

# **The Effects of Natural Disasters on Donations to Non-profits**

The Honors Program  
Senior Capstone Project  
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**ABSTRACT**

This study analyzes the relationship between natural disasters and donations to non-profit organizations in disaster-affected regions. Using regression analysis, this study seeks to determine the relationship based on various factors including the number of deaths, total number of people affected, the economic damage costs, and media coverage of a given disaster. The purpose of this study is to examine whether disaster-affected regions truly receive increased donations following a natural disaster, the sources of these donations (government grants versus private donations), the question of whether donations are diverted away from other non-profits in industries not related to relief efforts, the longevity of donation increases following a natural disaster, and disaster-related factors that have a significant and material effect on donations to non-profits. Data sources utilized in this study include the National Center for Charitable Statistics (NCCS), EM-DAT: The International Disaster Database, U.S. Bureau of Labor Statistics, and Google News, all analyzed from 2000 through 2006.

Findings from this study indicate that the occurrence of a natural disaster in a given state generates an increase in donations to non-profit organizations, and hurricanes specifically, cause a greater increase in donations than other types of natural disasters. The increased levels of donations seen by non-profits were found to be sustained for two years following the occurrence of a disaster. Government grants actually decrease following the occurrence of a natural disaster, while public donations increase, indicating an inverse relationship. When considering specific factors that measure the destruction of a natural disaster, media coverage relative to state population elicits the greatest increase in donations among all factors measured. The study finds no evidence that donations to non-profit organizations operating in humanitarian-related industries experience increased donations following the occurrence of a natural disaster.

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**INTRODUCTION**

This study on the effects of natural disasters on donations to non-profits contributes to scant existing research about the overall source of donations following a natural disaster, as well as the possible diversion of donations away from other regions to the affected region. This study focuses on which factors affect donations to non-profits by considering such factors as monetary costs of damage, death toll, number of people affected, disaster location, and media coverage.

Existing reports published by the International Monetary Fund define natural disasters as events due to natural causes that lead to ten or more fatalities, affect 100 or more people, or result in a call for international assistance or the declaration of a state of emergency (Rasmussen, 2004). Since 1970, natural disasters have caused more than \$1 trillion in damage, proving the economic significance of their impact.

It is important to consider the source of donations and potential trade-offs of increased donations in a natural disaster-affected region as compared with other regions. These trade-offs mean that other non-profits would suffer financially from a decrease in donations, and ultimately the people receiving services would feel the greatest impact. With a better understanding of the effects of natural disasters on donations to non-profits, government and non-profit organizations can roughly gauge the expected donation increase following a natural disaster, thereby allowing for more effective use of these funds in relief efforts.

In recent years, there have been an increased number of highly destructive natural disasters as measured in both monetary damage costs and the number of people affected by the disasters. These natural disasters have occurred around the world and have generated widespread media attention as well as international relief efforts. Understanding the patterns in donations to non-profits following a natural disaster will increase the level of awareness of these non-profits and shed new light on the use (or misuse) of donations.

In recent years hurricanes have garnered much media attention due to their highly destructive nature and increasingly invasive landfall. As the population of coastal cities has grown, the number of people affected by a given hurricane has increased, as have the number of people

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killed and the costs of damage. Hurricane Katrina, which made its landfall in August 2005, caused over \$90 billion in damage in the Gulf Coast, with much of the damage concentrated in New Orleans and surrounding areas of Louisiana. Nearly 2,000 people died as a result of Katrina and 500,000 were seriously affected by it (Leeson, 2007). Hurricane Katrina generated significant media coverage with 42,200 news reports referencing it in 2005. In comparison, Hurricane Dennis which also occurred in 2005 only saw 6,430 news reports referencing it in 2005 (Google News, 2011).

In their study, Okten and Weisbrod research the factors influencing private donations to non-profit organizations. They test whether voluntary giving is responsive to the same features as for-profit markets including price and advertising, in addition to studying the theory of crowding out (Okten and Weisbrod, 2000). Their findings aid my development of testable hypotheses that will serve to predict changes in donations to non-profits following natural disasters. Their findings indicate that a positive relationship between government grants and public support exists across many industries. Should this hold true, all areas of non-profit funding (both public donations and government grants) should see an increase in donations following a natural disaster in a particular region.

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**LITERATURE REVIEW**

Effects of Natural Disasters

Natural disasters occur all over the world and their timing and severity are generally unpredictable. The effects of natural disasters range in severity depending on a number of different factors including the strength and type of the disaster, the location and population of the area, the level of preparedness prior to the disaster, the general economic development of the area, and the response of the community. Recent natural disasters that have gathered significant media attention including: Hurricane Katrina, the earthquakes in Chile and Haiti, tsunamis in the Indian Ocean, and the earthquakes in New Zealand and Japan; have been both severe in strength and force as well as crippling to the economy and livelihood of the affected areas.

In a 2004 paper for the International Monetary Fund, Tobias Rasmussen defines natural disasters as events due to natural causes that lead to ten or more fatalities, affect 100 or more people, or result in a call for international assistance or the declaration of a state of emergency (Rasmussen, 2004). Additionally, Rasmussen cites data from the Centre for Research on the Epidemiology of Disasters stating that since 1970 natural disasters have affected more than 5 billion people and have caused more than \$1 trillion in damage. His research also shows that developing countries tend to suffer more from natural disasters, particularly in the number of people affected and cost, with regards to purchasing power, of the damage. Small islands, particularly those in the Eastern Caribbean Currency Union, see more natural disasters than non-island states of similar size. Due in a large part to hurricanes, Rasmussen calculates that a natural disaster inflicting damage equivalent to more than 2 percent of the island-state's gross domestic product can be expected once every 30 months (Rasmussen, 2004).

In his study, Noy (2008) cites a United Nations report that over the past decade more than 1.6 billion people have lost their homes or livelihoods or have suffered other damage as a result of a natural disaster. This represents an upward trend over the past few decades. In addition, Noy notes that although the number of lives lost has decreased in the past 20 years, the number of people affected has risen (Noy, 2008). While it is positive that the number of

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deaths has decreased; it is also evident that natural disasters are still a significant source of both economic and social damage.

In determining the impact of a natural disaster, the most significant characteristics to analyze are its speed of onset and availability of perceptual cues (wind, precipitation, ground movement, etc), the intensity and duration of impact, and overall probability of such an occurrence. These attributes help to determine the extent of casualties and persons and structures affected in the surrounding area (Lindell and Prater, 2003). Lindell and Prater also describe the potential physical impacts of disasters citing hurricanes as producing 16 of the 65 greatest disasters in the twentieth century and were responsible for the greatest number of deaths between 1947 and 1980. In contrast, earthquakes produced 28 of the greatest disasters and the second highest number of deaths. Floods produced four of the greatest 65 disasters but accounted for only about 4% of disaster-related deaths in the same period (Lindell and Prater, 2003).

