2010

The Economic Impact of the Gulf Opportunity Zone Act of 2005

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THE ECONOMIC IMPACT OF THE GULF OPPORTUNITY ZONE ACT OF 2005

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Mississippi

Randall B. Bunker

December 2010

DEDICATION

I would like to dedicate this dissertation to my mother, Nancy C. Bellinger. It was at her request that I started this long journey, and her love and support has been invaluable during this process. I cannot thank her enough for all that she has done for me in my life.

ACKNOWLEDGEMENTS

I would first like to acknowledge my dissertation committee: Dr. Tonya Flesher (Chair), Dr. Dale L. Flesher, Dr. J Riley Shaw, and Dr. William Shughart. I sincerely appreciate the time, intellectual contributions, and support each of you gave to this research project. Thanks to each of you for making this process a rewarding experience. Special appreciation is expressed to Dr. Tonya Flesher. Her inspiration, expert guidance, and timely responses made the completion of this dissertation possible.

I would also like to thank Dallas Bunker, Mary Bunker, and Lee Hunt. They are all wonderful family members who provided encouragement and support during this challenging process. I am thankful to Chelsi Bunker, Russell Bunker, and Jamie Hensley for their support. God has truly blessed me with great family and friends.

In addition, I am grateful to Dr. Mike Casey who inspired me to pursue my doctorate at the University of Mississippi and provided guidance during my time in the program.

Finally, I am thankful to my Ph.D. classmates: William H. Black, Corey Cagle, Dan Harris, and Dana Hart. Special appreciation is expressed to Corey Cagle for serving as an independent reviewer during this research project.

ABSTRACT

Politicians utilize tax policy investment incentives to foster economic growth and stimulate investment. On December 21, 2005, President Bush signed the Gulf Opportunity Zone Act of 2005, otherwise known as the GO Zone Act. The GO Zone Act provided tax incentives to stimulate economic growth and assist in the recovery and rebuilding efforts. This research evaluates the economic impact of tax policy investment incentives provided by the GO Zone Act of 2005. Congress continues to use tax incentives to stimulate economic growth even though empirical research on the impact of incentives is inconclusive.

Prior literature supporting the neoclassical theory of investment behavior suggests that tax investment incentives that reduce the cost of capital should increase investment spending and spur economic growth. The purpose of the research is to assess the effectiveness of tax policy investment incentives at the regional level and to examine whether these regional incentives create economic growth within policy coverage areas at the expense of the surrounding regions. Specifically, this study addresses the following research questions:

1) Do tax policy investment incentives promote economic growth and spur business investment spending at the regional level?

2) Are regional tax policy investment incentives a zero-sum game, where growth in one local area comes at the expense of reduced growth in other local areas?

The research questions are tested utilizing linear mixed-effects modeling, multiple ordinary least squares (OLS) regression, and binary logistic regression on a matched sample panel data set using observations from 2002 through 2008.

Results indicate that the regional tax policy investment incentives provided by the GO Zone Act did not generate significant increases in key economic indicators included in this study. These tax incentives were intended to accelerate capital spending and spur economic recovery, but do not appear to have had the desired impact. In addition, the results do not indicate that the tax incentives provided by the GO Zone Act has had a statistically significant negative impact on the surrounding region.

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CHAPTER I

INTRODUCTION

Tax policies in the United States are typically implemented to generate revenue for the government, however Congress has often used tax policy incentives to motivate spending and promote economic growth. Economic theory states that a decline in the total cost of productive assets would spur an increase in the quantity demanded, because, all else equal, lowering the cost of any item increases the quantity demanded of that item (U.S. Congress 2007). Basically, lowering the cost of an asset is an incentive to invest more and to produce more. Tax incentives, such as bonus depreciation, tax-exempt bond financing, and investment tax credits, have been used by Congress to stimulate business spending. Empirical research on the impact of tax incentives on economic growth has proven to be inconclusive, even though Congress is still implementing tax incentives to stimulate economic growth.

In the fall of 2005, the Gulf Coast region of the United States was severely damaged by multiple hurricanes. On August 29, 2005, Hurricane Katrina struck land and caused significant damage in Louisiana, Mississippi, and Alabama. On September 23, 2005, Hurricane Rita made landfall along the coastlines of Texas and Louisiana, causing additional damage to the already devastated Louisiana. Hurricane Wilma made several landfalls in mid-October 2005, devastating parts of the Yucatán Peninsula and southern Florida. Wilma set numerous records for both strength and seasonal activity. It was only the third Category 5 storm to develop in October. In response to these natural disasters, Congress developed new laws to provide disaster relief to the

hurricane victims and tax recovery measures to stimulate the economic recovery of the region.

On September 26, 2005, President Bush signed the Katrina Emergency Tax Relief Act of 2005 (KETRA). This Act attempted to provide immediate assistance and tax relief to the victims of Hurricane Katrina. On December 21, 2005, President Bush signed the Gulf Opportunity Zone Act of 2005, otherwise known as the GO Zone Act. The GO Zone Act extended the tax provisions of KETRA to the areas affected by Hurricane Rita and Hurricane Wilma and provided additional tax incentives, such as bonus depreciation and tax-exempt bond financing, to stimulate economic growth and assist the recovery and rebuilding efforts.

The GO Zone Act established regions, or zones, to determine which areas were entitled to use the new tax relief policies. The term 'GO Zone' refers to the region affected by Hurricane Katrina and includes the same areas designated as the 'core disaster area' by KETRA, which covered certain parishes in Louisiana and certain counties in Mississippi and Alabama; see figure 1.1 for a map of the Katrina GO Zone.[1] The GO Zone, or core disaster area, encompasses the area determined by the Federal Emergency Management Agency (FEMA) to be eligible for either individual only or both individual and public assistance from the Federal Government. The term 'Rita GO Zone' refers to the region affected by Hurricane Rita and covers southern Louisiana and southeastern Texas. The term 'Wilma GO Zone' referred to the region affected by Hurricane Wilma (southern Florida). The primary focus of this research is the 'GO Zone' region resulting from Hurricane Katrina, namely Louisiana, Mississippi, and

[1] According to IRS Publication 4492, the Katrina GO Zone region (core disaster area) includes 31 parishes in Louisiana, 49 counties in Mississippi, and 11 counties in Alabama. See Appendix A for a complete list of the counties and parishes utilized in this dissertation.

Alabama. This research attempts to quantify the economic impact of the tax incentives included in the Gulf Opportunity Zone Act of 2005 and to determine whether these tax incentives stimulated economic growth in the affected region.

Figure 1.1 – The GO Zone Core Disaster Area[2]

The Gulf Opportunity Zone Act of 2005

The Gulf Opportunity Zone Act of 2005 provided tax incentives for businesses and individuals to encourage rebuilding, rehabilitation, and investment in hurricane stricken areas. In addition, the GO Zone Act provided technical corrections to prior laws, extensions for certain expiring tax provisions, and tax relief for military

[2] Source Rothman and Altieri (2006).

personnel. Key tax provisions of the GO Zone Act included the following: (1) bonus first-year depreciation allowance, (2) increased Section 179 deduction, (3) extension of the carryback period from two years to five years for net operating losses from GO Zone related casualty losses, (4) tax-exempt bond financing for the GO Zone, (5) advanced refunding for certain tax exempt bonds, (6) partial expensing for demolition and clean-up costs, (7) increased low-income housing credit cap, (8) increased reforestation expenses, (9) increased rehabilitation tax credit, (10) expansion of Hope Scholarship and Lifetime Learning Credit for students in the GO Zone, (11) temporary suspension of limits on charitable contributions and additional charitable giving incentives, (12) employee retention credit, (13) employee housing allowance and employer credit, (14) penalty-free retirement plan distributions, and (15) extended tax deadlines. This research primarily focuses on the use of tax incentives intended to increase capital spending and spur economic growth, such as bonus depreciation, increased expense deductions, and investment tax credits. The business tax incentives provided by the GO Zone Act are discussed in detail in the following paragraphs.

Title I of the GO Zone Act provided detailed explanations of the tax incentives intended to spur business capital spending and promote economic growth. Bonus first-year depreciation is one of the primary tax incentives in the GO Zone Act, and it allows an additional first-year depreciation deduction equal to 50 percent of the adjusted basis of qualified Gulf Opportunity Zone property. In order for property to qualify for the additional first-year depreciation deduction, it must meet all of the following requirements: first, the property must be such that the general rules of the Modified Accelerated Cost Recovery System (MACRS) apply with (1) an applicable recovery

period of 20 years or less, (2) computer software other than that which is covered by Section 197, (3) water utility property (as defined in Section 168(e)(5)), (4) certain leasehold improvement property, or (5) certain nonresidential real property and residential rental property; second, substantially all use of such property must occur within the Gulf Opportunity Zone and in the active conduct of a trade or business by the taxpayer in the Gulf Opportunity Zone; third, the original use of the property in the Gulf Opportunity Zone must commence with the taxpayer on or after August 28, 2005 (in addition, it is intended that additional capital expenditures incurred to recondition or rebuild property, the original use of which in the Gulf Opportunity Zone began with the taxpayer, would satisfy the "original use" requirement; see Treasury Regulation sec.1.48-2 Example 5); finally, the property must be acquired by purchase (as defined under Section 179(d)) by the taxpayer on or after August 28, 2005 and placed in service on or before December 31, 2007 (for qualifying nonresidential real property and residential rental property, the property must be placed in service on or before December 31, 2008, in lieu of December 31, 2007) (Joint Committee on Taxation 2005, 14).

A more generous Section 179 deduction allowance is an additional tax incentive provided by the GO Zone Act. Under this provision, the $100,000 maximum amount that a taxpayer may elect to deduct under Section 179 is increased by the lesser of $100,000, or the cost of qualified Section 179 Gulf Opportunity Zone property for the taxable year. The provision applies with respect to qualified Section 179 Gulf Opportunity Zone property acquired on or after August 28, 2005, and placed in service on or before December 31, 2007. Thus, in addition to the $100,000 maximum cost of

any Section 179 property (including property that also meets the definition of qualified Section 179 Gulf Opportunity Zone property) that may be deducted under present law, a taxpayer may elect to deduct up to $100,000 more of the taxpayer's cost of qualified Section 179 Gulf Opportunity Zone property, resulting in a maximum deductible amount of $200,000 of qualified Section 179 Gulf Opportunity Zone property. The $100,000 present-law portion of this amount is indexed for taxable years beginning after 2003 and before 2008, so the total may be greater than $200,000 after taking indexation of this portion into account (Joint Committee on Taxation 2005, 16).

