach offers a reasonable representation of the costs incurred in the current year on a “steady state” and is provided for comparative purposes.

- The second major phase of this analysis is to quantify the **economic benefits of the current private distribution network used to combat hunger and food security from a community perspective**. These gains are analyzed on an annual basis as of 2014. There are three essential components to these effects, including (1) the large-scale warehousing and distribution facilities maintained by a large national network of food banks; (2) the thousands of associated distribution agencies; and (3) the incremental spending by recipients of resources that would otherwise be required for food are used to purchase other items. The first of these direct effects is based on a sampling of food banks of various sizes used to estimate employment across the entire network, as well as supporting data in the Feeding America Annual Report.²² The second category of direct impacts is based on the reported full-time equivalent paid employment in the supporting agencies, as indicated in a recent comprehensive survey.²³ In both instances, the amounts were adjusted to reflect the portion of the process that occurs outside the Feeding America network. Wages among the distribution organizations were assumed to reflect the average level in the non-profit sector. It should be noted that, using standard valuation measures for volunteer time, there is typically about \$1 billion per year in donated services within the network. While this amount is included in many of the studies that treat this distribution process as a cost of the system, it was not included in the current assessment. These efforts clearly have substantial value, but are likely primarily contributed from time that would otherwise be spent in leisure or alternative charitable activity as opposed to economic production. The final major category of benefits to be analyzed is the additional consumption that is made possible through food distribution. This measure is implemented using data from the United States Department of Agriculture related to the wholesale value of the meals distributed through the network. Because wholesale prices are not generally available to consumers on a broad basis, this approach should yield a conservative estimate of the benefits. Spending patterns are assumed to follow the typical outlays in the relevant income group as measured by the US Department of Labor in its *Consumer Expenditure Survey* and by ACCRA. Amounts are also fully adjusted to reflect leakages from the domestic expenditure stream, and all values are given in constant (2014) dollars. Once these direct components are quantified, they are evaluated with the context of the impact assessment system to determine the overall benefits.
- As a final segment of the analysis, a simulation was conducted of the social benefits that would occur if the private distribution systems were expanded to a degree sufficient to eliminate

²² 2013 Annual Report: Solving Hunger Together, Feeding America, 2013.

²³ Weinfield, Nancy S., et al., *Hunger in America 2014*, National Report prepared for Feeding America, Westate and the Urban Institute, August 2014.

hunger and food insecurity. While the ultimate solution might well consist at least partially of other measures, this quantification relative to the cost is illuminating and supports the premise that expanded federal investment or, in its absence, community efforts in this regard can be economically prudent and beneficial. This scenario was constructed based on the current magnitude of the network and the additional resources required in order to meet the remaining requirements. The needs were determined by computing the difference between (1) the needs for all persons suffering from hunger and food security on the assumption that they require assistance on average for half of the year and (2) an estimate of the meal-equivalents provided by federal programs and the additional meals presently provided by the food bank distribution system. This measure was independently verified based on a comprehensive study of unmet needs in Minnesota with the results indicating that the estimates were reasonable.²⁴ These results were then simulated to determine the total effects in comparison to the cost associated with expansion. These results were then simulated to determine the total effects in comparison to the cost associated with expansion. This segment of the analysis assumes that current costs per meal within the system will be maintained and that operations will expand proportionally to the added services. It further assumes that the work currently accomplished by volunteers will have to be purchased in the larger network. To the extent that greater efficiencies (economies of scale) are achieved or incremental volunteer hours are contributed (both of which are probable), the cost of the proposed solution would be reduced.

- For purposes of consistency, all values are expressed in constant (2014) dollars.
- The final major phase of the analysis is the simulation of the input-output system to measure overall economic effects of the direct economic stimulus stemming from (1) health care spending and outcomes, (2) education spending and outcomes, and (3) the local food distribution network. The present study was conducted within the context of the US Multi-Regional Impact Assessment System (USMRIAS) which was developed and is maintained by The Perryman Group. This model has been used in hundreds of diverse applications across the country and has an excellent reputation for accuracy and credibility. The system used in the current simulations reflects the unique industrial structure and characteristics of the US economy.
- The USMRIAS is somewhat similar in format to the Input-Output Model of the United States and the Regional Input-Output Modeling System, both of which are maintained by the US Department of Commerce. The model developed by TPG, however, incorporates several important enhancements and refinements. Specifically, the expanded system includes (1) comprehensive 500-sector coverage for any county, multi-county, or urban region; (2) calculation of both total expenditures and value-added by industry and region; (3) direct estimation of expenditures for multiple basic input choices (expenditures, output, income, or

²⁴ The Missing Meals Unmet Food Needs Study, Hunger-Free Minnesota, September 23, 2010.

employment); (4) extensive parameter localization; (5) price adjustments for real and nominal assessments by sectors and areas; (6) measurement of the induced impacts associated with payrolls and consumer spending; (7) embedded modules to estimate multi-sectoral direct spending effects; (8) estimation of retail spending activity by consumers; and (9) comprehensive linkage and integration capabilities with a wide variety of econometric, real estate, occupational, and fiscal impact models. The model has been thoroughly tested for reasonableness and historical reliability.