Hurricane Katrina made its landfall on August 25, 2005 and destroyed much of the city of New Orleans, and other nearby areas in the Gulf Coast. Katrina caused over \$125 billion in damage, more than twice the economic damage caused by Hurricane Andrew, previously the costliest hurricane in US history. Nearly 2,000 people died as a result of the hurricane and the difficult aftermath that followed (Leeson, 2007). It is estimated that Hurricane Katrina will surpass the damages of Hurricane Andrew in other areas as well. Specifically, the National Association of Home Builders estimates that the number of housing units destroyed by Hurricane Andrew was over 28,000 while they estimate that more than 200,000 homes will be found to have been damaged beyond repair in New Orleans following Hurricane Katrina (Cashell and Labonte, 2005). In addition, Cashell and Labonte point out that oil refineries in the Gulf Coast were shut down in the wake of the hurricane, with about 2 million barrels of refining capacity lost each day. The economic implications of a refining slowdown are vast and negatively impact energy prices for consumers (Cashell and Labonte, 2005). New Orleans and other Gulf ports represent about one sixth (in dollar terms) of all imports passing through US ports, any significant slowdown in the ports negatively affects world trade.



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Media coverage of natural disasters varies among disasters and its overall impact on donations to non-profits is yet unknown; however, following recent natural disasters that saw significant media coverage, its presence is certainly a growing factor. Shawn Powers studied the extensive media coverage of Hurricane Katrina and the disaster's domination of global headlines in the weeks following the hurricane. Despite the havoc Katrina brought to the local area, news dispersed rapidly among all media outlets. Powers posits that the crisis following Katrina may have been the "first of its kind, in that Internet technologies have been the critical medium for information dissemination" (Powers, 2005). The intense media coverage portrayed a range of responses from tremendous sympathy for those affected to harsh critiques of American policy and culture. Much of the coverage of the crisis focused on the failures of the U.S. government relief effort and the "slow" response time of FEMA (Powers, 2005). The widespread media coverage connected individuals from around the world to the natural disaster, increasing global awareness of the damage and resulting effects of Katrina.

A Need for Relief Created

In January 1995, the city of Kobe, Japan was rocked by a magnitude 7.2 earthquake that was 16.2 km deep. There were about 6,400 deaths as a result of the earthquake and more than 20,000 people were forced to find shelter in different parts of the city because their homes were destroyed. The direct financial loss of the earthquake was estimated at 7 trillion yen and the study conducted by the People's Rehabilitation Plan found that the city had only recovered about 80% from the earthquake a full 3 years after the earthquake. It is noted that approximately 70,000 buildings collapsed; with 55,000 of these seriously damaged and more than 7,000 buildings were destroyed in fires that broke out (Goda and Shaw, 2004).

The destruction caused by natural disasters creates a strong demand for basic-need products and services, some of these are provided through private enterprise but the majority of these services are provided by the government and the non-profit sector. The Federal government provides assistance to individuals and non-profits through such programs as Federal Emergency Management Agency (FEMA). Large organizations such as the American Red Cross are central to the planning and coordination of relief efforts and help direct funds, services, and manpower to small and medium sized organizations. The American Red Cross is

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led by a Board of Governors that oversees management and affairs of the organization and exists because of donations and its sustained endowment (American Red Cross 2010).

In their research, Goda and Shaw point out that following the tragic earthquake in Kobe, Japan, the prospect of reconstruction in this urban area created many problems. The planning of reconstruction is complex in nature, and the social, economic, and cultural context compounds these difficulties. Although both financial and human resources arrived in the affected areas, their sustainability was also challenging. Because community-based activities are deeply rooted in the culture, financial and physical aid were natural extensions to previously existing community programs. These programs paved the way for the introduction of corporate social responsibility into Japanese businesses and increased the overall charity efforts of the Japanese within their communities (Goda and Shaw, 2004).

Leeson cites a number of examples of extreme need following Hurricane Katrina. The damage costs to the city of New Orleans and the Gulf coast region reached unprecedented levels and the number of homeless was nearly impossible to handle. There was a serious need for significant and rapid assistance to the affected beyond what FEMA could handle (Leeson, 2007). The role of non-profits in disaster-relief following Hurricane Katrina provides a strong example for the necessity of this type of response. Non-profits have more flexibility in operations, giving them the ability to react faster to natural disasters. In addition, donations to non-profits serve as a gauge of how effective non-profits are at providing services to those in need. Leeson (2007) states that although non-profit organizations suffer somewhat from the absence of market prices to guide them in decision-making, they are likely to be directed toward satisfying the most highly-valued needs as individuals who make donations have an incentive to make sure their donations are used effectively and an incentive to search out information as to the best use of their donated resources (Leeson, 2007).

In his work, Noy cites other recent natural disasters of catastrophic proportions including the tsunami disaster in the Indian Ocean in December 2004 and the Pakistani Kashmir earthquake in October 2005. Other recent natural disasters include the 2006 drought in China, the earthquakes in Haiti, Chile, and Pakistan in 2010, and the earthquakes in New Zealand and Japan in 2011 (World Health Organization, 2011).

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In their 2003 research, Lindell and Prater explain the disparity among countries of different economic standards in damage levels following natural disasters. They find that developing countries in Asia, Africa, and South America account for the top twenty positions in terms of number of deaths from 1966 to 1990. In addition, low-income countries suffer on average 3,000 deaths per disaster while high-income countries suffer only 500 deaths per disaster (Lindell and Prater, 2003). Beyond the death toll, losses on buildings and property are significantly higher in developing countries as compared to developed countries. Countries such as India and Kenya have seen an exponentially faster rise in the damage costs than the United States which has also seen a significant increase in damage costs over the past four decades (Lindell and Prater, 2003).

In their research regarding corporate philanthropic disaster responses, Muller and Whiteman cite literature indicating that the frequency of intense tropical storms will likely increase in the near future and provide a reminder that the aggregate social and economic costs of such events have risen steadily since the 1960s (Muller and Whiteman, 2009). For example, they report that in the 1980s natural disasters worldwide caused \$228 billion in damage, while the 1990s saw over \$700 billion in damage. These figures do not take into account the recent worldwide catastrophes of the 2000s, but show an upward trend in the economic costs of natural disasters (Muller and Whiteman, 2009).

#### Role of Non-profit Organizations

Henry Hansmann studied the role of non-profit enterprise and reported his findings in a 1980 report for the Yale Law Journal. In his report, Hansmann points out that while non-profits represent a growing share of the economy, scant research exists regarding the role of nonprofits. Hansmann provides a specific definition of non-profit organizations stating that they are essentially “an organization that is barred from distributing its net earnings, if any, to individuals who exercise control over it, such as members, officers, directors or trustees” (Hansmann, 1980). Hansmann separates non-profits into those that are “donative” in nature, or those that exist to help in a charitable function funded by donations and grants, and those that are “commercial” in nature. He classifies “commercial” non-profits as those that receive the bulk of their income from prices charged for their services. He also provides for hybrid

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organizations that rely on both donations and fees charged such as universities and hospitals. In addition, he denotes non-profits as being either “mutual” or “entrepreneurial” in their leadership methods. Mutual non-profits generally have a board of directors elected by the membership while entrepreneurial non-profits are largely free from the exercise of formal control and generally controlled by a self-perpetuating board of directors (Hansmann, 1980).

In his study, Helmut Anheier analyzes management of non-profit organizations. By synthesizing the work of others, Anheier finds that non-profit organizations have a few key characteristics including that they must be organized, private (separate from government), non-profit-distributing, self-governing, and voluntary (Anheier, 2000). Anheier posits that non-profit organizations are more complex than for-profit businesses because they have “multiple bottom lines” that must be considered by management in the decision-making processes. Examples of these include the dual management structure where the overall mission of the organization is the focus of the board of directors as opposed to the financial bottom line alone. In addition, he cites the complex motivational structure of staff, volunteers and stakeholders that often require non-monetary goals. The organizational environment elicits different expectations and motivations from stakeholders and the interest and needs of clients is put ahead of the financial best-interest of the organization. Finally, the importance of values and deep convictions among stakeholders is necessary to the overall success of the organization (Anheier, 2000). Despite the complex role of managing non-profit organizations, their existence is quite essential to the current United States economy and there is significant reliance on non-profits to provide charitable work to those in need.