The GO Zone Act also provides businesses with various investment tax credits intended to promote capital spending. The Act increases the rehabilitation tax credit from 20 to 26 percent, and from 10 to 13 percent, respectively, of the credit under Section 47 with respect to any certified historic structure or qualified rehabilitated building located in the Gulf Opportunity Zone, provided that the qualified rehabilitation expenditures with respect to such buildings or structures are incurred on or after August 28, 2005, and before January 1, 2009 (Joint Committee on Taxation, 2005, 20). The GO Zone Act also provides employers with a housing allowance credit of up to $600 per month per employee and expands the KETRA employee retention credit. This provision provides a credit of 40 percent of qualified wages (up to a maximum of $6,000 per employee) paid by an eligible employer to an eligible employee. An eligible employer is any employer (1) that conducted an active trade or business on August 28, 2005, in the core disaster area and (2) with respect to which the trade or business described in (1) is inoperable on any day after August 28, 2005, and before January 1, 2006, as a result of damage sustained by reason of Hurricane Katrina 2009 (Joint

Committee on Taxation 2005, 50). The Congressional Budget Office (2006) estimates that tax benefits related to the GO Zone Act will amount to about $4 billion in 2006, $3 billion in 2007, and $2 billion over the years from 2008 to 2015 (Richardson 2006). The major tax provisions generating these tax benefits will be the 50 percent bonus depreciation, the Section 179 expensing, and the broadening of the employee retention tax credit to all companies regardless of size (Richardson 2006).

Tax Policy Investment Incentives

Federal tax policies often have involved tax incentives intended to increase capital spending by businesses and promote economic growth. Accelerated depreciation was introduced in 1954, followed by the investment tax credit in 1962. Those who framed the 1954 Internal Revenue Code characterized it as a comprehensive revision undertaken "to remove inequities, end taxpayer harassment, and lower tax barriers to economic growth" (Schindler 1959, 616). Within this framework, accelerated depreciation was designed "to assist modernization and to promote industrial expansion which in turn would foster increased production and a higher standard of living" (Schindler 1959, 616).

In 1981, the Accelerated Cost Recovery System (ACRS) provided sharp increases in depreciation benefits; however, the Tax Reform Act of 1986 repealed accelerated depreciation and the investment tax credit. The Job Creation and Worker Assistance Act of 2002 and the Growth Tax Relief Reconciliation Act of 2003 both provided depreciation tax incentives of some kind in the year of acquisition of a long-lived asset. The American Jobs and Creation Act of 2004 extended many of these

incentives through December 31, 2005. The Economic Stimulus Act of 2008 provided additional depreciation incentives and increased the Section 179 deduction, and the American Recovery and Reinvestment Act of 2009 extended them. Congress intended for these incentives to promote capital investment and to generate economic growth.

Such frequent use over the past 50 years suggests that Congress believes that tax incentives are an effective tool for promoting capital investment and economic growth. The theory behind the use of tax incentives is that by providing businesses with accelerated tax deductions and other investment tax credits; the cost of capital needed to purchase new investments is reduced through the time value of money. The Congressional House Committee relied on this theory when implementing the Job Creation and Worker Assistance Act of 2002 and the Growth Tax Relief Reconciliation Act of 2003. The committee felt that bonus depreciation incentives would stimulate equipment purchases and foster economic recovery by increasing employment and expanding business opportunities (U.S. Congress 2003). However, despite the continued use of tax investment incentives by policy-makers, empirical evidence concerning the effectiveness of tax incentives is inconclusive.[3]

Statement of Research Problem and Hypothesis

This research evaluates the economic impact of tax incentives provided by the Gulf Opportunity Zone Act of 2005. Tax policy incentives included in the Act, such as bonus depreciation and an increased Section 179 deduction, were intended to spur capital investments by businesses and promote economic growth within the core

[3] Chapter 2 provides a literature review of the history of tax policy initiatives and of prior empirical research on their effectiveness.

disaster area. This research studies the economic impact of these incentives at the county level in the affected regions, controlling for other relevant explanatory variables, such as government funded housing programs and the location of commercial casinos. The purpose of the research is to assess the effectiveness of tax policy investment incentives at the regional level and to identify statistically significant variables that can be utilized to predict economic growth at the county level. Additionally, the research examines whether these regional tax policy investment incentives create economic growth within policy coverage areas at the expense of the surrounding regions. Specifically, this research addresses the following research questions:

1) Do tax policy investment incentives promote economic growth and spur business investment spending at the regional level?

2) Are regional tax policy investment incentives a zero-sum game, where growth in one local area comes at the expense of reduced growth in other local areas?

Research Design and Methodology

This research utilizes linear mixed-effects modeling, multiple ordinary least squares (OLS) regression and logistic regression to identify the significant variables that distinguish differences between GO Zone and non-GO Zone counties and standard empirical models to analyze the impact of these variables on the surrounding counties. The research questions are analyzed with a matched sample panel data set using data from 2002 through 2008 to test whether tax policy investment incentives are effective at the regional level and to determine the impact of these incentives on the surrounding regions. A panel data set consists of a time series for each cross-sectional member in

the data set.[4] Observing the same units or subjects over time has several advantages over cross-sectional data or even pooled time series cross-sectional data (Wooldridge 2009).[5]

The first research question examines the impact of tax policy investment incentives at the regional level and whether these incentives promote economic growth. Research question 1 will be analyzed with the following dependent variables at the county level: annual industry earnings, manufacturing industry earnings, construction industry earnings, per capita income, personal income, average wages per job, median household income, total employment for all industries, total manufacturing employment, total construction employment, housing unit estimates, and the number of building permits issued annually. Each dependent variable will be analyzed individually with mixed effects modeling procedures for the GO Zone timeframe (2006-2008) and for the three-year period preceding Hurricane Katrina (2002-2004); 2005 will not be included in either combined sample due to the fact that it overlaps both groups. Annual changes for each dependent variable covering 2003 through 2008 will be calculated and subsequent statistical procedures will be performed on these values. The year over year changes for each dependent variable will be analyzed individually with OLS regression procedures on an annual basis for the period covering 2003 through 2008 and will also be analyzed individually for the GO Zone timeframe (2006-2008) and for the two-year period preceding Hurricane Katrina (2003-2004); 2005 will not be

[4] The key feature that distinguishes panel data from pooled time series cross-sectional data is that panel data tracks the same variable for the same cross-sectional units (in this case counties) over a given period of time.

[5] Having multiple observations on the same unit or subject allows for the control of certain unobserved characteristics of the dependent variable, in this case counties and parishes. A second advantage of panel data is that they often allow researchers to study the importance of lags in behavior or the result of decision making.

included in either combined sample due to the fact that it overlaps both groups. The independent variable used for research question 1 will be a dichotomous variable created for GO Zone and non-GO Zone counties in the sample.

The second research question examines whether tax policy investment incentives at the regional level are a zero-sum game, where economic growth created by incentives come at the expense of the surrounding regions. Research question 2 will be analyzed with many of the same economic indicators implemented in research question 1, except that research question 2 will examine the percentage change in each of these variables at the county level and attempt to determine if any increases in the affected core disaster area are offset by decreases in the surrounding counties. In addition, research question 2 will be analyzed with binary logistic regression utilizing specific key economic indicators implemented in research question 1, however this model will consider all of the variables simultaneously to determine if statistically significant differences exist between GO Zone counties and non-GO Zone counties.

Importance of the Research

Economists often recommend fostering capital investment spending and promoting economic growth by providing tax incentives, such as accelerated depreciation and the investment tax credit. Tax incentives designed to spur investment are a major component of tax policy. Since the early 1950s, Congress has enacted tax policies that provide investment incentives for businesses. Prior empirical research examining the effectiveness of tax policy investment incentives has proven to be inconclusive.

Most prior empirical research studies in this area have been cross-sectional studies based on industry-, firm-, or asset-level data and not typically tested at the regional level. Steinnes (1984) examined regional economic development and concluded that the use of pooled-time-series-cross-sectional data provides more accurate results when compared with research that only examines cross-sectional data for one time period. According to Wooldridge (2009), utilizing pooled cross sections from different years is an effective way of analyzing the effects of government policy. This research addresses these issues by utilizing a matched sample panel data set at the county level.

In general, counties are the smallest geographical regions for which significant data are available, and, to date, very little, if any, empirical research has been performed on the effectiveness of tax investment incentives using real-world economic data at the county level. The GO Zone Act provides the opportunity to research the effectiveness of tax-policy incentives on capital investment and economic growth at the county level over a finite period of time covering 2006 through 2008. According to Richardson (2006), Hurricanes Katrina and Rita may provide the ultimate test for tax policy in the United States. The Katrina Emergency Tax Relief Act of 2005 (KETRA) and, especially, the Gulf Opportunity Zone Act of 2005 give economists an opportunity to evaluate the effectiveness of tax policy (Richardson 2006).

The matched sample implemented in this research also allows the impact of tax incentives on surrounding regions to be examined. Multiple researchers have stated that regional tax incentives are potentially a zero-sum game where benefits provided to one region come at the expense of surrounding areas and that tax incentives do not produce

growth at the regional level, but simply shift spending from one area to another with no net gain.[6] This research minimizes some of these issues addressed by prior empirical research and provides evidence of the effectiveness of tax policy investment incentives at the regional level and shows the impact of these incentives on surrounding regions.

Underlying Theory

In 1958, Modigliani and Miller developed a theory of investment behavior based on a firm's cost of capital. One of the conclusions reached by Modigliani and Miller was that any investment project worth undertaking should raise the value of the firm; the return on the project, therefore, should be greater than the marginal cost of capital (1958). Modigliani and Miller also concluded, *ceteris paribus*, that a firm acting in the best interest of its stockholders would prefer investments that provided more income compared to less income and that the principal concern when considering investment decisions should be the marginal cost of capital. Based on these conclusions, tax incentives that lower a firm's marginal cost of capital for certain types of investments should make these investment opportunities more attractive when compared with options that are not eligible for these same tax incentives.

Hall and Jorgenson continued the research on the theory of investment behavior incorporating the cost of capital when they studied "the relationship between tax policy and investment expenditures using the neoclassical theory of optimal capital accumulation" (1967, 391). Hall and Jorgenson wanted to test the simple E.C. Brown (1955) argument that "businessmen in pursuit of gain will find the purchase of capital goods more attractive if they cost less" (1967, 391). Hall and Jorgenson (1967)

[6] See Bartik (1994) and Liard-Muriente (2007).

concluded that tax policies were highly effective in changing the level and timing of investment expenditures and that tax policies had important effects on the composition of investments. Hall and Jorgenson provided the first empirical results concerning the theory of investment behavior and provided the foundation for research studying the impact of tax incentives on investment behavior.