- The impact assessment (input-output) process essentially estimates the amounts of all types of goods and services required to produce one unit (a dollar's worth) of a specific type of output. For purposes of illustrating the nature of the system, it is useful to think of inputs and outputs in dollar (rather than physical) terms. As an example, the construction of a new building will require specific dollar amounts of lumber, glass, concrete, hand tools, architectural services, interior design services, paint, plumbing, and numerous other elements. Each of these suppliers must, in turn, purchase additional dollar amounts of inputs. This process continues through multiple rounds of production, thus generating subsequent increments to business activity. The initial process of building the facility is known as the *direct effect*. The ensuing transactions in the output chain constitute the *indirect effect*.
- Another pattern that arises in response to any direct economic activity comes from the payroll dollars received by employees at each stage of the production cycle. As workers are compensated, they use some of their income for taxes, savings, and purchases from external markets. A substantial portion, however, is spent locally on food, clothing, health care services, utilities, housing, recreation, and other items. Typical purchasing patterns in the relevant areas are obtained from the *ACCRA Cost of Living Index*, a privately compiled inter-regional measure which has been widely used for several decades, and the *Consumer Expenditure Survey* of the US Department of Labor. These initial outlays by area residents generate further secondary activity as local providers acquire inputs to meet this consumer demand. These consumer spending impacts are known as the *induced effect*. The USMRIAS is designed to provide realistic, yet conservative, estimates of these phenomena.
- Sources for information used in this process include the Bureau of the Census, the Bureau of Labor Statistics, the Regional Economic Information System of the US Department of Commerce, and other public and private sources. The pricing data are compiled from the US Department of Labor and the US Department of Commerce. The verification and testing procedures make use of extensive public and private sources.
- Impacts were measured in 2014 dollars.
- The USMRIAS generates estimates of the effect on several measures of business activity. The most comprehensive measure of economic activity used in this study is **Total Expenditures**. This

measure incorporates every dollar that changes hands in any transaction. For example, suppose a farmer sells wheat to a miller for \$0.50; the miller then sells flour to a baker for \$0.75; the baker, in turn, sells bread to a customer for \$1.25. The Total Expenditures recorded in this instance would be \$2.50, that is, \$0.50 + \$0.75 + \$1.25. This measure is quite broad, but is useful in that (1) it reflects the overall interplay of all industries in the economy, and (2) some key fiscal variables such as sales taxes are linked to aggregate spending.

- A second measure of business activity frequently employed in this analysis is that of **Gross Product**, the most commonly reported statistic regarding national economic performance. It is defined as the value of all final goods produced in a given region for a specific period of time. Stated differently, it captures the amount of value-added (gross area product) over intermediate goods and services at each stage of the production process, that is, it eliminates the double counting in the Total Expenditures concept. Using the example above, the Gross Product is \$1.25 (the value of the bread) rather than \$2.50. Alternatively, it may be viewed as the sum of the value-added by the farmer, \$0.50; the miller, \$0.25 (\$0.75 - \$0.50); and the baker, \$0.50 (\$1.25 - \$0.75). The total value-added is, therefore, \$1.25, which is equivalent to the final value of the bread. In many industries, the primary component of value-added is the wage and salary payments to employees.
- The third gauge of economic activity used in this evaluation is **Personal Income**. As the name implies, Personal Income is simply the income received by individuals, whether in the form of wages, salaries, interest, dividends, proprietors' profits, or other sources. It may thus be viewed as the segment of overall impacts which flows directly to the citizenry.
- The fourth measure, **Retail Sales**, represents the component of Total Expenditures which occurs in retail outlets (general merchandise stores, automobile dealers and service stations, building materials stores, food stores, drugstores, restaurants, and so forth). Retail Sales is a commonly used measure of consumer activity.
- The final aggregate used is **Permanent Jobs and Person-Years of Employment**. The Person-Years of Employment measure reveals the full-time equivalent jobs generated by an activity. It should be noted that, unlike the dollar values described above, Permanent Jobs is a "stock" rather than a "flow." In other words, if an area produces \$1 million in output in 2010 and \$1 million in 2011, it is appropriate to say that \$2 million was achieved in the 2010-2011 period. If the same area has 100 people working in 2010 and 100 in 2011, it only has 100 Permanent Jobs. When a flow of jobs is measured, such as in a construction project or a cumulative assessment over multiple years, it is appropriate to measure employment in Person-Years (a person working for a year). This concept is distinct from Permanent Jobs, which anticipates that the relevant positions will be maintained on a continuing basis.

Additional Articles Reviewed

Alaimo, K., C. Olson, and E. Frongillo, Family Food Insufficiency, But Not Low Income, is Positively Associated with Dysthymia and Suicide Symptoms in Adolescents, *Journal of Nutrition* 132 (2002).

Alaimo, K., C. Olson, and E. Frongillo, Food Insufficiency and American School-aged Children's Cognitive, Academic and Psychosocial Development, *Pediatrics* 108 (1) (2001).

Alaimo, K., et al., Food Insufficiency, Family Income and Health in U.S. Pre-School and School-aged Children, *American Journal of Public Health* 91 (5) (2001).

Alexander, K., D. Entwistle, and C. Horsey, From First Grade Forward: Early Foundations of High School Dropout, *Sociology of Education*, 70 (2) (1997).

Berto, P., et al., Depression: Cost-of-Illness Studies in the International Literature, a Review, *Journal of Mental Health Policy and Economics* 3 (2005).

Biros, M., P. Hoffman, and K. Resch, The Prevalence and Perceived Health Consequences of Hunger in Emergency Department Patient Populations, *Academy of Emergency Medicine* 12 (2005).

Casey, P., et al., Child Health-Related Quality of Life and Household Food Security, *Archives of Pediatric and Adolescent Medicine* 159 (2005).

Casey, P., et al., Children in Food Insufficient Low-Income Families: Prevalence, Health and Nutritional Status, *Archives of Pediatric Adolescent Medicine* 155 (2001).

Cook, J. T., et al., Food Insecurity is Associated with Adverse Health Outcomes Among Human Infants and Toddlers, *Journal of Nutrition* 134 (6) (2004).

Corso, P. S., et al., Medical Costs and Productivity Losses Due to Interpersonal and Self-Directed Violence in the United States, *American Journal of Preventive Medicine* 32 (6) (2007).

DuPont, R., et al., Economic Costs of Anxiety Disorders, *Anxiety* 2 (4) (1996).

Fendrick, A., et al., The Economic Burden of Non-Influenza-Related Viral Respiratory Tract Infection in the United States, *Archives of Internal Medicine* 163 (2003).

Goldschmidt, P. and J. Wang, When Can Schools Affect Dropout Behavior? A Longitudinal Multilevel Analysis, *American Educational Research Journal* 36 (1999).

Grantham-McGregor S., S. Walker, and S. Chang, Nutritional Deficiencies and Later Behavioural Development, *Proceedings of the Society for Nutrition* 59 (2000).