In his book, *The Nonprofit Economy*, Burton Weisbrod presents his findings on many areas of non-profit research including incentives and performance, the voluntary non-profit sector, charitable donations, revenue from sales, volunteer labor, and a discussion about the true differences between non-profit and for-profit organizations. In a section about the services provided by non-profits, Weisbrod mentions organizations providing a wide variety of services including nursery schools, universities, YMCAs, hospitals, charitable groups, country clubs, museums, chambers of commerce, trade associations, labor unions, and even National Geographic magazine (Weisbrod, 1985). Specific services provided by these organizations are

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as far-reaching and diverse as those provided by their for-profit counterparts. A unifying aspect among all of the above listed organizations is their non-profit status which provides them with such benefits as tax advantages, postal subsidies, and donations or government grant funding.

#### Importance of Donations to Non-profits

In their 2008 study, Jungbu Kim, Seong Soo Oh, and Taehyun Jung analyzed sources of non-profit funding. They compare two scenarios, the first being increased taxes and government-sponsored disaster relief efforts, the second being charitable donations to non-profits for disaster-relief aid provided by non-profit organizations. Their findings show that attitudes on the government role in disaster relief are not consistent with charitable giving behavior and are more affected by the survey respondents' political orientation than philanthropic motivation. Because of the varying opinion about government-sponsored disaster relief, there is a strong demand for non-profit organizations to provide this relief effort (Kim, Oh, and Jung, 2008).

In their study, Okten and Weisbrod determine the factors influencing private donations to nonprofit organizations. By testing whether voluntary giving is responsive to for-profit market features including price and advertising, and sources of other income such as government grants and service revenue, they ultimately find that fundraising is not carried to the profit-maximizing levels and does not mimic the same economic relationship as seen in the for-profit sector. In addition, they found evidence that government involvement does not generally crowd-out private donations; rather there are significant positive effects in many industries (Okten and Weisbrod, 2000).

In his 2007 report, James Andreoni highlights the most important aspects of charitable giving research as it relates to the three main actors within the charitable giving market. Andreoni reports that in 2005, charitable giving in the United States totaled over \$260 billion and individual giving accounted for 77%, while foundations accounted for 12%. In the United States, 70% of households report giving to charities in 2005 (Andreoni, 2007). In a 1997 study by Schlegemilch, Diamantopoulos, and Love studying the characteristics affecting charitable donations, the authors test variables including age, gender, education level, self-perceived level of generosity, income, individuals' mood, and perception of a charity's

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efficiency, to determine which factors can be used to predict whether an individual is a donor or non-donor with regard to charitable donations. They found, though contrary to some existing literature, that age does not play a significant role in determining whether an individual will or will not donate to a non-profit, but that volunteers working for a non-profit are more likely to make monetary donations to charities than those that do not volunteer (Schlegemilch, Diamantopoulos, and Love, 1998).

Examples of Increased Donations

Beyond the example of relief efforts following Hurricane Katrina, other natural disasters, many of these well-known, have elicited significant increases in donations to nonprofits over short periods of time. On January 12, 2010, there was a massive earthquake on the island of Haiti. This earthquake registered as a 7.0 on the Richter scale and the epicenter was a mere 16 miles away from the capital city of Port-au-Prince (Lau, 2010). It caused widespread loss and damage; however, many non-profit organizations responded to the immediate needs of the Haitian people and donations to these organizations continued their efforts.

According to OCHA, the earthquake and tsunami in Chile caused \$30 billion in damage and economic loss to the Chilean economy. There were 486 confirmed deaths and the affected population was estimated to be 1.8 million. In fiscal year 2010, total US government aid to Chile totaled nearly \$10 million with figures ending on April 22, 2010. Using these new funds, relief organizations launched new programs in Chile to provide such things as shelter and settlements, water, sanitation and hygiene, protection and safety, and economic relief to persons whose livelihoods were interrupted. This \$10 million represents new funds for Chilean nonprofit organizations as the US government was not providing this aid before the Chilean natural disasters (USAID, 2010).

Paulo Guimaraes, Frank Hefner, and Douglas Woodward studied the wealth and income effects of natural disasters focusing on the aftermath of Hurricane Hugo. In their study, they find that while natural disasters destroy physical wealth, they often dramatically raise the level of economic activity during the reconstruction phase. Through the work of non-profit organizations and government grants, rebuilding can be a productive way to overcome the tragic aftermath of natural disasters. Hurricane Hugo struck South Carolina in 1989, killing 25

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and causing \$5.3 billion in damages in lost agriculture, and destroyed residences and commercial structures (Guimaraes, Hefner, and Woodward, 1992). Guimaraes, Hefner, and Woodward determine that in the six quarters following Hugo, \$486.5 million was added to construction income aiding in job creation and growth for affected persons. They attribute the creation of 8,200 jobs, representing 8.5% of the construction sector's employment base to the reconstruction period following Hugo. The agriculture and forestry sector also saw gains of \$18.8 million, though this was much less than the \$1.5 billion in wealth lost to the hurricane (Guimaraes, Hefner, and Woodward, 1992). Overall, the relief and reconstruction effort can have positive economic effects despite the catastrophic damages seen.

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**HYPOTHESES**

H1: If a natural disaster strikes a particular region, then non-profit donations will increase in that region compared to the mean donations from previous years and other regions.

H2: If a natural disaster strikes a particular region, then public donations to non-profits will increase by a factor greater than the increase in government grants as compared to the mean donations from previous years.

H3: If a hurricane strikes a particular region, then donations to non-profit organizations will increase by a factor greater than among other types of natural disasters.

H4: If a natural disaster strikes a particular region then all recovery and aid-related (humanitarian) industries will see an increase in donations to non-profits.

H5: If a natural disaster strikes a particular region then the increased level of donations to non-profits in the disaster-affected region will remain elevated for a period of years following the disaster, based on the severity and cost of damage.

H6: If a natural disaster strikes a particular region, then the media coverage associated with the disaster will generate the most significant increase in donations to non-profit organizations (as opposed to the number of deaths, number of people affected, and damage costs).

Non-profit donations include government grants and private donations. Natural disasters include floods, storms (hurricanes), extreme temperature, earthquakes (seismic activity), and wildfires.



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**METHODOLOGY**

Measures

Natural disasters are analyzed based on the number of people killed, total number of people affected, and economic damage costs. The statistical mean of donations to non-profits by year and by state are compared with the donations in the same state and same year following a natural disaster. The donations to non-profits considered in this study include both government grants and private donations.

Data Sources

The main data sources utilized in this study include The National Center for Charitable Statistics (NCCS) and EM-DAT: The International Disaster Database. The NCCS data are comprised of the Core files which include data from public charities that report gross receipts of at least \$25,000 and file form 990 or 990-EZ, and private foundations that file form 990-PF. The data set includes financial variables from file 990-series forms for those organizations required to file them. The EM-DAT data includes data from natural disasters in the United States from 2000-2006. This data set includes such information as the number of people killed, the total number of people affected, and the economic damage costs of a given disaster. Additional data utilized in this study include employment data sets from the U.S. Bureau of Labor Statistics and internet hits for media coverage of disasters taken from Google News.