The key element of the neoclassical theory of investment behavior is the expected user cost of capital, which can be viewed as the current dollar "rental price" of one unit of capital for a single period (Chirinko 1986). The neoclassical model of investment "assumes that tax rate reductions will increase investment by lowering the rental price of capital" (Bosworth 1985, 6). Neoclassical theory of investment behavior suggests that tax incentives such as investment tax credits and bonus depreciation should reduce the cost of capital and increase capital spending on long-lived assets. Based on the theory of investment, the tax incentives provided in the GO Zone Act should lower a firm's marginal cost of capital in the qualifying locations, thus increasing capital investments and promoting economic growth.

Results

The first research question examines the impact of tax policy investment incentives at the regional level and whether these incentives promote economic growth. Research question 1 was tested with the following dependent variables at the county level: annual industry earnings, manufacturing industry earnings, construction industry earnings, per capita income, personal income, average wages per job, median household income, total employment for all industries, total manufacturing employment, total

construction employment, housing unit number estimates, and the number of building permits issued annually. Results indicate that the regional tax policy investment incentives provided by the GO Zone Act did not generate significant increases in key economic indicators included in this study. These tax incentives were intended to accelerate capital spending and spur economic recovery, but based on research findings, they do not appear to have had the impact desired by Congress. Based on the combined data analysis from all the models tested with linear mixed effects modeling and multiple regression procedures, statistical evidence supporting the effectiveness of regional tax policy investment incentives does not exist. The conclusion is drawn, therefore, that the tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005 have had no significant impact on economic growth in the affected region.

The second research question examines whether tax policy investment incentives at the regional level are a zero-sum game, where economic growth created by incentives come at the expense of the surrounding regions. Research results provided some tentative evidence supporting the zero-sum game theory; however, these results were not significant at the alpha level equal to 0.05. Based on the multiple regression data analysis from all of the models tested for research question 2, statistically significant evidence supporting the zero-sum game theory does not exist. The conclusion is drawn, therefore, that the tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005 have had no significant impact on economic growth in the surrounding region.

Contributions of the Study

This research quantifies the impact of tax policy investment incentives provided by the Gulf Opportunity Act of 2005 on investment behavior in the GO Zone core disaster area. The majority of prior empirical research on tax policy investment incentives was performed using firm-level data or by creating models to determine the effectiveness of tax policy incentives. This research adds to the existing literature concerning the effectiveness of tax policy investment incentives by using real-world county-level economic indicators to test the impact of tax policy investment incentives at the regional level. This research also provides evidence of the impact that regional tax policy investment incentives have on the surrounding areas, helping to determine whether regionally tailored tax incentives have a significant impact on the intended beneficiaries or are simply a zero-sum game that shifts spending from one geographic location to another.

Limitations of the Study

As with all forms of research, some limitations are inherent in archival empirical research. Archival empirical data for the affected region make this study possible but also limit the ability to generalize these results to other regions. In addition, empirical research utilizing real-world data can be prone to internal validity issues that exist due to lack of environmental controls and other possible causal factors. The purpose of this research is to determine whether tax policy investment incentives have an impact on economic growth at the regional level and to determine the impact on surrounding regions. Therefore, explanation and generalization are not the primary factors of this

research study. The time limitation of the study and the temporary nature of the tax policy investment incentives impose additional limitations on any findings. Even though the most current available data were used, these tax policy investment incentives were temporary, and Friedman's permanent income hypothesis indicates that investing patterns may not change with temporary reductions in tax burdens (Meghir 2004). Also, these temporary investment incentives may have shifted capital investment spending forward in time, which would indicate a temporary investment change with no significant long-term impact on economic growth. Future studies covering tax policy investment incentives could help to clarify some of these temporary and time-related limitations.

Organization

The following chapters of this dissertation are organized as follows. Chapter Two includes a literature review of the prior empirical work related to tax incentives and their economic impact. This chapter also includes a history of depreciation-related tax incentives utilized in the United States. Chapter Three provides the research questions and the methodology used to analyze the impact of tax incentives on the economic growth of the GO Zone. Chapter Four explains the results of the dissertation. Chapter Five summarizes the conclusions and limitations of this study.

CHAPTER II

LITERATURE REVIEW

Economists often recommend increasing capital investment spending by reducing the cost of capital through tax incentives such as accelerated depreciation and the investment tax credit. Tax incentives designed to spur investment are a major component of tax policy. According to Coen (1968), tax incentives for investment purposes are thought to stimulate capital expenditures in two ways. First, by reducing the amount of taxes paid on income from assets, or by changing the timing of the tax payments in favor of the future, "tax incentives increase the after-tax rate of return on capital. Second, by reducing tax liabilities, tax incentives increase a firm's cash flow (after-tax profits plus depreciation charges for tax purposes), which is one measure of internal funds available for investment and is thought by some to be an important determinant of investment expenditures" (Coen 1968, 200).

The empirical debate is not centered on whether the cost of capital influences investment – even economists who are skeptical about the wisdom of using tax legislation to stimulate investment agree that the cost of capital affects investment (U.S. Congress 2007, 3). The debate is centered on the relative sensitivity of investment to changes in the cost of capital (U.S. Congress 2007, 3). The conclusions drawn by researchers examining the sensitivity of investment to changes in the cost of capital are affected by the assumptions, the methods of analysis, and the statistical techniques used by the researchers. Therefore, there are sizable bodies of research on both sides concerning the effectiveness of tax policy investment incentives.

Since the early 1950s, Congress has enacted tax policies that provide investment incentives for businesses. Bonus depreciation and/or accelerated depreciation, along with investment tax credits and increased Section 179 expense deduction allowances, have been very popular incentives used by Congress in the past few decades. The vast majority of empirical research concerning the effectiveness of tax-policy incentives has implemented some form of the user-cost-of-capital model developed by Hall and Jorgenson (1967), which maps changes in depreciation rates or tax credits created by tax policy to the user's cost measure of the marginal incentive to invest in new assets. These tax incentives are designed to increase capital spending and promote economic growth. Prior empirical research concerning the impact of these tax policy incentives has provided inconsistent results on the actual effects that these incentives create.

The remainder of this literature review consists of three sections. The first section provides a review of the history of tax policy incentives implemented in the United States for the purpose of increasing capital spending and promoting economic growth. The second section provides a review of the results of prior empirical studies that examine the impact of various tax policy incentives on capital investment decisions. The final section provides a review of the literature that supports the use of the variables and methods selected for this study of tax policy incentives on capital investment decisions.

The History of Tax Investment Incentives

Historically, the primary tax policy incentives used to increase capital investment and spur economic growth have been investment tax credits, various

adjustments to depreciation, and/or increased Section 179 election to expense deductions. According to Diamond and Mirrlees (1971), a tax system should not favor one type of input over another; otherwise, economic inefficiency will result. Current depreciation rules violate this concept by creating economic distortions caused by the difference between true economic depreciation and the depreciation allowance for tax purposes. Depreciation rules introduce a non-optimal tax on capital due to the time-value of money because firms do not receive the full benefit of depreciation in the year of purchase. For example, according to Cohen et al. (2002), depreciation policies create the following inequities: (1) for 7-year tax life assets, each dollar of equipment spending is allowed a deduction worth only 84 cents in present value, (2) for 5-year equipment, the current deduction is worth 88 cents, and (3) for 3-year equipment, the current deduction is worth 94 cents. Since the value of the depreciation deduction is lower than the true expense amount, the cost of investing is higher, which could decrease investment and reduce economic activity. Assuming a 42 percent corporate tax rate (35 percent federal plus 7 percent state and local tax rate), the cost of the new investment under current law relative to expensing is: 11.5 percent higher for 7-year equipment, 8.7 percent higher for 5-year equipment, and 4.3 percent higher for 3-year equipment (Cohen et al. 2002). Based on the numerical evidence alone, tax-policy incentives that reduce the tax on investment activity should almost certainly increase investment spending and spur economic growth.

Since the early 1900s, a depreciation deduction has been part of corporate income tax policy. The modern-day income tax began with the ratification of the 16th Amendment and the passage of the Revenue Act of 1913. The Revenue Act of 1913

permitted “a reasonable allowance for exhaustion, wear and tear of property arising out of its use in business” (Kern 2000, 147).[7] Tax policies concerning depreciation have been changed many times in the past century. According to Kern (2000), the motivations for these frequent changes are attributed to: proper income measurement, raising revenue, encouraging capital formation, or ensuring a neutral tax system.

In the early part of the 20th century, financial managers were allowed to exercise considerable judgment with regard to the amount of depreciation that was expensed on their income statements for financial reporting and on how much depreciation they deducted for income tax purposes. In 1920, the Treasury first issued Bulletin F, leaving the determination of the amount of depreciation to the taxpayer based on judgment and experience, with final approval by the Commissioner (Kern 2000, 148). After 1920, the amounts of depreciation allowances increased dramatically. According to Kern (2000), by 1931, the amount of depreciation deductions claimed exceeded corporate taxable income, prompting the Treasury to issue a revised Bulletin F that attached a preliminary study that gave "probable useful lives" for over 2,700 different kinds of industrial assets. Even with this updated guidance, determining the depreciation deduction amount remained at the discretion of the taxpayer.

In 1934, the Treasury Department issued Treasury Decision 4422, which required taxpayers to furnish a schedule showing their calculations of depreciation expense to substantiate their depreciation deductions and also required taxpayers to allocate the cost of an asset over its useful life using the straight-line or units-of-production method (Kern 2000). Prior to 1934, the burden of demonstrating that a

[7] The corporate excise tax enacted as part of the Corporate Excise Tariff Act of 1909 also allowed a reasonable allowance for the depreciation of property.

taxpayer had misstated income by improperly calculating his depreciation expense fell on the Internal Revenue Service. However, in 1934 this policy was changed and for the first time the burden of proof shifted from the government to the taxpayer.

In 1942, the Treasury Department issued a second revision of Bulletin F (also known as IRS Publication 173) that recommended useful lives for over 5,000 assets used in 57 different industries and activities (IRS 2005). The Treasury's estimates of useful lives, however, were based on the timeframe that covered the Great Depression of the 1930s when businesses tended not to replace their obsolete assets very frequently, which caused the useful-life estimates listed in the revised Bulletin F to generally be longer than an asset's actual useful life (Kern 2000). This disparity between actual and useful-life estimates resulted in tax depreciation deductions being less than what was considered economically justifiable depreciation and this policy continued until 1954 (Kern 2000).

A major shift occurred concerning depreciation tax policy with the enactment of the Internal Revenue Code of 1954. For the first time, Congress, rather than the Treasury, determined allowable methods for calculating the depreciation deduction, and this represented the first time that Congress considered using tax depreciation as an economic incentive for stimulating investment (Kern 2000). The tax law change in 1954 allowed businesses to use any method of depreciation as long as it was both applied consistently and did not exceed twice the straight-line rate of depreciation, which included the double-declining-balance method.