Greenberg P., et al., The Economic Burden of Depression in the United States: How Did It Change Between 1990 and 2000? *Journal of Clinical Psychiatry* 64 (1) (2003).

Hu, X., et al., Burden of Migraine in the United States: Disability and Economic Costs, *Archives of Internal Medicine* 159 (1999).

Jimerson, S., Meta-analysis of Grade Retention Research: Implications for Practice in the 21st Century, *School Psychology Review* 30 (2001).

Kersey, M., et al., The Prevalence and Effects of Hunger in an Emergency Department Patient Population, *Academy of Emergency Medicine* 6 (1999).

Kleinman, R., et al., Hunger in Children in the United States: Potential Behavioral and Emotional Correlates, *Pediatrics* 101 (1) (1998).

Lee, J. and E. Frongillo, Nutritional and Health Consequences are Associated with Food Insecurity Among U.S. Elderly Persons, *Journal of Nutrition* 131 (2001).

Lipton, R., et al., Prevalence and Burden of Migraine in the United States: Data from the American Migraine Study II, *Headache: The Journal of Head and Face Pain* 41 (2001).

Liu, J., et al., Malnutrition at Age 3 Years and Externalizing Behavior Problems at Ages 8, 11 and 17 Years, *American Journal of Psychiatry* 161 (2004).

Lozoff, B., E. Jiminez, and A. Wolff, Long-Term Developmental Outcomes of Infants with Iron Deficiency, *New England Journal of Medicine* 325 (1991).

Miller, J. and S. Korenman, Poverty and Children's Nutritional Status in the United States, *American Journal of Epidemiology* 140 (3) (1994).

Murphy, M., et al., Relationship Between Hunger and Psychosocial Functioning in Low-Income American Children, *Journal of the American Academy of Child and Adolescent Psychiatry*, 37 (2) (1998).

Olson, C., Nutrition and Health Outcomes Associated with Food Insecurity and Hunger, *Journal of Nutrition* 129 (1999).

Pheley, A., et al., Food Security and Perceptions of Health Status: A Preliminary Study of Rural Appalachia, *Journal of Rural Health* 18 (2002).

Pollitt, E., et al., A Re-conceptualization of the Effects of Undernutrition on Children's Biological, Psychosocial and Behavioral Development, *Social Policy Report* 10 (1996).

Rice, D. and L. Miller, Health Economics and Cost Implications of Anxiety and Other Mental Disorders in the United States, *British Journal of Psychiatry* 34 (1998).

Rice, D., Cost of Illness Studies: What is Good About Them? *Injury Prevention* 6 (2000).

Rice, D., Economic Costs of Substance Abuse, *Proceedings of the Association of American Physicians* 111 (1995).

Rouse, C. E., Labor Market Consequences of an Inadequate Education, Paper prepared for The Social Costs of an Inadequate Education symposium, Teachers College of Columbia University, October 2005.

Rumberger R. and G. Palardy, Test Scores, Dropout Rates, and Transfer Rates as Alternative Indicators of High School Performance, *American Educational Research Journal* 42 (2005).

Rumberger, R., Dropping Out of Middle School: A Multilevel Analysis of Students and Schools, *American Educational Research Journal* 32 (1995).

Sharkey, J. R., Risk and Presence of Food Insufficiency are Associated with Low Nutrient Intakes and Multimorbidity Among Homebound Older Women Who Receive Home-delivered Meal, *The Journal of Nutrition* 133 (11) (2003).

Skalicky, A., et al., Child Food Insecurity and Iron Deficiency Anemia in Low-Income Infants and Toddlers, *Maternal and Child Health Journal* 10 (2) (2006).

Stewart, W., et al., Lost Productive Time and Cost Due to Common Pain Conditions in the US Workforce, *Journal of the American Medical Association* 290 (2003).

Stormer, A. and G. Harrison, Does Household Food Security Affect Cognitive and Behavioral Development of Kindergarteners? Institute for Research on Poverty, November 2003.

Stuff, J., et al., Household Food Insecurity is Associated with Adult Health Status, *Journal of Nutrition* 134 (2004).

Tarasuk, V., Household Food Insecurity with Hunger is Associated with Women's Food Intakes, Health and Household Circumstances, *Journal of Nutrition* 131 (2001).

Vozoris, N. and V. Tarasuk, Household Food Insufficiency is Associated with Poorer Health, *Journal of Nutrition* 133 (1) (2003).

Weinrab, L., et al., Hunger: Its Impact on Children's Health and Mental Health, *Pediatrics* 110 (2002).

Detailed Sectoral Results

Components of the Economic Cost of Hunger: Lifetime

The Annual Impact of Increased Health Care Expenses Associated with Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	(\$6,001,947,242)	(\$1,668,389,716)	(\$1,088,653,355)	(16,350)
Mining	(\$4,292,932,481)	(\$1,007,377,817)	(\$570,034,750)	(3,196)
Construction	(\$6,281,908,507)	(\$3,343,815,054)	(\$2,755,511,231)	(37,009)
Nondurable Manufacturing	(\$61,226,026,717)	(\$16,966,828,421)	(\$8,713,297,359)	(132,201)
Durable Manufacturing	(\$9,824,355,617)	(\$3,759,566,449)	(\$2,464,595,340)	(32,226)
Transportation and Utilities	(\$25,761,750,600)	(\$9,948,806,946)	(\$5,726,711,346)	(60,220)
Information	(\$6,610,165,793)	(\$4,062,410,739)	(\$1,753,446,258)	(15,530)
Wholesale Trade	(\$10,057,790,495)	(\$6,800,704,125)	(\$3,921,346,270)	(41,729)
Retail Trade	(\$40,894,208,868)	(\$30,668,024,306)	(\$17,827,828,546)	(520,610)
Finance, Insurance, and Real Estate	(\$42,848,782,863)	(\$11,214,424,931)	(\$4,183,363,272)	(41,232)
Business Services	(\$12,325,756,581)	(\$7,430,010,601)	(\$6,060,984,381)	(70,280)
Health Services	(\$89,554,502,935)	(\$57,636,195,538)	(\$48,731,938,105)	(768,270)
Other Services	(\$18,028,532,895)	(\$9,311,322,864)	(\$7,472,979,171)	(170,721)
TOTAL	(\$333,708,661,593)	(\$163,817,877,507)	(\$111,270,689,385)	(1,909,575)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: Because virtually all of the incremental health care in this population is funded through uncompensated care, federal programs, and local tax revenues, its provision represents an avoidable diversion of economic resources that has ripple effects throughout the economy. This direct cost is estimated and allocated using the incidence of health outlays across industrial sectors as measured by the relevant coefficients of the US Multi-Regional Impact Assessment System (net of the direct health expenditures).