Methods

Each donation type is analyzed separately to eliminate confounding factors that could have a negative impact on the validity of the results. Unemployment rates nationwide are analyzed to eliminate the possibility that they affect donations. An example of this could be lower donation rates from a given region that simultaneously has a high rate of unemployment.

All data are quantitative. Regression analyses are computed to examine the relationship between donations to non-profits and the occurrence of natural disasters in the regions of these non-profits. Variables are measured as a proportion of total population or state gross domestic product of the state. By analyzing the number of deaths divided by the population of the region for a given disaster, results can then be compared across areas and disasters. This process is used for all variable factors including the number of people affected and the media

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coverage associated with the given disaster. To determine the coefficient for cost of damage, the estimated damage costs of a given disaster are divided by the gross domestic product of the affected region and are also separately, considered relative to the population of the state.

Additional variables considered in this study have been taken from the 1998 study by Okten and Weisbrod, *Determinants of Donations in Private Nonprofit Markets*, including the fundraising efforts of an organization to evaluate the possibility that these efforts contribute significantly to the increase in donations. While Okten and Weisbrod use the age of an organization as a proxy for its reputation, this study uses the size of the organization as a proxy for reputation.

The data sets are merged in Statistical Analysis Software (SAS) to perform regression analysis on pre-determined variables. These variables include: government grants, cash on hand, fundraising efforts of an organization, operating leverage, executive officer compensation, size of the organization, positive net income, the number of deaths relative to state population, the damage costs relative to gross domestic product, the number of people affected relative to the state population, the media coverage relative to state population, and the annual unemployment rate in the state. Regression analysis is used to determine significant variables in each hypothesis test while measurements of mean donations to non-profits given certain circumstances are used to analyze specific events, states, and years.

To test for pre-selected variables, create dummy variables to test for independent significance of these factors. Using a “what if” analysis, dummy variables are created for all years included (2000-2006), the twelve states with the highest number of natural disasters occurring over the period, and the industry classification of each non-profit institution. By creating dummy variables, it is possible to isolate and independently test each variable, improving the validity of the results.

The “base case” test scenario separates natural disasters into two categories (hurricanes and others) and controls for government grants, cash on hand, fundraising efforts, operating leverage, compensation of executive officers, size of the firm, positive net income, media coverage of the natural disaster, the unemployment rate in the affected state, and the year. In

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subsequent tests, variables are added to control for additional information including natural disaster specifics, industry classification of non-profits, and the state in which the disaster occurred.

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**RESULTS**

Natural disasters occurring from 2000 to 2006 in the United States are analyzed to determine the relationship between the occurrence of a natural disaster and donations to non-profit organizations in the immediate area and across the United States. 300 natural disasters occurred over this period, the most common disaster being floods with 102 occurrences, the next most common were tornadoes with 43 occurrences. The least frequent natural disasters were wind storms and mudflows (1 occurrence each) and flash floods and wild fires (2 occurrences each). Though floods and tornadoes were the most common, the damage they caused was not as catastrophic as other storms. Hurricanes proved to be the most damaging storms as the total number of deaths was 2,038, the total number of people affected 6,330,633 and the total damage costs \$202.0 billion, far exceeding any other type of disaster. Of the 7 reported droughts, no one was killed or affected, representing the fewest people killed and affected by a natural disaster. Among the 1 windstorm and 1 mudflow, 2 flash floods, and 5 epidemics, there were no reported damages, representing the lowest damage costs from natural disasters. On average, natural disasters occurring between 2000 and 2006 killed 19 people, affected 29,087 people, and caused \$1.03 billion in damage. (See Appendix A for data table)

In performing a regression analysis to test for significant factors in determining donations to non-profit organizations, this study finds that government grants, cash on hand, fundraising efforts of the firm, positive net income, operating leverage, compensation of executive officers, and the size of firm all have an effect on donations to non-profits. In addition, the unemployment rate in the state is significant, as is the media coverage associated with natural disasters.

Other factors that are tested and not found to be significant in determining donations to non-profits include the damage costs relative to state gross domestic product, damage costs relative to state population, the number of deaths relative to the state population, and the number of people affected relative to the state population.

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#### Hypothesis Testing

H1: If a natural disaster strikes a particular region, then non-profit donations will increase in that region compared to the mean donations from previous years and other regions.

This study finds evidence to reject the null hypothesis that if a natural disaster strikes a particular region, then non-profit donations will not increase in that region compared to the mean donations from previous years and other regions in favor of the alternative hypothesis.

This study finds that non-profit donations increase in a region following the occurrence of a natural disaster evidenced by the intercept T-value of 96.84. This study does not however, find any connection among regions which is contrary to part of the original hypothesis that funds are diverted from one region to another when a change in donations occurs in a given region.

When analyzing the data associated with the 8 most disaster-prone states, of the 48 cases included, 16 cases saw an increase in natural disasters. Of these 16 cases, 15 also saw a net increase in donations to non-profit organizations. In 2002 in California, there were two more disasters than in 2001; however, donations to non-profits through both private funding and government grants decreased over the same period.

Two specific examples that illustrate the relationship between natural disasters and increased donations to local non-profits are Hurricane Katrina and Hurricane Rita. In August of 2005, Hurricane Katrina made landfall causing an estimated \$125 billion in damage to the Gulf coast region, specifically in Louisiana. In 2005, public donations to non-profit organizations in Louisiana increased \$641,941.04 or 17.18% from 2004 totals. Government grants to Louisiana also increased in 2005 by \$44,153.73 or 2.11%. Hurricane Rita struck the Gulf coast in September of 2005 inflicting \$16 billion in damage, with most of the damage occurring in Texas. Public non-profit donations in Texas increased \$614,488.86 or 29.84% from 2004 totals, and government grants increased \$212,020.26 or 11.31%. Although the unemployment rate in Louisiana increased by 1.2% from 2004 to 2005, the unemployment rate in Texas fell over the same period by 0.6%, clouding the role of unemployment in determining donations to non-profits.

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H2: If a natural disaster strikes a particular region, then public donations to non-profits will increase by a factor greater than the increase in government grants as compared to the mean donations from previous years.

This study finds evidence to reject the null hypothesis that if a natural disaster strikes a particular region, then public donations to non-profits will not increase by a factor greater than the increase in government grants as compared to the mean donations from previous years in favor of the alternative hypothesis.

Findings of this study indicate that while total donations to non-profit organizations increase following the occurrence of a natural disaster, government grants actually decrease. In all regressions, government grants have significant, negative T-values, indicating that they have an inverse relationship with public donations to non-profits. Because government grants actually decrease following the occurrence of a natural disaster, it is therefore true that public donations increased by a factor greater than government grants. In the base scenario, government grants decrease as public donations increase, as represented by the T-value of -50.25. Other significant factors in determining donations to non-profits following the occurrence of a natural disaster that exhibit a similar, inverse effect on public donations include cash on hand, operating leverage, officer compensation, and organization size.

H3: If a hurricane strikes a particular region, then donations to non-profit organizations will increase by a factor greater than among other types of natural disasters.

This study finds evidence to reject the null hypothesis that if a hurricane strikes a particular region, then donations to non-profit organizations will not increase by a factor greater than among other types of natural disasters in favor of the alternative hypothesis.