Congress believed that the pre-1954 depreciation system acted as a barrier to investment; Congress, therefore, implemented the double-declining balance method of

depreciation in 1954 hoping to stimulate investment while conforming to sound accounting principles by using realistic estimated useful lives (House of Representatives 1954). Congress also believed that the pre-1954 "tax depreciation methods might depress business capital expenditures below the level needed to keep the economy operating at high levels of output and employment" (House of Representatives 1954, 22). Thus, the 1954 tax policy changes were designed to provide incentives for investment.

In 1958, the Small Business Tax Revision Act of 1958 was passed by Congress, and it provided an additional incentive to stimulate capital investments by allowing small businesses to deduct up to 20 percent of the cost of property in the year of purchase as an immediate expense election, which is similar to the Section 179 deductions allowed today (Congressional Record 1958). By 1962, depreciation procedures grouped assets by industry of use and reduced the write-off periods, which allowed more generous deductions.

In addition to the new depreciation guidelines implemented in 1962, a second tax policy incentive was implemented to stimulate investments. The Revenue Act of 1962 introduced the investment tax credit (ITC) for the first time. This investment tax credit was equal to seven percent of the cost of a qualifying asset in the year of acquisition. Unlike a deduction, a credit is a dollar-for-dollar reduction of a taxpayer's tax liability. Congress also considered the possibility of using more accelerated methods of depreciation in lieu of the investment tax credit; however this idea was discarded because Congress believed that realistic depreciation rules did not provide sufficient incentive to spur economic growth (Kern 2000). Congress believed that the

credit was "preferable to higher depreciation charges because the latter tends to distort income accounting" (Committee on Finance 1962, 12). Apparently, Congress did not wish to deviate drastically from accounting and economic concepts of income in order to stimulate capital investment.

The investment tax credit represented a landmark in terms of tax incentives for investment. President Kennedy advocated enacting the credit to stimulate capital formation, and he believed that higher levels of capital formation would raise productivity, keep people employed, and alleviate a serious balance of payments problem (House of Representatives 1962, 31). Congress echoed his sentiments by stating that the objective of the credit was "to encourage modernization and expansion of the Nation's productive facilities and thereby improve the economic potential of the country, with resultant increase in job opportunities and betterment of our competitive position in the world economy" (Committee on Finance 1962, 11).

In 1966, inflationary pressures caused the temporary suspensions of the investment tax credit and accelerated depreciation allowances.[8] The suspensions were short-lived, as they were lifted by President Johnson in 1967. Inflationary problems reappeared in 1969, and the investment tax credit was repealed by the Reform Act of 1969. Congress believed that the investment tax credit contributed directly to inflationary pressures and caused wide fluctuations in investment; hence, "eliminating the credit would help reduce inflation and help keep the rate of change in investment on a more steady path" (House of Representatives 1969, 178).

[8] H.R. 17607 suspended the credit effective 10/10/66 to 12/31/67. H.R. 6950 lifted the suspension effective 3/10/67.

In the late 1960s and early 1970s, the United States economy was facing slow growth, high inflation, and high unemployment, so Congress took action once again. The Revenue Act of 1971 introduced the Class Life Asset Depreciation Range System (ADR), which replaced the previous depreciation procedures with new guidelines and also reinstated the investment tax credit. The investment tax credit and new depreciation guidelines enacted in 1971 were designed to be "large enough to stimulate the economy and yet not so large that they create a new wave of inflationary pressure" (Committee on Finance 1971, 71). The ADR system provided new guidelines used to define the useful life of an asset. Congress hoped to simplify the administration of depreciation rules with these new guidelines; at the same time, the ADR increased the number of asset classes from 75 to 132 (Committee on Finance 1971).

The United States was facing extremely high levels of unemployment in 1975, leading Congress to introduce the Tax Reduction Act of 1975. The Tax Reduction Act of 1975 provided a temporary increase in the investment tax credit and was designed to restore economic growth and to move toward full employment (Kern 2000).[9] Congress expected the tax revisions to "help revive the economy and increase employment without adding significantly to inflationary pressures" and believed that the increase in the tax credit would create more jobs, increase productivity, reduce inflation, and improve the U.S. balance of payments (House of Representatives 1975, 7). The Tax Reform Act of 1976 extended the temporary increase in the investment tax credit until December 31, 1980, and the Revenue Act of 1978 made the increase in the investment tax credit permanent, effective January 1, 1981 (Kern 2000).

[9] The Tax Reduction Act of 1975 increased the ITC from 7% to 10% for qualified property acquired before January 1, 1977.

The next major shift occurred with the introduction of the Economic Recovery Tax Act of 1981 (ERTA), which introduced the Accelerated Cost Recovery System (ACRS) and modified the investment tax credit. This new ACRS system classified depreciable assets into one of four recovery classes (3-year, 5-year, 10-year, and 15-year)[10] and was drastically different from previous depreciation methods. Historically, Congress had been concerned that depreciation guidelines were in accordance with accounting and economic principles. With ERTA, simplifying tax rules and encouraging investment seemed far more important than conforming to accounting practice for financial reporting (Kern 2000, 157). According to Kern (2000), Congress had multiple reasons for making such drastic changes, including the following: (1) they concluded that prior depreciation and investment tax credit provisions did not provide the investment stimulus that was considered essential for economic expansion; (2) they believed that the prior law was unnecessarily complicated; and (3) they concluded that the real value of depreciation deductions had declined because of inflation. Between 1982 and 1985, the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA), the Deficit Deduction Act of 1984, and the Imputed Interest Act of 1985 all made minor changes to the tax policies developed by ERTA, but nothing of great significance.[11]

The next major tax legislation was the Tax Reform Act of 1986, which included major shifts in depreciation policy and repealed the investment tax credit. The Act modified ACRS, resulting in the creation of the Modified Accelerated Cost Recovery System (MACRS). MACRS lengthened the useful lives of certain assets, expanded the

[10] Typically the majority of assets fell into the 3-year or the 5-year class; the 10-year class and the 15-year class were reserved for a few specialized assets. All depreciable realty had a 15-year recovery period.
[11] TEFRA required a taxpayer to reduce the depreciable basis of property by one-half of the investment tax credit taken on the property. The other Acts lengthened the recovery period for realty and made other small changes.

number of property classes, and added the half-year convention to simplify calculations in the first and last year of a property's recoverable life. MACRS was designed to "provide for more neutral depreciation treatment across diverse assets" (Joint Committee on Taxation 1986, 10). Once again, Congress returned to the thought process that recovery periods should more closely reflect the actual useful lives of depreciable assets (Kern 2000).

Congress passed the Revenue Reconciliation Act of 1993, and this law lengthened the nonresidential realty recovery period from 31.5 to 39 years. With this piece of legislation, Congress had turned full circle toward having depreciation reflect "proper" income measurement with regard to depreciable real property (Kern 2000). Congress felt that depreciation deductions did not match the economic lives of property. In order to measure more accurately the economic income derived from using nonresidential realty, the recovery period was increased to 39 years (House of Representatives 1993, 625-626).

The Job Creation and Worker Assistance Act of 2002 was an economic stimulus bill that was enacted in part due to the terrorist attacks of September 11, 2001. After these tragedies, Congress needed to promote capital investments that would foster business expansion and generate employment opportunities (Committee Report 2003). The Act allowed an additional first-year depreciation deduction equal to 30 percent of the adjusted basis of qualified property, subject to the general rules regarding whether an item is deductible.[12] This additional first-year depreciation deduction is also commonly referred to as "bonus depreciation" or "partial expensing" throughout the

[12] The Act basically allowed 30 percent of investment occurring during a three-year period following September 11, 2001 to be expensed and written off immediately, instead of following normal depreciation guidelines.

literature. In order for property to qualify for the additional first-year depreciation deduction it must meet all of the following requirements: first, the property must be property to which the general rules of MACRS apply with (1) an applicable recovery period of 20 years or less, (2) water utility property (as defined in Section 168(e)(5)), (3) computer software other than computer software covered by Section 197, or (4) qualified leasehold improvement property; and second, the original use of the property must commence with the taxpayer on or after September 11, 2001 (Joint Committee on Taxation 2002, 3). This bonus depreciation incentive was the first major change in investment tax policy since the Tax Reform Act of 1986.

The Growth Tax Relief Reconciliation Act of 2003 provided additional tax investment incentives for businesses to spur economic growth. The Act increased the first-year depreciation deduction enacted by the Job Creation and Worker Assistance Act of 2002 from 30 percent to 50 percent on qualified property. In order to qualify for the additional depreciation deduction, the property had to be acquired after May 5, 2003, and before January 1, 2005. The Act also increased the Section 179 expense deduction allowance through January 1, 2005, basically doubling the base amount of $100,000 for qualifying property. In 2005, Congress passed the Gulf Opportunity Zone Act of 2005 that extended these accelerated bonus depreciation deductions and Section 179 deduction incentives, in addition to other tax credits, for certain regions of the United States devastated by hurricanes.[13] The economic impact these tax investment incentives had on the affected regions is the focus of this research.

[13] The tax investment incentives provided by the GO Zone Act are discussed in detail in Chapter 1 of this dissertation.

The Economic Stimulus Act of 2008 was signed into law during February 2008, with the intended purpose of mitigating the economic recession. The Act provided recovery rebates for individuals and tax incentives for business investment. It contained two primary business investment incentives, an increased Section 179 expense deduction, and a bonus depreciation incentive. The maximum Section 179 expense deduction was increased to $250,000, and the phaseout threshold for the deduction was increased to $800,000 for tax years beginning during 2008. Also, an additional first-year depreciation deduction equal to 50 percent of adjusted basis was allowed for qualifying property placed in service after December 31, 2007, and before January 1, 2009 (Jones 2008).

In early 2009, Congress passed the American Recovery and Reinvestment Act of 2009, as a direct response to the economic crisis then facing the United States; it was intended to spur economic activity and investment in long-term growth. According to Section 3 of the Act, this legislation was meant to accomplish the following: (1) preserve and create jobs and promote economic recovery, (2) assist those most impacted by the recession, (3) provide investments needed to increase economic efficiency by spurring technological advances in science and health, (4) increase investment in transportation, environmental protection, and other infrastructure that will provide long-term economic benefits, and (5) stabilize State and local government budgets, in order to minimize and avoid reductions in essential services and counterproductive state and local tax increases (House of Representatives 2009). The Act extends by one year the 50 percent bonus depreciation deduction available for qualified property and the increased Section 179 expense amount enacted by the Economic Stimulus Act of 2008.

The following table summarizes the tax investment incentives covered in this literature review.