The Annual Impact (based on Lifetime Effects) of Lost Earnings Associated with Health Deficiencies Resulting from Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Person-Years)</i>
Agriculture	(\$26,974,977,908)	(\$7,474,510,929)	(\$4,883,842,493)	(73,495)
Mining	(\$28,284,607,757)	(\$6,646,792,688)	(\$3,473,632,953)	(19,084)
Construction	(\$29,928,113,359)	(\$14,977,639,364)	(\$12,342,507,370)	(166,122)
Nondurable Manufacturing	(\$169,447,128,204)	(\$45,388,300,618)	(\$23,547,920,420)	(354,611)
Durable Manufacturing	(\$53,600,163,493)	(\$21,196,701,635)	(\$13,830,599,421)	(178,905)
Transportation and Utilities	(\$80,432,802,733)	(\$31,908,863,336)	(\$18,680,256,693)	(203,177)
Information	(\$24,252,842,214)	(\$14,812,975,999)	(\$6,399,036,167)	(57,099)
Wholesale Trade	(\$36,431,286,916)	(\$24,648,768,996)	(\$14,212,701,069)	(151,669)
Retail Trade	(\$107,400,346,566)	(\$80,154,304,559)	(\$46,526,038,367)	(1,369,663)
Finance, Insurance, and Real Estate	(\$156,422,640,984)	(\$51,774,142,838)	(\$19,529,066,557)	(186,592)
Business Services	(\$58,167,943,252)	(\$37,449,057,137)	(\$30,548,834,812)	(354,808)
Health Services	(\$37,051,186,214)	(\$25,330,182,397)	(\$21,416,904,410)	(337,669)
Other Services	(\$57,322,086,933)	(\$29,540,586,168)	(\$23,600,329,130)	(532,031)
TOTAL	(\$865,716,126,534)	(\$391,302,826,664)	(\$238,991,669,861)	(3,984,924)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: This measure captures the social costs of the adverse health effects on lifetime earnings of hunger in a given year (2014). Values are given in constant (2014) dollars and are discounted at a 3% real (inflation-adjusted) rate. They are fully adjusted for (1) the likelihood of substitution among workers (which reduces amount reflected in individual losses), (2) the production losses associated with a reduced supply of labor, and (3) the spillover effects on suppliers and consumer spending of the reduced productive capacity. While this "lifetime" approach is a valid measure of this component of the overall annual harms associated with hunger and is widely used, it overstates the magnitude that actually occurs within a given year. These annual amounts are separately estimated and reported.

The Total Annual Impact (based on Lifetime Effects) of Health Care Expenses and Lost Earnings Associated with Health Deficiencies Resulting from Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures <i>(2014 Dollars)</i>	Real Gross Product <i>(2014 Dollars)</i>	Personal Income <i>(2014 Dollars)</i>	Employment <i>(Person-Years)</i>
Agriculture	(\$32,976,925,150)	(\$9,142,900,645)	(\$5,972,495,847)	(89,844)
Mining	(\$32,577,540,238)	(\$7,654,170,505)	(\$4,043,667,703)	(22,280)
Construction	(\$36,210,021,867)	(\$18,321,454,418)	(\$15,098,018,600)	(203,131)
Nondurable Manufacturing	(\$230,673,154,921)	(\$62,355,129,039)	(\$32,261,217,779)	(486,812)
Durable Manufacturing	(\$63,424,519,111)	(\$24,956,268,083)	(\$16,295,194,761)	(211,132)
Transportation and Utilities	(\$106,194,553,333)	(\$41,857,670,283)	(\$24,406,968,039)	(263,397)
Information	(\$30,863,008,007)	(\$18,875,386,738)	(\$8,152,482,426)	(72,629)
Wholesale Trade	(\$46,489,077,411)	(\$31,449,473,121)	(\$18,134,047,340)	(193,398)
Retail Trade	(\$148,294,555,434)	(\$110,822,328,864)	(\$64,353,866,913)	(1,890,273)
Finance, Insurance, and Real Estate	(\$199,271,423,847)	(\$62,988,567,770)	(\$23,712,429,828)	(227,824)
Business Services	(\$70,493,699,833)	(\$44,879,067,738)	(\$36,609,819,194)	(425,087)
Health Services	(\$126,605,689,149)	(\$82,966,377,935)	(\$70,148,842,515)	(1,105,939)
Other Services	(\$75,350,619,828)	(\$38,851,909,033)	(\$31,073,308,301)	(702,753)
TOTAL	(\$1,199,424,788,127)	(\$555,120,704,171)	(\$350,262,359,246)	(5,894,499)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: See notes to component tables.