This study finds that there is significant evidence that if a hurricane strikes a particular region, then donations to non-profit organizations will increase by a factor greater than among other types of natural disasters. Donations to non-profit organizations increase more following the occurrence of a hurricane than other types of natural disasters as evidenced by the T-value of 2.86. When controlling for disaster type, other significant factors in determining donations to non-profits following the occurrence of a hurricane include government grants, fundraising efforts, operating leverage, and the size of the firm. When considering other disaster types,

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significant factors include government grants, cash on hand, fundraising efforts of the firm, operating leverage, officer compensation, size of the firm, positive net income, damage costs relative to state GDP, the number of people affected relative to population, media coverage relative to population, and the unemployment rate. In the 11 instances (of 28 example cases) where more hurricanes occurred in a given region than other disasters, only 7 cases saw donations to non-profits increase, while 4 cases actually saw mean donations to non-profits decrease year over year.

H4: If a natural disaster strikes a particular region then all recovery and aid-related (humanitarian) industries will see an increase in donations to non-profits.

This study fails to reject the null hypothesis that if a natural disaster strikes a particular region then all recovery and aid-related (humanitarian) industries will not see an increase in donations to non-profits.

All humanitarian industries were significant in tests measuring donations to non-profits; however, all of the humanitarian industries saw decreases in donations in the period measured. Health, disease, shelter, public safety, human service, and community improvement related industries were classified as humanitarian or aid-related industries, and all of these industries have an inverse relationship with increases in total donations to non-profits as evidenced by their negative T-values. The intent of these tests was to illustrate the perceived diversion of funds from non-humanitarian industries to humanitarian industries following a natural disaster; however, this did not occur. With three exceptions, all industries were statistically significant in seeing a decrease in donations following the occurrence of a natural disaster in a given region. National security and social action organizations saw increases in donations following the occurrence of a natural disaster as indicated by their significant, positive T-values. The agriculture industry saw no significant change in donations. (T-values are included in Appendix G with humanitarian industries shaded in grey.)

H5: If a natural disaster strikes a particular region then the increased level of donations to non-profits in the disaster-affected region will remain elevated for a period of years following the disaster, based on the severity and cost of damage.

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This study finds evidence to reject the null hypothesis that if a natural disaster strikes a particular region then the increased level of donations to non-profits in the disaster-affected region will not remain elevated for a period of years following the disaster, based on the severity and cost of damage, in favor of the alternative.

In the data collected there are number of instances where non-profit donations remain elevated in a period following the occurrence of a natural disaster, evidenced by the significance of media coverage of natural disasters (relative to population) in the two years following the occurrence of a natural disaster. In the first year following the occurrence of a natural disaster, the “lagging” media coverage is significant in determining donations to non-profits with a T-value of 2.28, while in the second year following the occurrence of a natural disaster there is a T-value of 3.25 for media coverage in determining donations to non-profits.

In the example of Louisiana, there is an increased level of donations in 2006, the year following Hurricane Katrina despite the fact that no natural disasters occurred in Louisiana in 2006 and the unemployment rate (another contributing factor) fell by 2.8%. This specific case follows the alternative hypothesis.

H6: If a natural disaster strikes a particular region, then the media coverage associated with the disaster will generate the most significant increase in donations to non-profit organizations (as opposed to the number of deaths, number of people affected, and damage costs).

This study finds evidence to reject the null hypothesis that if a natural disaster strikes a particular region, then the media coverage associated with the disaster will not generate the most significant increase in donations to non-profit organizations in favor of the alternative hypothesis.

Media coverage associated with natural disasters is found to have a significant effect on donations to non-profits while the number of deaths, number of people affected, and total damage costs do not have a significant effect. Media coverage of a given natural disaster elicits an increase in donations to non-profits while other factors do not have a significant effect, evidenced by a T-value of 2.23 in the base case regression test for media coverage relative to population.



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In 2005, media coverage associated with Hurricane Katrina in Louisiana generated 42,400 news hits, far greater than media coverage associated with any other natural disaster. The 14 hurricanes that occurred from 2000 to 2006 generated a total of 165,266 news hits, or an average of 11,805 news hits per hurricane. The other 286 natural disasters (excluding hurricanes) recorded over the same period generated a total of 274,851 news hits, or an average of 961 news hits per disaster.

#### Unintended Results

This study indirectly produces some results beyond the scope of the original hypotheses. For the purposes of this study, the theory of crowding out was not considered following the review of previous literature. In their 2000 study, Okten and Weisbrod find that a positive relationship between government grants and public support exists across many industries. Should this hold true, all areas of non-profit funding should see an increase in donations following a natural disaster in a particular region (assuming that government grants or public donations will increase), yet the findings of this study indicate otherwise. In the base case scenario testing the general relationship between the occurrence of a natural disaster and donations to non-profits, government grants produce a significant T-value of -50.25, indicating that government grants decrease as public donations to non-profits increase. Other research on crowding out presents conflicting theories, and the overall relationship between government donations to non-profits and public donations to non-profits remains perplexing.

#### Data Fit

The coefficient of determination is used to measure the strength of the given variables in determining the outcome. In this study, the coefficient of determination values (R-squared) for various T-tests ranged from approximately 15-25%, indicating a fairly low correlation between the variables tested and the outcome (donations to non-profits). The highest r-squared value observed was in the base case scenario in testing the first hypothesis as the variables tested: government grants, cash on hand, fundraising efforts of the organization, operating leverage, officer compensation, organization size, positive net income, and unemployment account for 25% of the effects seen in donations to non-profits following the occurrence of a natural disaster. The lowest r-squared value observed was in testing the fifth hypothesis, measuring the effects of natural disasters in on donations to non-profits in

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subsequent years. The variables tested: government grants, cash on hand, fundraising efforts of the organization, operating leverage, officer compensation, organization size, positive net income, media coverage, and unemployment in measuring the effects seen in donations to non-profits following the occurrence of a natural disaster in the first and second years following the disaster.

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#### **PROBLEMS ENCOUNTERED**

##### Data Limitations

Non-profit donation data is limited to annual reporting by the organization. In August 2005, Hurricane Katrina struck the Gulf coast and most of the damage was concentrated in Louisiana, specifically New Orleans. In September 2005, the Gulf coast region was struck by Hurricane Rita another significant, damaging storm. While most of the damage caused by Rita was concentrated in Texas, it also affected Louisiana. Because of the limited time frame of the non-profit donation data, it is nearly impossible to derive an accurate conclusion regarding the disaster-specific increase in donations to non-profits following a significant natural disaster.

Media coverage data was collected according to Google News hits in the year of the disaster according to the disaster name or disaster sub-type and date as reported by EM-DAT: The International Disaster Database. This data collection does not control for full-year media coverage of a particular disaster, rather it assesses the coverage from the disaster date until year-end. While all data was susceptible to the same confounding factors and no alternate data set presented itself, this limitation could have negative effects on the validity of the data and the overall test.

##### Selection of Test Variables

The variables used in this study were selected based on their use in previous studies and perceived relevance to this study. It is possible that some relevant variables were overlooked and if included, these variables may have altered the results of this study. In their study, *Determinants of Donations to Non-profits*, Okten and Weisbrod used fundraising expenditures in the previous year, government grants, program service revenues, the number of years the non-profit has been in existence, and the “price” of contributing a dollar of output to the organization. While these variables were relevant to this study, only fundraising expenditures, government grants, and revenues are considered in this study. Instead of using the age of a non-profit as a proxy for reputation and productivity, this study uses the size of the organization as a similar proxy.