Table 2.1 – The History of Tax Investment Incentives

Legislation/Action	Change	Rationale
Corporate Excise Tariff Act of 1909	Depreciation first appeared.	Provide a reasonable allowance for the depreciation of property.
Revenue Act of 1913	Depreciation first appeared as part of the income tax.	Permit a reasonable allowance for exhaustion, wear and tear of property arising out of its use in business.
Treasury first issued Bulletin F (1920)	Determination of depreciation left up to the taxpayer.	To provide guidance.
Revised Bulletin F (1931)	Provided "probable useful lives" for over 2,700 different kinds of industrial assets.	To provide guidance.
Treasury Decision 4422 (1934)	Required taxpayers to furnish a schedule showing their calculations of depreciation expense deduction.	To provide guidance.
Revised Bulletin F (1942) (aka IRS Publication173)	Treasury Department recommended useful lives for over 5,000 assets used in 57 different industries.	To provide guidance.
Internal Revenue Code of 1954	Allowed businesses to use any method of depreciation as long as it was both consistently applied and did not exceed twice the straight-line rate of depreciation.	Economic incentive for stimulating investment.
Small Business Tax Revision Act of 1958	Immediate expense election first introduced (similar to Section 179 expense deduction).	Provide assistance for small businesses.

Table 2.1 – Continued

Revenue Act of 1962	Introduction of the first investment tax credit (7%).	Stimulate capital formation and raise productivity.
H.R. 17607 (1966)	Suspend investment tax credit.	To reduce inflationary pressures.
H.R. 6950 (1967)	Suspension lifted.	To stimulate growth.
Reform Act of 1969	Repealed investment tax credit.	To reduce inflationary pressures.
Revenue Act of 1971	Introduced the Class Life Asset Depreciation Range System (ADR) and reinstated the investment tax credit.	To stimulate the economy.
Tax Reduction Act of 1975	Provided a temporary increase in the investment tax credit (7% to 10%).	Restore economic growth.
Tax Reform Act of 1976	Extended temporary increase through 1980.	To stimulate growth.
Revenue Act of 1978	Made investment tax credit increase permanent.	To stimulate growth.
Economic Recovery Tax Act of 1981	Introduced the Accelerated Cost Recovery System (ACRS) and modified the investment tax credit.	To stimulate growth and simplify depreciation guidelines.
Tax Equity and Fiscal Responsibility Act of 1982	Reduced depreciable basis if full investment credit taken.	To scale back 1981 provisions.
Deficit Deduction Act of 1984	Extended real property lives from 15 to 18 years.	To reduce deficit.
Imputed Interest Act of 1985	Extended real property lives from 18 to 19 years.	To reduce deficit.
Tax Reform Act of 1986	Repealed the invesment tax credit. Introduced the Modified Accelerated Cost Recovery System (MACRS).	To provide for more neutral treatment across diverse assets.

Table 2.1 – Continued

Revenue Reconciliation Act of 1993	Extended the nonresidential realty recovery period from 31.5 to 39 years.	To measure more accurately economic income from such property.
Job Creation and Worker Assistance Act of 2002	Additional first-year depreciation deduction equal to 30 percent of the adjusted basis of qualified property.	To promote capital investments and generate employment opportunities.
Growth Tax Relief Reconciliation Act of 2003	Increased the first-year depreciation deduction from 30 percent to 50 percent on qualified property and increased the Section 179 expense deduction.	To stimulate growth.
Gulf Opportunity Zone Act of 2005	Extended 50 percent bonus depreciation and increased Section 179 expense deduction. Also provided numerous investment credits.	To promote capital investments, generate employment opportunities, and to spur economic growth in hurricane affected areas.
Economic Stimulus Act of 2008	Additional first-year depreciation deduction equal to 50 percent of the adjusted basis of qualified property and increased Section 179 expense deduction.	To promote capital investments and economic growth.
American Recovery and Reinvestment Act of 2009	Extended provisions of Economic Stimulus Act of 2008.	To spur economic activity and invest in long-term growth.

Empirical Studies of the Impact of Tax Policy Incentives on Capital Investments

In 1962, E.C. Brown wrote an article discussing the investment process and the impact that fiscal policy could potentially have on it. Brown (1962) discusses the modified depreciation adjustments of 1954, and the potential impact of the tax credit recommended by the Kennedy Administration, a tax credit intended to stimulate investment in plant and equipment. Brown discusses the differences between

depreciation adjustments and tax credits and analyzes the potential impacts these tax incentives could have on investment behavior. Brown (1962) concludes that investment-stimulating devices, such as depreciation adjustments and investment tax credits, are a fascinating chapter in fiscal policy and deserve detailed study. Brown urges research in this area and he states, "If economists are to be useful to those designing policy, it behooves us to press on with our study of investment decisions to give them breadth and depth comparable to our knowledge of consumer behavior" (Brown 1962, 344).

Prior to the 1967 article, "Tax Policy and Investment Behavior" by Hall and Jorgenson, very little, if any, empirical research concerning the impact of tax policy incentives had been performed. The purpose of their research was to study the relationship between tax policy and investment expenditures using the neoclassical theory of optimal capital accumulation (Hall and Jorgenson 1967). Hall and Jorgenson examined the effects of accelerated depreciation methods adopted in 1954 and the investment tax credit of 1962. They also investigated the depreciation guidelines of 1962 and considered the hypothetical effects of adoption of first-year write-off in 1954 as an alternative to accelerated depreciation.

Hall and Jorgenson (1967) used data on investment expenditures for structures and equipment separately, for both manufacturing and non-farm, non-manufacturing sectors of the U.S. economy for the years 1929-63. Based on their research findings, Hall and Jorgenson (1967) concluded that the effects of accelerated depreciation were very substantial, especially for investment in structures, and that the depreciation guidelines of 1954 were significant with respect to investments in equipment. Hall and

Jorgenson (1967) also concluded that the effects of the investment tax credit of 1962 were dramatic and left no doubt about the impact of tax policy on determining investment behavior. Their overall conclusions were "that tax policy is highly effective in changing the level and timing of investment expenditures" and "that tax policy has had important effects on the composition of investment" (Hall and Jorgenson 1967, 392).

Jorgenson and Siebert (1968) extended the prior research by studying the theory of corporate investment behavior based on the neoclassical theory of optimal capital accumulation in more detail. The neoclassical theory of corporate investment behavior assigns an important role to the cost of capital and also considers the rate of change of the price investment goods. Changes in this price result in capital gains and losses that must be included in the calculation of economic profit or loss; holding all else constant, a high rate of change of prices of investment goods should provide an incentive to use more capital, while a low rate of change should serve as a disincentive (Jorgenson and Siebert 1968). The price of capital depends on the cost of capital, the price of investment goods, the rate of change in the price of investment goods, and the tax structure (Jorgenson and Siebert 1968, 1130). Under this theory, the firm chooses a production plan that will maximize its value. Jorgenson and Siebert (1968) evaluated the effects of inflation on the level of investment, along with other determinants, including the cost of capital, the level of prices on investment goods, and the tax structure.

Jorgenson and Siebert (1968) attempted to avoid biases that could arise from inappropriate homogeneity assumptions by analyzing the data using both time series

and cross-sectional models.[14] Jorgenson and Siebert (1968) developed two alternative versions of the neoclassical model of investment. In the first model, the rate of change of the price of investment goods is assumed to influence investment decisions directly. The second model assumes that the rate of change of the price of investment goods is transitory and without direct effect on investment behavior. These two models were used to evaluate investment behavior for 15 large manufacturing firms from a wide variety of industry groups. Jorgenson and Siebert (1968) concluded that inflation does have an impact on investment and should be taken into account when performing research, but they also supported previous research and concluded that the theory of corporate investment behavior based on the neoclassical theory of optimal capital accumulation does suffice to explain corporate investment behavior.

Coen (1968) performed research based on the accelerated depreciation incentives implemented in 1954, the investment tax credit of 1962, and the tax rate reductions provided by the Revenue Act of 1964. This research utilized two models to investigate the influence of tax incentives on investments. These models provided results that contradicted the earlier findings of Hall and Jorgenson. According to the model developed by Coen, a reduction in the user cost of capital will produce a one-shot increase in the desired stock of capital (Coen 1968, 209). Policies that produced an estimated $5.1 billion in tax savings in manufacturing from 1954 through mid-1962 increased manufacturing capital expenditures by only $2.0 billion during the same period, and policies that produced an estimated $8.6 billion in tax savings from mid-1962 through the third quarter of 1966 increased expenditures by only $2.8 billion

[14] Prior research (Kuh 1963) had shown that cross sections for successive years did not provide a stable explanation of investment behavior.

(Coen 1968, 210). Coen (1968) concluded that the performance of the tax incentives has been disappointing but does admit that a decisive judgment on the effectiveness of tax incentives is impossible unless one is willing to accept the merits of his two investment models.

Taubman and Wales (1969) studied the impact of investment tax subsidies in a neoclassical growth model, in particular the 1962 tax credit and the switch from straight-line depreciation to accelerated depreciation. This study developed a new model but does incorporate the research methods used by Jorgenson and by Coen. Taubman and Wales (1969) concluded that although output is higher after 1962 than would have occurred with no tax incentives, the overall impact of these tax incentives falls short of their intended results.

A study by Chisholm (1974) examines the effects of tax policy investment incentives on the optimal replacement decisions for farm machinery. This study develops a discrete time period model for evaluating the impact of tax incentives on investments and then applies the model to a case study on the optimal replacement ages for farm tractors in Australia. Results indicated that the removal tax policy investment incentives did substantially increase the optimal replacement age for farm machinery, providing evidence that tax policy does influence investment behavior.[15]

Coen (1975) attempted to examine the economic impact of depreciation using a new approach: an indirect method that attempted to infer patterns of economic depreciation from the behavior of actual capital expenditures in 21 manufacturing industries. Results showed that accelerated depreciation methods increased the present

[15] Chisholm (1974) did note that results indicated that changes in the time pattern of the tax-deductibility of depreciation will in general have only minimal influence on optimal replacement decisions.

values of tax depreciation relative to economic depreciation by about ten percentage points. In general, Coen's findings indicated that tax depreciation incentives do have a positive impact on investment behavior.

Brimmer and Sinai (1976) used simulations based on the 1975 Data Resources, Inc. (DRI) quarterly econometric model of the United States to study the effects of several tax proposals, including increasing the investment tax credit and instituting an inflation allowance for depreciation. Each tax subsidy tested in their research raised business fixed investment, the stock of plant and equipment, and the production capacity of the economy as measured by potential gross national product (GNP). Results also indicated that depreciation investment incentives were superior relative to the investment tax credit. Brimmer and Sinai (1976) concluded that tax reform would bring a significant improvement in capital formation and business liquidity, but tax incentives were not necessarily the most effective strategy for accomplishing these tasks. Brimmer and Sinai (1976) believed "A more effective strategy could be the pursuit of macro-economic policies designed to raise aggregate demand and reduce the excessively high level of unemployment" (307).