The Annual Impact of Increased Educational Expenses Associated with Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	(\$907,118,844)	(\$251,838,556)	(\$159,082,470)	(2,358)
Mining	(\$691,065,556)	(\$163,145,118)	(\$86,797,324)	(450)
Construction	(\$860,557,258)	(\$431,201,572)	(\$355,336,883)	(4,771)
Nondurable Manufacturing	(\$4,738,118,835)	(\$1,266,667,889)	(\$658,397,536)	(9,929)
Durable Manufacturing	(\$1,510,787,131)	(\$606,453,330)	(\$395,973,764)	(5,003)
Transportation and Utilities	(\$2,330,324,719)	(\$902,516,918)	(\$526,851,155)	(5,679)
Information	(\$647,408,664)	(\$395,557,384)	(\$171,019,998)	(1,520)
Wholesale Trade	(\$1,000,196,140)	(\$676,702,878)	(\$390,192,902)	(4,161)
Retail Trade	(\$3,025,376,859)	(\$2,261,525,790)	(\$1,313,378,192)	(38,562)
Finance, Insurance, and Real Estate	(\$4,446,959,362)	(\$1,631,553,588)	(\$614,269,164)	(5,886)
Business Services	(\$1,548,541,055)	(\$999,106,311)	(\$815,014,811)	(9,460)
Health Services	(\$998,252,228)	(\$685,423,513)	(\$579,531,922)	(9,131)
Other Services	(\$1,653,439,594)	(\$859,168,538)	(\$687,737,839)	(15,483)
TOTAL	(\$24,358,146,247)	(\$11,130,861,386)	(\$6,753,583,961)	(112,391)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: Because virtually all of the incremental educational requirements in this population are funded through publicly supported school systems, their provision represents an avoidable diversion of economic resources that has ripple effects throughout the economy. This direct cost is estimated and allocated using the incidence of overall outlays and tax burden across industrial sectors as measured by the relevant coefficients of the US Multi-Regional Impact Assessment System (net of the direct educational expenditures).

The Annual Impact (based on Lifetime Effects) of Lost Earnings Associated with Educational Deficiencies Resulting from Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures (2014 Dollars)	Real Gross Product (2014 Dollars)	Personal Income (2014 Dollars)	Employment (Person-Years)
Agriculture	(\$66,885,658,251)	(\$18,533,382,503)	(\$12,109,704,817)	(182,233)
Mining	(\$70,132,943,746)	(\$16,481,018,288)	(\$8,613,027,501)	(47,319)
Construction	(\$74,208,089,033)	(\$37,137,723,386)	(\$30,603,796,330)	(411,907)
Nondurable Manufacturing	(\$420,151,695,670)	(\$112,542,311,400)	(\$58,388,116,687)	(879,274)
Durable Manufacturing	(\$132,903,990,871)	(\$52,558,165,068)	(\$34,293,586,800)	(443,603)
Transportation and Utilities	(\$199,436,714,059)	(\$79,119,446,755)	(\$46,318,527,840)	(503,786)
Information	(\$60,136,001,648)	(\$36,729,433,244)	(\$15,866,694,968)	(141,579)
Wholesale Trade	(\$90,332,997,293)	(\$61,117,719,725)	(\$35,241,024,841)	(376,070)
Retail Trade	(\$266,303,939,190)	(\$198,746,165,441)	(\$115,363,382,784)	(3,396,141)
Finance, Insurance, and Real Estate	(\$387,856,899,950)	(\$128,376,291,389)	(\$48,423,189,674)	(462,662)
Business Services	(\$144,230,004,073)	(\$92,856,603,851)	(\$75,747,195,501)	(879,761)
Health Services	(\$91,870,065,190)	(\$62,807,314,580)	(\$53,104,167,648)	(837,264)
Other Services	(\$142,132,665,686)	(\$73,247,198,116)	(\$58,518,066,416)	(1,319,196)
TOTAL	(\$2,146,581,664,659)	(\$970,252,773,746)	(\$592,590,481,806)	(9,880,797)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: This measure captures the social costs of the adverse education effects on lifetime earnings of hunger in a given year (2014). Values are given in constant (2014) dollars and are discounted at a 3% real (inflation-adjusted) rate. They are fully adjusted for (1) the likelihood of substitution among workers (which reduces amount reflected in individual losses), (2) the production losses associated with a reduced supply of labor, and (3) the spillover effects on suppliers and consumer spending of the reduced productive capacity. The potentially confounding effects of gender, race/ethnicity, citizenship, language, and region have also been controlled within the model. While this "lifetime" approach is a valid measure of this component of the overall annual harms associated with hunger and is widely used, it overstates the magnitude that actually occurs within a given year. These annual amounts are separately estimated and reported.

The Total Annual Impact (based on Lifetime Effects) of Educational Expenses and Lost Earnings Associated with Educational Deficiencies Resulting from Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures <i>(2014 Dollars)</i>	Real Gross Product <i>(2014 Dollars)</i>	Personal Income <i>(2014 Dollars)</i>	Employment <i>(Person-Years)</i>
Agriculture	(\$67,792,777,096)	(\$18,785,221,060)	(\$12,268,787,287)	(184,591)
Mining	(\$70,824,009,302)	(\$16,644,163,405)	(\$8,699,824,826)	(47,770)
Construction	(\$75,068,646,291)	(\$37,568,924,958)	(\$30,959,133,213)	(416,678)
Nondurable Manufacturing	(\$424,889,814,505)	(\$113,808,979,289)	(\$59,046,514,223)	(889,203)
Durable Manufacturing	(\$134,414,778,002)	(\$53,164,618,398)	(\$34,689,560,564)	(448,606)
Transportation and Utilities	(\$201,767,038,777)	(\$80,021,963,673)	(\$46,845,378,994)	(509,465)
Information	(\$60,783,410,312)	(\$37,124,990,628)	(\$16,037,714,966)	(143,099)
Wholesale Trade	(\$91,333,193,433)	(\$61,794,422,603)	(\$35,631,217,743)	(380,231)
Retail Trade	(\$269,329,316,049)	(\$201,007,691,231)	(\$116,676,760,976)	(3,434,703)
Finance, Insurance, and Real Estate	(\$392,303,859,312)	(\$130,007,844,976)	(\$49,037,458,838)	(468,548)
Business Services	(\$145,778,545,128)	(\$93,855,710,163)	(\$76,562,210,312)	(889,221)
Health Services	(\$92,868,317,419)	(\$63,492,738,092)	(\$53,683,699,570)	(846,396)
Other Services	(\$143,786,105,280)	(\$74,106,366,654)	(\$59,205,804,255)	(1,334,679)
TOTAL	(\$2,170,939,810,905)	(\$981,383,635,132)	(\$599,344,065,767)	(9,993,188)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: See notes to component tables.