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#### Assumed Independence of Data

Aside from the suggested relationships among different variables, all data are assumed to be independent of one another. For example, the natural disaster data is assumed to have no significance on the unemployment rate in the affected-region though with extreme natural disasters this may be incorrect. A study by the Bureau of Labor Statistics finds that in October 2005, the unemployment rate of persons 16 years and over who were evacuated from their residence (even temporarily) due to Hurricane Katrina increased from 10.5% in August, to 33.4% in October. This rapid decrease in the number of people employed in Louisiana is likely to have a material impact on the annual unemployment rate. This impact could have the effect of “double counting” the effect of Hurricane Katrina specifically on donations to non-profit organizations.

This study did not consider the possibility that non-profit organizations in non-humanitarian industries might see an increase in donations following a particularly devastating natural disaster nor did it consider the possibility of “donor fatigue” or the potential that donations do not increase following a natural disaster because potential donors already feel they have made significant contributions following the occurrence of other events. These two situations could potentially have a material impact on the true relationship between the occurrence of a natural disaster and donations to non-profit organizations in the same region. In addition, the geographic proximity was not considered as a factor in this study. For the example of Hurricane Katrina, while the majority of damage was concentrated in Louisiana, specifically in New Orleans, many people who were evacuated from Louisiana moved either temporarily or permanently away from Louisiana to states such as Mississippi and Texas. A 2006 study by the Health and Human Services Commission of Texas estimates that a total of 251,000 evacuees of Louisiana remained in Texas as of June 2006 with the greatest portion located in the Eastern Texas/ Houston region (Health and Human Services Commission, 2006).

Finally, international considerations were not made when conducting this research. All data sets were specific to the United States and did not consider international events over the same period. I learned while reviewing literature of previous research that during the period of 2000 to 2006 there were a number of devastating natural disasters that occurred abroad that may

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have impacted domestic donation levels to non-profits through the possible diversion of donations away from domestic organizations in favor of international relief efforts. Examples of such disasters include the tsunami disaster in the Indian Ocean in December 2004, the Pakistani Kashmir earthquake in October 2005, and the 2006 drought in China. Conversely, donations to non-profit organizations include those funds given by both domestic and international donors. International donations may be affected by local conditions not controlled for in this study that would have a confounding effect on the validity of the results.

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**CONCLUSION**

In recent years, natural disasters have garnered significant media attention due in part to their sheer force but also in part to the destruction they have caused in their wake. Specific factors associated with the “destruction” caused by natural disasters include the number of deaths, number of people affected, damage costs, and media coverage. This study found that donations to non-profits in a given state increase following the occurrence of a natural disaster in that state as compared to the mean donations from previous years. This study finds that government grants and public donations to non-profits have a significant and inverse relationship following the occurrence of a natural disaster. These results confirm that public donations increase by a factor greater than government grants (following a natural disaster) because government grants in fact move inversely with public donations. The results also indicate that hurricanes generate a greater increase in donations to non-profits than other types of natural disasters. The mean media coverage for hurricanes is higher than that of other types of disasters (11,805 as compared to 961), indicating that hurricanes generate significantly more media coverage than other types of natural disasters.

Humanitarian, or aid-related, industries did not see a significant increase in donations to non-profits following the occurrence of a natural disaster. Nearly all industries saw a significant decrease in donations to non-profits following the occurrence of a natural disaster. Non-profit organizations classified within the national security and social action industries did see increases in donations, while there were no significant findings about donations to non-profits within the agriculture industry. This finding addresses concerns about the potential diversion of funds from relief-related industries from those industries not related to the relief efforts, as there is no conclusive evidence of this. This study also found that if a natural disaster strikes a particular region, the increased level of donations to non-profits in the disaster-affected region remains elevated in subsequent years. This effect could be seen in the two years following the natural disaster. From the perspective of those managing relief and rebuilding efforts, this sustained level of increased donations is a positive sign as it shows continued support for rebuilding efforts.

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In addition, this study finds that media coverage associated with natural disasters generate the most significant increase in donations to non-profit organizations as compared to the number of deaths, the number of people affected, and the damage costs. Media coverage was the only significant disaster-related variable in determining donations to non-profits. While media coverage itself may be a factor of the number of deaths, people affected, and damage costs, it was the only variable that had a direct effect on donations to non-profits following the occurrence of a natural disaster. Findings on the effects of media coverage of a natural disaster present an opportunity for future studies on the behavioral aspects of public donations to non-profit organizations.

**RECOMMENDATIONS FOR FUTURE RESEARCH**

This study sought to establish a foundation for research on the effects of natural disasters on donations to non-profit organizations. Little research has been conducted on this subject and there is significant room for future research. One natural extension of this study would be the inclusion of international data on both the non-profit donation and natural disaster sides. This would provide a larger base to make conclusions about, improving the validity of the results and increasing the significance of hypothesis tests. In addition, the use of international data would eliminate or confirm the possibility that international events confound the results of this study focused on the United States.

Another natural extension of this study would be to expand the time period considered to include more natural disasters which would better illustrate an overall trend in donations to non-profit organizations following the occurrence of natural disasters. In the United States during the 1990s there were a number of catastrophic natural disasters including Hurricane Andrew, which was the most damaging hurricane prior to Hurricane Katrina. Hurricane Andrew potentially presents an interesting case for comparison with the effects seen on donations to non-profits following Hurricane Katrina.

Another area that appears a likely extension of this study would be the introduction of additional variables. Expanding the number of variables considered in this study would likely improve future results in terms of both statistical significance and reader understanding. While this study included a number of variables introduced by Okten and Weisbrod in their study, additional studies on both donations to non-profits and the effects of natural disaster on commerce in general would improve the overall study. The fairly low coefficients of determination from this study allude to the fact that there are a number of other variables weighing on the overall donations to non-profits following the occurrence of a natural disaster.

The results of this study reveal trends in human behavior particularly regarding reactions to the occurrence of natural disasters. The findings regarding the significance of media coverage in determining donations to non-profits in areas following the occurrence of natural disasters forge a potential path in behavioral finance as to what factors or conditions prompt



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individuals to donate to non-profit organizations. Further exploration of the role of media coverage in generating increased donations to non-profit organizations is a potential extension of this study. I recommend finding a more standardized database measuring media coverage of natural disasters that accounts for a uniform time period, particularly one that could measure lagging effects of media coverage in continuing to generate an increase in donations to non-profits in a disaster-affected area.