Parker and Zieha (1976) studied the impact of the temporary increase of the investment tax credit introduced by the Tax Reduction Act of 1975. They developed a measurement model to determine the extent to which the Act compensated for the recent changes in the rate of inflation experienced in the United States. Their purpose was to measure the overall incentive toward capital investment provided by these tax provisions under various rates of inflation. Parker and Zieha (1976) applied their measurement model to 572 cases representing various combinations of investment

credit rates, asset lives, and rates of inflation. Results indicated that increasing the rate of investment credit from seven percent to ten percent was not sufficient to offset the penalty resulting from tax accounting on an historical cost basis, given recent inflation experience in the United States. However, the results also indicated a sizeable difference in the benefits yielded depending on an asset's useful economic life.

Rennie (1977) examined how the cost of capital influenced investment expenditures in privately owned class A and B electric utilities.[16] This study adopted the neoclassical theory of optimal capital accumulation developed by Hall and Jorgenson and researched the impact of the 1954 accelerated depreciation allowances, the investment tax credit of 1962, and the subsequent suspension, re-instatement, and repeal of the investment tax credit in 1966, 1967, and 1969 respectively.[17] His research found that accelerated depreciation from 1954 resulted in a reduction of the cost of capital of 7.67 percent, causing a 22.4 percent increase in production plant expenditures from 1957 through 1969. Rennie (1977) also determined that the 1962 investment tax credit reduced the rental cost of capital by 2.57 percent and increased the capital stock by 12.72 percent from 1965 through 1969. This study found that the suspension of the investment tax credit in 1966 resulted in decreases of capital stock, the 1967 re-instatement resulted in subsequent increases, and the repeal of 1969 resulted in decreased amounts. Based on his research findings, Rennie (1977) concluded that tax-policy incentives did indeed affect the amount and timing of fixed investments in the private class A and B electric utility industry.

[16] Privately owned class A and B electric utilities produced 76.4 percent of all electricity sold in the United States during 1969 (Rennie 1977).

[17] Rennie's study also includes analysis of other tax policy issues during this period not related to this study. The analysis of these issues has not been incorporated in this review.

Coen and Hickman (1984) studied the long-run effects of tax-policy incentives based on simulations using the Hickman-Coen Annual Growth Model. This model was designed to study U.S. economic growth for intermediate and long-run time periods, and analyze business investment, among other items. This study considered four separate scenarios involving changes in tax policies. Coen and Hickman (1984) concluded that changes in personal income taxation do not have permanent effects on economic activity, but that the outcome is strikingly different for a tax-policy incentive directly affecting business investment. Their results indicated that depreciation liberalization under the 1981 tax act raised the level of long-term growth by over one percent and that these tax-policy incentives also foster a permanently higher level of productivity.

Bosworth (1985) investigated the impact of the tax policy changes that occurred in 1981 and 1982 on investment expansion in the early 1980s. Overall, investment spending increased during the sample period. The increases, however, were not correlated with the asset categories receiving the largest tax incentives. Results showed no correlation between the investment growth in certain asset categories and the relative tax incentives for each category. Bosworth (1985) noted that office equipment and automobiles accounted for almost 93 percent of the growth in this study, but the legislation of 1981 and 1982 provided no changes or incentives for automobiles, and they actually decreased the rates on computers. Results indicated that depreciation allowances can greatly increase cash flow in the short run, but have a smaller effect on the price of an asset over its lifetime. Bosworth (1985, 34) stated that his results "need not imply that the neoclassical model of investment behavior is wrong in its focus on

changes in the price of capital". Overall, Bosworth (1985) believed that the tax system has become so complex that tax policy incentives intended to promote certain activities may result in far different outcomes in practice.

Chirinko (1986) examined the relationship between tax policy and business investment using four different classes of investment models included in previous research. Chirinko reviews the theory, key assumptions, and empirical results generated by these four classes of investment models. He stated that prior research has shown a significant relationship between tax policy and investment behavior, but he believed these results to be based on assumptions that arguably led to upward biases. Chirinko (1986) concluded that investment behavior may respond to tax policy incentives, but that significant supporting empirical evidence has yet to be generated.

Shapiro (1986) studied the impact of the cost of capital within the framework of the neoclassical theory of investment. This study uses U.S. private business firm-level data for the period 1955 to 1983. Shapiro (1986) concluded that investment and the cost of capital are either uncorrelated or only weakly correlated, but that investment and output are strongly correlated. His observation that investment and output are strongly correlated while the cost of capital has little correlation with investment weighs against the neoclassical model. Other researchers in this area, however, have noted that correlation is not causation, and that weak correlation does not imply that changes in taxation have no effect on investment. Olivier Blanchard commented that the weak correlation could have stemmed from "omitted variable bias" between user cost and an omitted productivity variable that makes the correlation appear insignificant (Shapiro

1986, 155). Blanchard also explained how the small correlation could result from other factors, such as the small variance in user cost.

Halvorsen (1991) researched the effects of tax policy on investment in agriculture. This study uses aggregated annual time-series data covering 1955 through 1978. The effects of tax policy on agricultural investment during the sample period are investigated by simulating demand equations for equipment and structures using actual rental prices as well as the rental prices that would have existed under three alternative tax policy scenarios (Halvorsen 1991). Halvorsen (1991) concluded that tax policy incentives over the sample period did increase agricultural spending on equipment and structures, giving support to the impact of tax incentives.

Auerbach and Hassett (1992) derived and estimated models of investment behavior and studied how tax policy investment incentives impacted this behavior. Their estimates suggested that tax policy incentives that lower the user cost of capital have played an important role in investment behavior, particularly for investment in machinery and equipment. Auerbach and Hassett (1992) concluded that tax policy changes affect the level and pattern of investment significantly, although their impact has not always been a stabilizing factor. They believed that further work was needed to explore the various impacts that tax policies could have on investment behavior before any definitive conclusions could be drawn.

Cummins and Hassett (1992) analyzed disaggregated firm-level investments impacted by the Tax Reform Act of 1986. The Tax Reform Act of 1986 repealed the investment tax credit and generally extended depreciation lifetimes, both of which could potentially impact capital investments. Cummins and Hassett (1992) found strong

evidence of the impact of tax policy on investment and concluded that there is a significant relationship between the cost of capital and equipment investment. They also concluded that there was a strong relationship between the cost of capital and structures investment.

Davis and Swenson (1993) studied the impact of tax incentives on the demand for capital investments by developing controlled laboratory markets. Prior research, such as Chirinko (1986), had noted the difficulties in this area of econometric research caused by the numerous estimations needed, including (1) purchase cost of a unit of capital, (2) financial cost of capital, net of inflation, (3) rate of depreciation, (4) rate of income taxation, (5) rate of investment credit, (6) net cost of debt finance, and numerous other estimations. According to Davis and Swanson (1993), the difficulties in calculating proper estimates for these variables highlight the general limitations of econometrics in certain settings. They chose, therefore, to create a laboratory model to eliminate these restrictions. The results of their experiments did not support the neoclassical prediction that depreciable asset investment will increase in response to tax policy incentives, such as accelerated depreciation or investment tax credits.[18] The experimental results indicated that the demand for investment was unresponsive to tax incentives because equipment suppliers captured the tax benefits for themselves by increasing the prices of the depreciable assets.

Clark (1993) examined the effects of tax incentives on aggregate investment behavior and focused exclusively on investment in durable equipment. Clark believed that the long-run attitude of investors would be better served by a stable policy, rather

[18] Davis and Swenson (1993) note that their results provide no evidence regarding real-world dollar responses to investment, but provide insight into the theory of investment behavior nevertheless.

than by ever changing tax-policy incentives. Clarke (1993) concluded that the investment tax credit was not appropriate for short-run fine tuning of fiscal policy. Clark's evidence indicated that changes in the investment tax credit had only minimal and delayed effects on equipment investment and that an investment tax credit is unlikely to have socially beneficial effects.

A study by Wasylenko (1997) analyzed the state of the literature concerning the role of taxation on economic development. Wasylenko (1997) noted that policymakers believed that tax incentives influenced economic behavior, and historical evidence had shown that government tax policy often included incentives intended to foster growth. However, researchers have struggled over the past 20 years to determine the extent to which tax policy incentives influence the level and distribution of employment and investment, particularly in state and local regions. The majority of studies relating economic development to tax policy can be said to use ad hoc empirical specifications, so, at best, these studies demonstrated statistical association rather than showing the true nature of the relationship between tax policy and economic development (Wasylenko 1997). Wasylenko (1997) believed that the results from previous research in this area were driven by variations in the data, changing time periods, as well as other factors. Wasylenko (1997) concluded the results were not very reliable and changed depending on the variables included in the model and/or the time period analyzed.

Goolsbee (1998) examined the estimated response of real investment to changes in the cost of capital created by tax policy incentives. His findings indicated that much of the benefit of investment tax incentives does not go to investing firms but rather to capital suppliers. According to Goolsbee (1998), a ten percent investment tax credit

increases equipment prices 3.5-7.0 percent, so a large part of the subsidy's reduction in the effective purchase price of equipment for investing firms is simply lost to the capital suppliers. Goolsbee (1998) stated, "Only about 60 percent of investment subsidies go to the buyers, with the remaining 40 percent going to capital suppliers" (138). Overall, results indicated that investment spending was responsive to investment tax policy, but in the short run, the increased demand for investment mainly increased capital goods prices rather than quantities. Goolsbee (1998) claimed these results indicated that investment tax subsidies might provide largely unintended benefits for capital suppliers.

A study by Hassett and Hubbard (1998) examined whether investment tax incentives were blunted by changes in prices of capital goods. This study explored this topic by estimating the extent to which industrialized countries are price takers in the world market for capital goods. Results from the study indicated that most countries, including the United States, face a highly elastic supply of capital goods, suggesting that the effect of investment incentives on the price of investment goods is small. Therefore, tax policy investment incentives were likely to result in real investment rather than simply being dissipated in changes in capital-goods prices.

A later study by Goolsbee (2000) examined the potential bias arising from measurement error in the cost of capital and the impact this bias could create when studying the impact of investment incentives. Using panel data on different types of capital equipment and the econometric methods of Griliches and Hausman (1986), Goolsbee (2000) tested for the presence of measurement error in the tax term and calculated the implied size of such an error, and he examined how important the measurement error is for conventional estimates of investment. Findings provided

direct evidence of measurement error in the tax component of the cost of capital accounting for about 20 percent of the tax term's variance. After correcting for the error, Goolsbee (2000) concluded that taxes significantly affect both prices and investment and that conventional results may be off by as much as a factor of four.