The Total Annual Impact (based on Lifetime Effects) of Health and Educational Expenses and Lost Earnings Associated with Health and Educational Deficiencies Resulting from Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures <i>(2014 Dollars)</i>	Real Gross Product <i>(2014 Dollars)</i>	Personal Income <i>(2014 Dollars)</i>	Employment <i>(Person-Years)</i>
Agriculture	(\$100,769,702,245)	(\$27,928,121,705)	(\$18,241,283,135)	(274,436)
Mining	(\$103,401,549,540)	(\$24,298,333,910)	(\$12,743,492,529)	(70,050)
Construction	(\$111,278,668,157)	(\$55,890,379,376)	(\$46,057,151,813)	(619,809)
Nondurable Manufacturing	(\$655,562,969,425)	(\$176,164,108,328)	(\$91,307,732,002)	(1,376,015)
Durable Manufacturing	(\$197,839,297,113)	(\$78,120,886,482)	(\$50,984,755,325)	(659,737)
Transportation and Utilities	(\$307,961,592,110)	(\$121,879,633,956)	(\$71,252,347,033)	(772,862)
Information	(\$91,646,418,319)	(\$56,000,377,366)	(\$24,190,197,392)	(215,728)
Wholesale Trade	(\$137,822,270,843)	(\$93,243,895,724)	(\$53,765,265,083)	(573,629)
Retail Trade	(\$417,623,871,483)	(\$311,830,020,096)	(\$181,030,627,889)	(5,324,976)
Finance, Insurance, and Real Estate	(\$591,575,283,159)	(\$192,996,412,746)	(\$72,749,888,666)	(696,371)
Business Services	(\$216,272,244,961)	(\$138,734,777,900)	(\$113,172,029,506)	(1,314,309)
Health Services	(\$219,474,006,567)	(\$146,459,116,028)	(\$123,832,542,085)	(1,952,335)
Other Services	(\$219,136,725,108)	(\$112,958,275,687)	(\$90,279,112,556)	(2,037,431)
TOTAL	(\$3,370,364,599,032)	(\$1,536,504,339,303)	(\$949,606,425,014)	(15,887,687)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: See notes to component tables.

Components of the Economic Cost of Hunger: Typical Year

The Total Annual Impact (based on the Portion of Lifetime Effects Observed in a Typical Year) of Health Care Expenses and Lost Earnings Associated with Health Deficiencies Resulting from Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	(\$6,670,295,874)	(\$1,853,582,793)	(\$1,209,658,438)	(18,171)
Mining	(\$4,993,729,308)	(\$1,172,062,838)	(\$656,099,615)	(3,669)
Construction	(\$7,023,425,839)	(\$3,714,910,253)	(\$3,061,316,780)	(41,125)
Nondurable Manufacturing	(\$65,424,352,914)	(\$18,091,396,855)	(\$9,296,735,109)	(140,987)
Durable Manufacturing	(\$11,152,386,213)	(\$4,284,748,957)	(\$2,807,270,772)	(36,659)
Transportation and Utilities	(\$27,754,603,158)	(\$10,739,400,557)	(\$6,189,544,867)	(65,254)
Information	(\$7,211,069,119)	(\$4,429,426,137)	(\$1,911,992,712)	(16,945)
Wholesale Trade	(\$10,960,434,451)	(\$7,411,417,175)	(\$4,273,488,888)	(45,487)
Retail Trade	(\$43,555,225,867)	(\$32,653,976,622)	(\$18,980,586,269)	(554,546)
Finance, Insurance, and Real Estate	(\$46,724,406,359)	(\$12,497,212,917)	(\$4,667,227,428)	(45,855)
Business Services	(\$13,766,961,295)	(\$8,357,871,458)	(\$6,817,881,089)	(79,071)
Health Services	(\$90,472,505,898)	(\$58,263,791,706)	(\$49,262,576,493)	(776,636)
Other Services	(\$19,448,780,153)	(\$10,043,238,584)	(\$8,057,715,432)	(183,903)
TOTAL	(\$355,158,176,448)	(\$173,513,036,851)	(\$117,192,093,892)	(2,008,308)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: See notes to component tables.

The Total Annual Impact (based on the Portion of Lifetime Effects Observed in a Typical Year) of Educational Expenses and Lost Earnings Associated with Educational Deficiencies Resulting from Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	(\$3,473,519,657)	(\$962,963,918)	(\$623,731,501)	(9,350)
Mining	(\$3,382,064,620)	(\$795,521,322)	(\$417,278,946)	(2,266)
Construction	(\$3,707,919,532)	(\$1,856,174,967)	(\$1,529,603,681)	(20,575)
Nondurable Manufacturing	(\$20,859,327,495)	(\$5,584,913,189)	(\$2,898,747,919)	(43,666)
Durable Manufacturing	(\$6,610,309,496)	(\$2,623,108,635)	(\$1,711,817,718)	(22,024)
Transportation and Utilities	(\$9,982,705,787)	(\$3,938,327,849)	(\$2,304,091,756)	(25,009)
Information	(\$2,954,825,344)	(\$1,804,864,697)	(\$779,824,635)	(6,952)
Wholesale Trade	(\$4,466,270,687)	(\$3,021,788,053)	(\$1,742,390,027)	(18,591)
Retail Trade	(\$13,243,451,462)	(\$9,887,410,528)	(\$5,739,867,922)	(168,872)
Finance, Insurance, and Real Estate	(\$19,329,017,626)	(\$6,557,348,251)	(\$2,472,265,580)	(23,638)
Business Services	(\$7,082,642,226)	(\$4,562,011,570)	(\$3,721,432,556)	(43,216)
Health Services	(\$4,523,304,027)	(\$3,095,338,394)	(\$2,617,137,330)	(41,257)
Other Services	(\$7,107,065,950)	(\$3,669,661,455)	(\$2,933,074,390)	(66,100)
TOTAL	(\$106,722,423,908)	(\$48,359,432,828)	(\$29,491,263,961)	(491,517)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: See notes to component tables.