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**APPENDICES**

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**Appendix A – Natural Disaster Data**

By Subtype	Occurrences	Average Killed	Average Affected	Average Damage (mill)	Total Killed	Total Affected	Total Damage (mill)	Media coverage (hit)
Cold Wave	4	30	-	\$ -	118	-	\$ -	3481
Drought	7	-	-	\$ 933.57	0	-	\$ 6,535.00	12349
Earthquake	13	5	4,625.54	\$ 2,517.75	68	60,132	\$ 32,730.80	23218
Epidemic	5	63	81,340.60	\$ -	317	406,703	\$ -	0
Flood	102	6	10,248	\$ 336.75	634	1,045,255	\$ 34,348.95	94382
Flash Flood	2	11	60	\$ -	22	120	\$ -	11520
Scrub	10	2	68,175	\$ 278.11	16	681,753	\$ 2,781.10	10989
Forest	38	2	2,756	\$ 208.61	83	104,735	\$ 7,927.10	50278
Heat Wave	11	131	482	\$ -	1442	5,306	\$ -	22998
Hurricane	14	146	452,188	\$ 14,428.78	2038	6,330,633	\$ 202,002.86	165266
Storm	19	7	1,850	\$ 192.79	124	35,157	\$ 3,663.00	4360
Tornado	43	7	1,235	\$ 449.18	298	53,084	\$ 19,314.90	14762
Tropical Storm	2	4	2	\$ 8.00	7	4	\$ 16.00	1456
Winter	26	19	95	\$ 42.45	483	2,467	\$ 1,103.60	10777
Wind Storm	1	1	47	\$ -	1	47	\$ -	40
Volcano	0	-	-	\$ -	0	-	\$ -	0
Mudflow	1	15	15	\$ -	15	15	\$ -	1070
Wild Fires	2	1	468	\$ 8.00	1	935	\$ 16.00	13171
<b>Totals</b>	<b>300</b>	<b>18.89</b>	<b>29,087.82</b>	<b>\$ 1,034.80</b>	<b>5,667</b>	<b>8,726,345</b>	<b>\$ 310,439.31</b>	<b>440117</b>

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Appendix B – Non-profit Donation Examples

Hurricane Katrina		29-Aug-05	Killed	1,833	Total Affected	500,000	Est Damage in US\$ Mil	125,000.00			
									Louisiana		
Direct public support			Change			Government grants			Change		
Year	Amount	Change	%	Total	%	Total	%	Total	Change	%	Total
2000	\$ 2,096,863.73					\$ 1,422,813.12		\$ 3,519,676.85			
2001	\$ 2,842,260.24	\$ 745,396.51	35.55%			\$ 1,634,762.01	14.90%	\$ 4,477,022.25	\$ 211,948.89	14.90%	\$ 957,345.40
2002	\$ 2,959,902.11	\$ 117,641.87	4.14%			\$ 1,681,597.68	2.86%	\$ 4,641,499.79	\$ 46,835.67	2.86%	\$ 164,477.54
2003	\$ 3,835,745.81	\$ 875,843.70	29.59%			\$ 2,110,679.98	25.52%	\$ 5,946,425.79	\$ 429,082.30	25.52%	\$ 1,304,926.00
2004	\$ 3,735,798.12	\$ (99,947.69)	-2.61%			\$ 2,090,293.65	-0.97%	\$ 5,826,091.77	\$ (20,386.33)	-0.97%	\$ (120,334.02)
2005	\$ 4,377,739.16	\$ 641,941.04	17.18%			\$ 2,134,447.38	2.11%	\$ 6,512,186.54	\$ 44,153.73	2.11%	\$ 686,094.77
2006	\$ 4,155,274.94	\$ (222,464.22)	-5.08%			\$ 2,305,400.49	8.01%	\$ 6,460,675.43	\$ 170,953.11	8.01%	\$ (51,511.11)
Hurricane Rita		26-Sep-05	Killed	10	Total Affected	300,000	Est Damage in US\$ Mil	16,000.00			
									Texas		
Direct public support			Change			Government grants			Change		
Year	Amount	Change	%	Total	%	Total	%	Total	Change	%	Total
2000	\$ 1,662,599.45					\$ 1,365,135.08		\$ 3,027,734.53			
2001	\$ 1,688,347.03	\$ 25,747.58	1.55%			\$ 1,447,276.99	6.02%	\$ 3,135,624.02	\$ 82,141.91	6.02%	\$ 107,889.49
2002	\$ 1,477,344.38	\$ (211,002.65)	-12.50%			\$ 1,770,767.39	22.35%	\$ 3,248,111.77	\$ 323,490.40	22.35%	\$ 112,487.75
2003	\$ 1,958,175.47	\$ 480,831.09	32.55%			\$ 2,020,081.46	14.08%	\$ 3,978,256.93	\$ 249,314.07	14.08%	\$ 730,145.16
2004	\$ 2,059,349.37	\$ 101,173.90	5.17%			\$ 1,875,015.84	-7.18%	\$ 3,934,365.21	\$ (145,065.62)	-7.18%	\$ (43,891.72)
2005	\$ 2,673,838.23	\$ 614,488.86	29.84%			\$ 2,087,036.10	11.31%	\$ 4,760,874.33	\$ 212,020.26	11.31%	\$ 826,509.12
2006	\$ 3,264,567.13	\$ 590,728.90	22.09%			\$ 2,559,345.54	22.63%	\$ 5,823,912.67	\$ 472,309.44	22.63%	\$ 1,063,038.34

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Appendix C- Unemployment Data