Cohen et al. (2002) examined the effects of the bonus depreciation incentives provided in the Job Creation and Worker Assistance Act of 2002. This study utilized the results derived from prior research, such as Hall and Jorgenson (1967) and Auerbach and Hassett (1992), to evaluate the impact of the law on the marginal cost of equipment investment and whether the temporary nature of the incentive increased or decreased the stimulus associated with the tax reduction. Results indicated these tax-policy provisions significantly increase the incentive to invest in equipment.[19] Cohen et al. (2002) also found that the temporary nature of the incentives provided more immediate stimulus than a permanent tax cut would have for base case parameters, but they stated that this conclusion was not theoretically robust.

A study by Desai and Goolsbee (2004) examined the related issues of capital overhang and taxes using data at the industry, the asset, and especially the firm level. More specifically, they studied whether over-investment in the 1990s caused the low investment of the 2000s and whether investment spending in the 2000s became less sensitive to prices. They hoped to determine why the tax-policy incentives provided in 2002 and 2003 seemed to have been ineffective in restoring investment to normal levels. Desai and Goolsbee (2004) found little correlation between the investment boom of the 1990s and the investment declines of the 2000s, and they found evidence of

[19] Cohen et al. modeled these tax incentives as a complete surprise, but noted that many firms may well have anticipated them in advance, which would have likely restrained investment prior to enactment.

small investment increases in various industries.[20] Desai and Goolsbee (2004) concluded that these minimal increases were not evidence that tax-policy incentives were ineffective. Rather, the short-run effect of the incentives was simply too small to counteract the double-digit declines that occurred in the 2000s.

Goolsbee (2004) studied the impact that tax policy investment incentives can have on the quality composition of capital goods that firms purchase. Detailed data on farming, mining, and construction machinery suggested that this impact is economically important. Goolsbee (2004) concluded that increased capital investment spending generated by tax policy investment incentives appeared to be driven by firms shifting to higher quality capital goods rather than buying larger numbers of existing capital vintages, allowing suppliers to reap some of the gain through higher prices from tax benefits intended to increase output. Goolsbee (2004) even goes as far as stating that "all" of the increase in investment from tax subsidies comes from an upgrade to higher quality purchases and not from quantity increases (521). In addition, Goolsbee (2004) believed that this quality response was specifically tied to tax policy because increases in investments for other purposes did not generate the same effect.

A study by Miller et al. (2008) researched the impact of the bonus depreciation incentives of 2002 and 2003 on capital expenditures in the general aviation market, which includes all aviation other than commercial and military aircraft. This study attempted to quantify the impact of bonus depreciation incentives on the manufacture and delivery of general aviation aircraft in the United States. This research was

[20] In the comments section of this paper reviewer Kevin Hassett states, "the authors have favored some extreme assumptions that are not supported by their empirical work, all aligned in a manner to make the tax cuts seem ineffective. A more balanced assessment of the recent impact of the tax reforms would certainly be more favorable" (Desai and Goolsbee 2004, 339).

performed using sample data from the general aviation industry, provided by GAMA (an international trade association representing 56 of the world's leading aircraft manufacturers), covering 1987 through 2005. Results from Miller et al. (2008) revealed that bonus depreciation incentives did not have a statistically significant impact on the shipment of general aviation aircraft in the United States. The results, however, indicated that the bonus depreciation incentives contributed to a significant shift in the sales mix of general aviation aircraft manufactured from piston to turbine aircraft. Basically, the bonus depreciation incentives did not significantly increase the number of aircraft purchased, but the incentives did cause investors to purchase more expensive, higher quality aircraft.

House and Shapiro (2008) studied the effects of temporary investment tax incentives using a model to determine the impact of investment subsidies, specifically examining the bonus depreciation allowances included in the 2002 and 2003 tax bills. This study used quarterly data from the Bureau of Economic Analysis (BEA) covering 1959 through 2006. House and Shapiro (2008) found that temporary investment tax incentives did alter the timing of investment decisions, and they concluded that bonus depreciation incentives passed in 2002 and then increased in 2003 had a powerful impact on the composition of investment. Capital that benefited substantially from the tax policy saw sharp increases in investment, with no evidence that market prices increased due to the policy. The general results held for only the specific circumstance of a sufficiently temporary change in the cost of purchasing capital goods; however calculations showed that even changes in tax policy that last for several years can be safely modeled as temporary.

Hulse and Livingstone (2010) examined the effect on capital expenditures of bonus depreciation tax incentives that were enacted as part of the 2002 and 2003 Tax Acts. This study used quarterly firm-level data covering 1990 through 2006. After controlling for many previously documented determinants of capital expenditures, results indicated that capital expenditures during bonus depreciation's availability were greater than those during the time it was not available. However, Hulse and Livingstone (2010) noted that other results indicated that bonus depreciation had an insignificant effect on capital expenditures, and these mixed findings persisted through several sensitivity analyses. Overall, Hulse and Livingstone (2010) interpreted their results as weakly supportive evidence that Congress attained its goal of stimulating capital spending.

Conclusion

The research studies covered in this literature review analyzed the impact of tax policy incentives on capital spending utilizing various techniques. The majority of prior empirical studies in this area has been based on firm-level data and tested using some form of econometric model or regression equation. However, there have been a few studies that used other methods, such as controlled laboratory experiments and case studies. The overall results, while still inconclusive, tend to show that tax policy incentives do have a positive impact on capital spending and economic growth. Tax policymakers continue to use investment incentives to spur capital spending and foster economic growth, regardless of the lack of conclusive evidence about their

effectiveness. The following table summarizes the empirical research findings covered in this literature review.

Table 2.2 – Prior Studies on the Impact of Tax Policy on Capital Investments

Study	Conclusion
Hall and Jorgenson 1967	Tax policy is highly effective in changing the level and timing of investment expenditures and tax policy has had important effects on the composition of investment expenditures.
Jorgenson and Siebert 1968	Inflation does have an impact on investment and should be taken into account when performing research, but also concluded that the theory of corporate investment behavior based on the neoclassical theory of optimal capital accumulation does suffice to explain corporate investment behavior.
Coen 1968	Tax policy incentives had been disappointing and resulted in only minimal increases in investment of capital expenditures.
Taubman and Wales 1969	Tax policy incentive output is higher in the new state than would have occurred with no tax incentives, however the overall impact of these tax incentives falls short of their intended results.
Chisholm 1974	Tax policy incentives did substantially change the optimal replacement age for farm machinery, providing evidence that tax policy does influence investment behavior.
Coen 1975	Accelerated depreciation methods increased the present values of tax depreciation relative to economic depreciation by about ten percentage points, indicating that tax depreciation incentives do have an impact on investment behavior.
Brimmer and Sinai 1976	Tax reform would bring a significant improvement in capital formation and business liquidity; however tax incentives are not necessarily the most effective strategy to use to accomplish these tasks.
Parker and Zieha 1976	Increasing the rate of investment credit from 7 percent to 10 percent was not sufficient to offset the penalty resulting from tax accounting on the historical cost basis, given recent inflation experience in the United States.

Table 2.2 – Continued

Rennie 1977	Tax policy incentives did indeed affect the amount and timing of fixed investments in the private class A and B electric utility industry.
Coen and Hickman 1984	Depreciation liberalization under the 1981 tax act raised the level of long-term growth by over one percent and these tax policy incentives foster a higher growth rate and a permanently higher level of productivity.
Bosworth 1985	The tax system has become so complex that tax policy incentives intended to promote certain activities may result in far different outcomes in practice.
Chirinko 1986	Investment behavior may respond to tax policy incentives, but significant supporting empirical evidence has yet to be generated.
Shapiro 1986	Investment and the cost of capital are either uncorrelated or only weakly correlated, but investment and output are strongly correlated.
Halvorsen 1991	Tax policy incentives over the sample period did increase agricultural spending on equipment and structures, giving support to the impact of tax incentives.
Auerbach and Hassett 1992	Tax policy changes have played a significant role in affecting the level and pattern of investment, although this impact on investments has not always been a stabilizing factor.
Cummins and Hassett 1992	Tax policy has a strong impact on investment and there is a significant relationship between the cost of capital and equipment investment; also that there is a strong relationship between the cost of capital and structures investment.
Davis and Swenson 1993	Tax policy incentives are not effective; their results indicated that demand for investment was unresponsive to tax incentives because equipment suppliers captured the tax benefits for themselves by increasing the prices for the depreciable assets.
Clark 1993	Changes in the investment tax credit have had only minimal and delayed effects on equipment investment and an investment tax credit is unlikely to have socially beneficial effects.

Table 2.2 – Continued

Wasylenko 1997	Prior studies in this area demonstrated statistical association rather than showing the true nature of the relationship between tax policy and economic development and that the results from previous research studies were not very reliable and were driven by variations in the data, changing time periods, and other factors.
Goolsbee 1998	Investment spending is responsive to investment tax policy, but in the short run the increased demand for investment mainly increases capital goods prices rather than quantities.
Hassett and Hubbard 1998	Tax policy investment incentives are likely to result in real investment rather than simply being dissipated in changes in capital-goods prices.
Goolsbee 2000	After correcting for the measurement error in cost of capital, tax policies significantly affect both prices and investment.
Cohen et al. 2002	Tax policy provisions significantly increase the incentive to invest in equipment and the temporary nature of the incentives provided more immediate stimulus than a permanent tax cut.
Desai and Goolsbee 2004	Tax policy incentives created small investment increases in various industries, however the short-run effect of the incentives was simply too small to counteract the double-digit declines that occurred in the 2000s
Goolsbee 2004	Increased capital investment spending generated by tax policy investment incentives appeared to be driven by firms shifting to higher quality capital goods rather than buying a larger number of their existing capital types.
Miller et al. 2008	Bonus depreciation incentives did not have a statistically significant impact on the shipment of general aviation aircraft in the United States; however, the results indicated that the bonus depreciation incentives did contribute to a significant shift in the sales mix of general aviation aircraft from piston to turbine aircraft.
House and Shapiro 2008	Temporary investment tax incentives do alter the timing of investment decisions and bonus depreciation incentives passed in 2002 and then increased in 2003 had a powerful impact on the composition of investment.

Table 2.2 – Continued

Hulse and Livingstone 2010	Capital expenditures during bonus depreciation's availability were greater than those during the time it was not available. Results are considered weakly supportive evidence that Congress attained its goal of stimulating capital spending.