The Total Annual Impact (based on the Portion of Lifetime Effects Observed in a Typical Year) of Health and Educational Expenses and Lost Earnings Associated with Health and Educational Deficiencies Resulting from Hunger and Food Insecurity on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	(\$10,143,815,531)	(\$2,816,546,711)	(\$1,833,389,939)	(27,521)
Mining	(\$8,375,793,928)	(\$1,967,584,160)	(\$1,073,378,561)	(5,935)
Construction	(\$10,731,345,371)	(\$5,571,085,220)	(\$4,590,920,461)	(61,700)
Nondurable Manufacturing	(\$86,283,680,409)	(\$23,676,310,044)	(\$12,195,483,029)	(184,653)
Durable Manufacturing	(\$17,762,695,709)	(\$6,907,857,592)	(\$4,519,088,490)	(58,683)
Transportation and Utilities	(\$37,737,308,945)	(\$14,677,728,406)	(\$8,493,636,623)	(90,263)
Information	(\$10,165,894,462)	(\$6,234,290,834)	(\$2,691,817,346)	(23,897)
Wholesale Trade	(\$15,426,705,138)	(\$10,433,205,228)	(\$6,015,878,915)	(64,078)
Retail Trade	(\$56,798,677,329)	(\$42,541,387,150)	(\$24,720,454,191)	(723,418)
Finance, Insurance, and Real Estate	(\$66,053,423,985)	(\$19,054,561,168)	(\$7,139,493,008)	(69,493)
Business Services	(\$20,849,603,521)	(\$12,919,883,028)	(\$10,539,313,646)	(122,287)
Health Services	(\$94,995,809,925)	(\$61,359,130,100)	(\$51,879,713,823)	(817,894)
Other Services	(\$26,555,846,103)	(\$13,712,900,039)	(\$10,990,789,821)	(250,004)
TOTAL	(\$461,880,600,356)	(\$221,872,469,679)	(\$146,683,357,852)	(2,499,825)

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: See notes to component tables.

Economic Benefits of Food Banks and the Charitable Distribution Network

The Annual Impact of Food Bank Operations on Business Activity in the US				
Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	\$46,343,177	\$13,218,999	\$8,588,690	129
Mining	\$43,744,060	\$9,924,733	\$5,330,297	27
Construction	\$51,500,544	\$27,371,275	\$22,555,640	303
Nondurable Manufacturing	\$491,097,950	\$125,707,094	\$65,422,679	1,039
Durable Manufacturing	\$75,501,640	\$28,272,422	\$18,453,343	241
Transportation and Utilities	\$979,890,937	\$618,785,642	\$402,639,050	5,197
Information	\$58,550,739	\$35,964,378	\$15,491,792	137
Wholesale Trade	\$86,803,152	\$58,789,197	\$33,898,371	361
Retail Trade	\$357,238,124	\$269,074,444	\$156,599,806	4,549
Finance, Insurance, and Real Estate	\$346,924,676	\$88,226,476	\$35,837,478	359
Business Services	\$83,216,097	\$51,712,214	\$42,183,906	489
Health Services	\$81,130,406	\$56,783,776	\$48,011,196	756
Other Services	\$260,913,985	\$133,570,327	\$111,138,175	2,542
TOTAL	\$2,962,855,486	\$1,517,400,978	\$966,150,423	16,129
Source: US Multi-Regional Impact Assessment System, The Perryman Group				

The Annual Impact of the Charitable Food Distribution Network Served by Food Banks on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	\$711,476,867	\$193,236,121	\$126,123,291	1,904
Mining	\$388,942,795	\$90,520,314	\$51,417,379	290
Construction	\$881,391,718	\$467,488,109	\$385,239,317	5,186
Nondurable Manufacturing	\$6,421,545,129	\$1,870,322,106	\$1,003,766,733	16,096
Durable Manufacturing	\$949,838,378	\$358,346,395	\$233,255,053	3,220
Transportation and Utilities	\$2,813,050,048	\$1,237,460,403	\$734,503,111	8,201
Information	\$965,855,436	\$589,471,012	\$253,544,863	2,220
Wholesale Trade	\$955,185,070	\$646,502,336	\$372,779,005	3,980
Retail Trade	\$4,162,811,383	\$3,113,741,663	\$1,808,440,450	53,084
Finance, Insurance, and Real Estate	\$4,081,404,446	\$1,045,960,347	\$411,193,780	4,022
Business Services	\$1,288,317,621	\$788,259,859	\$643,018,066	7,469
Health Services	\$937,896,627	\$655,954,229	\$554,615,369	8,745
Other Services	\$9,586,611,527	\$5,408,967,839	\$4,629,948,810	105,636
TOTAL	\$34,144,327,046	\$16,466,230,734	\$11,207,845,227	220,053

Source: US Multi-Regional Impact Assessment System, The Perryman Group

The Annual Impact of the Incremental Household Spending Facilitated by the Food Bank and Charitable Food Distribution Network on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	\$1,850,395,121	\$552,787,495	\$355,677,357	5,351
Mining	\$1,426,218,058	\$336,572,759	\$202,413,409	1,133
Construction	\$2,150,129,392	\$1,101,855,953	\$907,997,915	12,220
Nondurable Manufacturing	\$15,940,801,893	\$4,272,988,822	\$2,215,098,172	35,306
Durable Manufacturing	\$2,556,292,891	\$968,074,693	\$630,215,874	8,552
Transportation and Utilities	\$9,822,549,670	\$3,423,673,711	\$1,901,157,474	18,636
Information	\$2,633,292,641	\$1,621,277,312	\$699,814,153	6,235
Wholesale Trade	\$2,642,010,419	\$1,787,853,215	\$1,030,892,055	11,011
Retail Trade	\$23,125,606,186	\$17,454,501,392	\$10,165,859,334	294,113
Finance, Insurance, and Real Estate	\$17,585,851,856	\$3,026,615,966	\$1,163,877,451	11,565
Business Services	\$3,413,174,222	\$2,009,181,801	\$1,638,977,457	19,042
Health Services	\$4,444,950,058	\$3,150,484,016	\$2,663,763,404	42,000
Other Services	\$8,240,230,148	\$4,275,770,425	\$3,387,620,531	70,336
TOTAL	\$95,831,502,553	\$43,981,637,558	\$26,963,364,585	535,500