	2007	2006	2005	2004	2003	2002	2001	2000
AL	3.50%	3.50%	3.80%	5.00%	5.40%	5.40%	4.70%	4.10%
AK	6.10%	6.50%	6.90%	7.40%	7.70%	7.10%	6.20%	6.20%
AZ	3.90%	4.20%	4.70%	5.00%	5.70%	6.00%	4.70%	4.00%
AR	5.20%	5.20%	5.10%	5.60%	5.80%	5.30%	4.70%	4.20%
CA	5.30%	4.90%	5.40%	6.20%	6.80%	6.70%	5.40%	4.90%
CO	3.90%	4.40%	5.10%	5.60%	6.10%	5.70%	3.80%	2.70%
CT	4.60%	4.40%	4.90%	4.90%	5.50%	4.40%	3.10%	2.30%
DE	3.50%	3.50%	4.00%	3.90%	4.20%	4.00%	3.50%	3.30%
DC	5.40%	5.70%	6.50%	7.50%	7.00%	6.70%	6.30%	5.70%
FL	4.10%	3.40%	3.80%	4.70%	5.30%	5.70%	4.70%	3.80%
GA	4.60%	4.70%	5.20%	4.70%	4.80%	4.80%	4.00%	3.50%
HI	2.70%	2.50%	2.80%	3.20%	3.90%	4.00%	4.20%	4.00%
ID	3.00%	3.00%	3.70%	4.60%	5.20%	5.40%	4.90%	4.60%
IL	5.10%	4.60%	5.80%	6.20%	6.70%	6.50%	5.40%	4.50%
IN	4.60%	5.00%	5.40%	5.30%	5.30%	5.20%	4.20%	2.90%
IA	3.70%	3.70%	4.30%	4.60%	4.40%	3.90%	3.30%	2.80%
KS	4.10%	4.40%	5.10%	5.50%	5.60%	5.10%	4.30%	3.80%
KY	5.60%	5.90%	6.00%	5.60%	6.30%	5.70%	5.20%	4.20%
LA	3.80%	3.90%	6.70%	5.50%	6.20%	5.90%	5.40%	5.00%
ME	4.70%	4.70%	4.90%	4.60%	5.00%	4.40%	3.70%	3.30%
MD	3.50%	3.80%	4.10%	4.30%	4.50%	4.50%	4.10%	3.60%
MA	4.40%	4.70%	4.80%	5.20%	5.80%	5.30%	3.70%	2.70%
MI	7.10%	6.90%	6.80%	7.10%	7.10%	6.20%	5.20%	3.70%
MN	4.60%	4.10%	4.20%	4.60%	4.90%	4.50%	3.80%	3.10%
MS	6.20%	6.70%	7.80%	6.30%	6.40%	6.70%	5.60%	5.70%
MO	5.10%	4.80%	5.40%	5.80%	5.60%	5.20%	4.50%	3.30%
MT	3.50%	3.30%	3.60%	4.00%	4.30%	4.50%	4.50%	4.80%
NE	2.90%	3.00%	3.90%	3.90%	4.00%	3.70%	3.10%	2.80%
NV	4.80%	4.30%	4.50%	4.40%	5.20%	5.70%	5.30%	4.50%
NH	3.50%	3.50%	3.60%	3.90%	4.50%	4.50%	3.40%	2.70%
NJ	4.30%	4.60%	4.50%	4.90%	5.90%	5.80%	4.30%	3.70%
NM	3.50%	4.10%	5.20%	5.80%	5.90%	5.50%	4.90%	5.00%
NY	4.50%	4.60%	5.00%	5.80%	6.40%	6.20%	4.90%	4.50%
NC	4.70%	4.70%	5.30%	5.50%	6.50%	6.60%	5.60%	3.70%
ND	3.10%	3.20%	3.40%	3.50%	3.60%	3.50%	2.80%	2.90%
OH	5.60%	5.40%	5.90%	6.10%	6.20%	5.70%	4.40%	4.00%
OK	4.00%	4.10%	4.50%	5.00%	5.60%	4.80%	3.70%	3.10%
OR	5.10%	5.30%	6.20%	7.30%	8.10%	7.60%	6.40%	5.10%
PA	4.30%	4.50%	5.00%	5.40%	5.70%	5.60%	4.80%	4.20%
RI	5.20%	5.10%	5.10%	5.20%	5.40%	5.10%	4.50%	4.20%
SC	5.60%	6.40%	6.80%	6.80%	6.70%	6.00%	5.20%	3.60%
SD	2.90%	3.10%	3.70%	3.70%	3.50%	3.30%	3.10%	2.70%
TN	4.90%	5.20%	5.60%	5.40%	5.70%	5.30%	4.70%	4.00%
TX	4.40%	4.90%	5.40%	6.00%	6.70%	6.40%	5.00%	4.40%
UT	2.80%	3.00%	4.10%	5.10%	5.70%	5.80%	4.40%	3.40%
VT	3.90%	3.70%	3.50%	3.70%	4.50%	4.00%	3.30%	2.70%
VA	3.00%	3.00%	3.50%	3.70%	4.10%	4.20%	3.20%	2.30%
WA	4.60%	4.90%	5.50%	6.20%	7.40%	7.30%	6.20%	5.00%
WV	4.20%	4.50%	4.90%	5.30%	6.00%	5.90%	5.20%	5.50%
WI	4.80%	4.70%	4.80%	5.00%	5.60%	5.30%	4.40%	3.40%
WY	2.90%	3.20%	3.70%	3.90%	4.50%	4.20%	3.90%	3.80%

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Appendix D- T-Test: Hypothesis 1

Government grants	-0.21395	
		(-36.03)
Cash on hand	-0.0053	
		(-7.74)
Fundraising	0.17919	
		(25.74)
Operating leverage	-0.1332	
		(-51.42)
Officer compensation	-0.00106	
		(-2.09)
Organization size	-0.03483	
		(-62.67)
Postive net income	0.00203	
		(9.18)
Unemployment	0.01069	
		(8)

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Appendix E- T-Test: Hypothesis 2

Government grants	-0.21485	
		(-50.25)
Cash on hand	-0.00479	
		(-9.45)
Fundraising	0.23034	
		(40.66)
Operating leverage	-0.127	
		(-69.36)
Officer compensation	-0.00159	
		(-3.77)
Organization size	-0.0346	
		(-84.93)
Postive net income	0.00223	
		(13.65)
Media/ population	4.01E-06	
		(2.78)
Unemployment	0.01232	
		(11.54)

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Appendix F- T-Test: Hypothesis 3

Government grants	-0.21542	
		(-34.98)
Cash on hand	-0.00409	
		(-5.42)
Fundraising	0.32598	
		(33.77)
Operating leverage	-0.12092	
		(-46.68)
Officer compensation	-0.00265	
		(-3.56)
Organization size	-0.03417	
		(-57.12)
Postive net income	0.0025	
		(10.34)
Deaths/ population	0.000423	
		(1.19)
Damage/ GDP	-0.00026	
		(-1.46)
Persons affected/ population	-3.27E-08	
		(-0.55)
Media/ population	1.35E-06	
		(0.65)
Unemployment	0.00925	
		(6.68)
Hurricanes	0.01893	
		(2.86)



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Appendix G- T-Test: Hypothesis 4

Arts, Culture, and Humanities	-0.11243	
		(-25.13)
Education	-0.22791	
		(-62.44)
Environmental Protection	-0.02709	
		(-3.69)
Animal-Related	-0.06465	
		(-7.41)
Health	-0.36031	
		(-97.83)
Mental Health, Crisis Intervention	-0.34244	
		(-52.23)
Diseases, Disorders	-0.16665	
		(-19.33)
Medical Research	-0.085	
		(-9.1)
Crime, Legal Related	-0.1353	
		(-12.7)
Employment, Job Related	-0.39973	
		(-47.5)
Agriculture	0.02101	
		(1.62)
Housing, Shelter	-0.39867	
		(-85.82)
Public Safety	-0.22445	
		(-18.95)
Recreation, Sports, Leisure, Athletics	-0.2991	
		(-43.79)
Youth Development	-0.10662	
		(-14.11)
Human Services	-0.2919	
		(-76.14)
Foreign Affairs, and National Security	0.0959	
		(11.87)
Civil Rights, Social Action, Advocacy	0.10724	
		(6.3)
Community Improvement	-0.25743	
		(-38.9)
Science and Technology Research	-0.2626	
		(-27.01)
Public, Society Benefit	-0.26214	
		(-27.3)

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Appendix H- T-Test: Hypothesis 5

Government grants	-0.20063	
		(-41.84)
Cash on hand	-0.00461	
		(-7.46)
Fundraising	0.20011	
		(35.1)
Operating leverage	-0.13074	
		(-63.39)
Officer compensation	-0.00232	
		(-3.87)
Organization size	-0.03331	
		(-73.63)
Positive net income	0.000401	
		(1.74)
1Yr Lag	3.34E-06	
		(2.28)
2Yr Lag	5.89E-06	
		(3.25)
unemployment	0.00973	
		(8.98)

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Appendix I- T-Test: Hypothesis 6

Government grants	-0.21403	
		(-50.05)
Cash on hand	-0.0048	
		(-9.47)
Fundraising	0.2312	
		(40.8)
Operating leverage	-0.12682	
		(-69.23)
Officer compensation	-0.00159	
		(-3.78)
Organization size	-0.03461	
		(-84.92)
Positive net income	0.00222	
		(13.57)
Damage/ GDP	-0.00023	
		(-1.35)
Deaths/ Population	0.000342	
		(1.02)
Persons affected/ Population	2.01E-08	
		(0.35)
Media/ Population	4.46E-06	
		(2.23)
Unemployment	0.00987	
		(11.01)

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Appendix I: R-Squared Values by T-Test

<b>Test</b>	<b>R-Squared</b>
H1: Base case	0.2463
H2: Government grants	0.1606
H3: Hurricanes	0.1643
H4: Humanitarian	0.1930
H5: Lagging effect	0.1505
H6: Media coverage	0.1607

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