Source: US Multi-Regional Impact Assessment System, The Perryman Group

The Total Annual Impact of the Food Bank and Charitable Food Distribution Network on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	\$2,608,215,165	\$759,242,616	\$490,389,338	7,385
Mining	\$1,858,904,913	\$437,017,806	\$259,161,085	1,450
Construction	\$3,083,021,654	\$1,596,715,337	\$1,315,792,871	17,709
Nondurable Manufacturing	\$22,853,444,972	\$6,269,018,022	\$3,284,287,584	52,440
Durable Manufacturing	\$3,581,632,909	\$1,354,693,511	\$881,924,270	12,014
Transportation and Utilities	\$13,615,490,654	\$5,279,919,756	\$3,038,299,635	32,034
Information	\$3,657,698,816	\$2,246,712,702	\$968,850,809	8,592
Wholesale Trade	\$3,683,998,641	\$2,493,144,749	\$1,437,569,430	15,352
Retail Trade	\$27,645,655,693	\$20,837,317,499	\$12,130,899,591	351,746
Finance, Insurance, and Real Estate	\$22,014,180,978	\$4,160,802,788	\$1,610,908,708	15,945
Business Services	\$4,784,707,939	\$2,849,153,874	\$2,324,179,430	27,000
Health Services	\$5,463,977,092	\$3,863,222,021	\$3,266,389,968	51,500
Other Services	\$18,087,755,659	\$9,818,308,590	\$8,128,707,516	178,514
TOTAL	\$132,938,685,086	\$61,965,269,270	\$39,137,360,234	771,682

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Economic Benefits of Expanding the Food Bank and Charitable Distribution Network

The Incremental Annual Impact of Expanding the Food Bank and Charitable Food Distribution Network to a Level Sufficient to Meet Current Hunger and Food Insecurity Needs on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	\$3,670,176,459	\$1,068,375,958	\$690,056,337	10,392
Mining	\$2,615,776,928	\$614,954,044	\$364,681,152	2,041
Construction	\$4,338,305,233	\$2,246,834,203	\$1,851,531,302	24,920
Nondurable Manufacturing	\$32,158,457,197	\$8,821,512,380	\$4,621,518,629	73,792
Durable Manufacturing	\$5,039,931,124	\$1,906,270,732	\$1,241,008,694	16,905
Transportation and Utilities	\$19,159,175,956	\$7,429,692,708	\$4,275,374,189	45,077
Information	\$5,146,968,037	\$3,161,484,596	\$1,363,328,255	12,091
Wholesale Trade	\$5,183,976,103	\$3,508,253,955	\$2,022,890,424	21,603
Retail Trade	\$38,901,865,185	\$29,321,442,948	\$17,070,118,563	494,962
Finance, Insurance, and Real Estate	\$30,977,478,344	\$5,854,915,901	\$2,266,806,550	22,437
Business Services	\$6,732,850,372	\$4,009,215,810	\$3,270,492,689	37,993
Health Services	\$7,688,690,858	\$5,436,172,103	\$4,596,333,818	72,469
Other Services	\$25,452,369,080	\$13,815,932,650	\$11,438,393,339	251,198
TOTAL	\$187,066,020,877	\$87,195,057,988	\$55,072,533,943	1,085,881

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: This scenario assumes that current programs are expanded to a level sufficient to meet the current estimated needs for additional food supply. These results reflect only operational and purchasing effects. The potential health and educational benefits are considered elsewhere.

Economic Benefits of Food Bank Network Expansion and Reduced Cost of Hunger

The Incremental Annual Impact of Expanding the Food Bank and Charitable Food Distribution Network to a Level Sufficient to Meet Current Hunger and Food Insecurity Needs and Anticipated Improvements in Health and Educational Outcomes on Business Activity in the US

Sector	Total Expenditures	Real Gross Product	Personal Income	Employment
	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(2014 Dollars)</i>	<i>(Permanent Jobs)</i>
Agriculture	\$11,785,228,884	\$3,321,613,327	\$2,156,768,289	32,409
Mining	\$9,316,412,071	\$2,189,021,372	\$1,223,384,001	6,789
Construction	\$12,923,381,530	\$6,703,702,378	\$5,524,267,671	74,280
Nondurable Manufacturing	\$101,185,401,524	\$27,762,560,415	\$14,377,905,052	221,514
Durable Manufacturing	\$19,250,087,691	\$7,432,556,806	\$4,856,279,486	63,851
Transportation and Utilities	\$49,349,023,112	\$19,171,875,433	\$11,070,283,488	117,287
Information	\$13,279,683,607	\$8,148,917,264	\$3,516,782,133	31,208
Wholesale Trade	\$17,525,340,214	\$11,854,818,137	\$6,835,593,556	72,866
Retail Trade	\$84,340,807,048	\$63,354,552,668	\$36,846,481,916	1,073,697
Finance, Insurance, and Real Estate	\$83,820,217,532	\$21,098,564,836	\$7,978,400,956	78,032
Business Services	\$23,412,533,188	\$14,345,122,233	\$11,701,943,606	135,823
Health Services	\$83,685,338,798	\$54,523,476,183	\$46,100,104,876	726,784
Other Services	\$46,697,045,962	\$24,786,252,681	\$20,231,025,196	451,201
TOTAL	\$556,570,501,162	\$264,693,033,731	\$172,419,220,225	3,085,741

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Note: This scenario assumes that current programs are expanded to a level sufficient to meet the current estimated needs for additional food supply. As a result, the economic losses related to health and education deficiencies associated with hunger and food insecurity should be largely eliminated. The current simulation assumes that 80% of these losses are recaptured to allow for some friction and potential inefficiency in the system (although research indicates that it is quite efficient). It should be noted that these benefits are only measured as they occur in a typical year, although they persist over the lifetime of the affected individuals.