Significant Variables in the Tax Incentive and Capital Investment Relationship

The literature concerning the effectiveness of tax investment incentives is extensive, and the majority of empirical research performed on the topic has been based at the industry level, the firm level, or the asset level. In general, counties are the smallest geographical regions for which significant amounts of data are available, and to date very little, if any, empirical research has been performed on the effectiveness of tax investment incentives using real-world economic data at the county level. The Gulf Opportunity Zone Act of 2005 provides an opportunity to research the effectiveness of tax policy incentives on capital investment and economic growth at a more micro level. The research studies in the following paragraphs examined economic growth and/or capital investments and were based at the regional or county level. These research studies will provide the foundation for selecting variables at the county level used to measure economic growth in this dissertation.

A study by Chang (1979) used the closing of Brookley Air Force Base in Mobile, Alabama, as a unique opportunity for testing the feasibility of developing a small area econometric forecasting model. The econometric forecasting model developed by Chang (1979) was a simultaneous equation system that included numerous variables, such as: lagged manufacturing investment, output by the

manufacturing sector, output by the construction sector, employment, population, wage income, personal income, retail sales, and a time variable, just to name a few.[21] Chang extracted many of the variables used in his research from the Bureau of Economic Analysis' Regional Economic Information System (REIS). The econometric forecasting model developed by Chang proved to be quite accurate in predicting local variables such as population, total employment, and personal income. The forecasting model developed by Chang became the basis for long-run revenue and growth forecasting and other financial plans for the City of Mobile.

Carlino and Mills (1987) explored the determinants of population and employment densities by analyzing data from the 1970s, using numerous variables, covering more than 3,000 counties across the United States. This study analyzed the change in total population density, total employment density, and manufacturing employment density, along with other variables, including taxes per capita, median family income, median education levels, and interstate highway density to determine factors contributing to economic growth. Carlino and Mills (1987) mentioned that they would have liked to include variables concerning local amenities, such as natural and recreational resources, but the data were not available at the county level.

According to Wasylenko (1997), the most common measures of economic development and growth are income, employment, investment, plant expansions, plant relocations and plant "births". He noted that studies done before 1980 generally used aggregate employment or employment growth data and analyzed a single period of cross-sectional observations, showing the importance that policymakers attach to jobs and job growth in their states or local regions. Income levels, income growth, and

[21] A complete list of variables used by Chang (1979) is available on page 439 of his research paper.

investment measures have been used less frequently in studies of state and local economic development, but personal income is not necessarily a good measure of economic activity at the local level because this information can include income from other sources produced outside the region (Wasylenko 1997). Wasylenko believed that wage or salary data could be used as a measure of location-specific economic activity, and he also noted that investment data were difficult to obtain for local regions. Wasylenko (1997) also noted that other control variables typically were included in research studies, such as taxes, public expenditure variables, and environmental factors, along with indicators of market size, such as population and per capita income, which were generally included to represent local demand.

Wheeler (2001) studied how growth disseminates geographically by examining the correlation structure of rates of growth in county-level economic activity. He estimated growth rates at the county level over a period of time covering 1984 to 1994 using four different measures: population, employment, income, and earnings. He extracted the variables for his research from the Bureau of Economic Analysis's Regional Economic Information System (REIS). Changes in total earnings and employment are place-of-work measures, whereas changes in total personal income and population are place-of-residence measures. Wheeler (2001) focused his research at the county level for numerous reasons, including: counties are relatively small, they form a geographic partition of the country, and they offer a useful unit of analysis when examining geographic patterns of growth in the United States. Results from the Wheeler (2001) study indicated that there seemed to be systematic variation in a county's growth rate with respect to its population size; stating that large counties grow

more slowly on average.

In an attempt to describe a more comprehensive regional economic growth model, Monchuk et al. (2007) examined some of the forces that underlie economic growth at the county level. This study examined economic growth in the Midwest from 1990 to 2001 in a cross-section of 787 counties in Minnesota, Wisconsin, Illinois, Iowa, Missouri, Kansas, Nebraska, North Dakota, and South Dakota. Researchers make note of other popular measures of economic growth at the county level, including population, employment, and per capita income growth. These researchers considered a large number of growth-related variables in the specification of their model. Empirical estimation results indicated that amenities, state and local tax burdens, population density, amount of primary agriculture activity, and demographics have important impacts on economic growth (Monchuk et al. 2007).

Carruthers and Mulligan (2008) examined the process of growth and change within American metropolitan areas by estimating a series of regional adjustment models. According to the researchers, regional development and growth happens in two interconnected ways: via demand-induced growth, which is driven by economic opportunity, and by supply-induced growth, which is driven by personal preference. Demand-induced growth occurs when firms require additional labor, causing a greater demand for workers. Supply-induced growth occurs when people move from one place to another for reasons that do not have anything to do with employment, causing an increase in the supply of labor. The traditional two-equation regional adjustment model examines population and employment changes over time. Carruthers and Mulligan (2008) expanded the traditional two-equation framework by adding a third variable,

average annual wage, to the system. Their research examined the rate of change over time for population density, employment density, and average annual wage to measure economic growth. The empirical models developed in this study were tested with data for 831 counties representing 329 metropolitan areas over a period covering 1982 through 1997. Results were significant, and the explanatory power of the models was consistent with other regional adjustment models.

Deller (2008) examined regional economic growth that is focused on available amenities. This research relied, in part, on the National Outdoor Recreation Supply Information System (NORSIS) dataset developed and maintained by the USDA Forest Service's Southern Research Station. As a result of the 1998 Resource Planning Act, the Forest Service maintains an extensive county-level dataset documenting facilities and resources that support outdoor recreation activities. This dataset contains over 300 separate variables ranging from population density, the proportion of county acres in each of cropland, forest, pasture/range-land, mountains and water surface, employment and income levels in recreational industries, and the number of public libraries (Deller 2008). Among numerous amenity measures used by Deller (2008) to research growth rates at the county level, he included the following historical measures of economic growth as variables: per capita income, employment, population, unemployment rate, education, local taxes, and percentage of population employed by state and local government.

Numerous other studies have been performed that examined economic growth regionally. Goss and Phillips (1994) examined economic growth at the state level and used employment growth over time as a proxy to measure economic growth. Steinnes

and Fisher (1974) estimated a model of intra-urban location and used numerous variables in their model including the following: manufacturing employment, non-manufacturing employment, median income, race, college faculty, property tax rate, and other factors. Helms (1985) examined the effects of state and local taxes on economic growth and included variables such as population density, education, highways, wages, and multiple types of taxes in his research. Courant (1994) urged researchers to "don't just count jobs" when measuring economic development and that variables such as average growth rate of state product, employment growth, changes in per capita income, value of business building permits, and other factors should be considered when explaining economic growth. Peavy (2007) analyzed regional employment and concluded, among other items, that the percentage of the civilian labor force in a county that is white has a positive and significant effect on both manufacturing and total employment.

Steinnes (1984) examined regional economic development using many of the previously mentioned variables and concluded that the use of pooled time series-cross-sectional data with a lagged dependent variable provides more accurate results when compared with research that examined only cross-sectional data for one time period. Bartik (1994) noted that success in one area could cause negative results in other areas, explaining that job growth in one local area will, in part (not necessarily totally), come at the expense of reduced job growth in other local areas. Liard-Muriente (2007) also noted that regional development policies could be described as a zero-sum game, with local job reshuffling as the outcome. After all, if one area accomplishes growth, it may be at the expense of another area. Therefore, when examining economic growth,

researchers should consider the impact of surrounding regions.

Criterion Variables

Research question 1 addresses the impact of tax policy investment incentives at the regional level and whether these incentives promote economic growth. Based on the relevant literature, research question 1 will be analyzed with the following dependent variables at the county level: annual industry earnings, manufacturing industry earnings, construction industry earnings, per capita income, personal income, average wages per job, median household income, total employment for all industries, total manufacturing employment, total construction employment, housing unit estimates, and the number of building permits issued annually. Each dependent variable will be analyzed individually with mixed effects modeling procedures for the GO Zone timeframe (2006-2008) and for the three-year period preceding Hurricane Katrina (2002-2004); 2005 will not be included in either combined sample due to the fact that it overlaps both groups. Annual changes for each dependent variable covering 2003 through 2008 will be calculated and subsequent statistical procedures will be performed on these values. The year over year changes for each dependent variable will be analyzed individually with OLS regression procedures on an annual basis for the period covering 2003 through 2008 and will also be analyzed individually for the GO Zone timeframe (2006-2008) and for the two-year period preceding Hurricane Katrina (2003-2004); 2005 will not be included in either combined sample due to the fact that it overlaps both groups. The independent variable used for research question 1 will be a dichotomous variable created for GO Zone and non-GO Zone counties in the sample.

This research does not analyze all potential variables that have been used by prior empirical studies to evaluate economic growth, but the selected variables should provide more than sufficient evidence to determine whether or not the regional tax incentives provided by the GO Zone Act have impacted the affected region.

Research question 2 addresses whether tax policy investment incentives at the regional level are a zero-sum game, where economic growth created by incentives are at the expense of the surrounding regions. Research question 2 will be analyzed with many of the same economic indicators implemented in research question 1, except that research question 2 will examine the percentage change in each of these variables individually at the county level and attempt to determine if any increases in the affected core disaster area are offset by decreases in the surrounding counties. In addition, research question 2 will be analyzed with binary logistic regression utilizing many of the variables simultaneously to determine if statistically significant differences exist between GO Zone counties and non-GO Zone counties.

Control Variables

After a natural disaster strikes, the governor of the affected state makes a request to the president for disaster assistance. The president must then decide whether to declare the state or region a disaster area. If the president issues a disaster declaration under the authority of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Stafford Act), disaster assistance is then administered through various federal programs. Only after the president has declared a disaster can the government give disaster assistance. The Federal Emergency Management Agency (FEMA) determines

the level of relief funding for specific areas, but Congress determines further appropriations in cases requiring large amounts of funding beyond FEMA's allocated budget (Garrett and Sobel 2003).

In response to the 2005 Gulf Coast hurricanes, Congress provided about $130 billion in disaster recovery assistance, including about $19.7 billion in Community Development Block Grant (CDBG) funds for assistance in rebuilding permanent housing (GAO 2010). The Department of Housing and Urban Development (HUD) provided Louisiana and Mississippi, the two states most affected, with the majority of these supplemental CDBG funds, which were to be used in part for housing recovery (GAO 2010). The Louisiana Road Home Homeowner Program was designed to provide a one-time compensation grant payment, up to a maximum of $150,000, to eligible homeowners whose primary residence was damaged by the 2005 Gulf Coast hurricanes and who wished to (1) repair or rebuild their home, (2) purchase another home in Louisiana, or (3) sell their home and relocate outside of the state (GAO 2010, 52). After the 2005 hurricanes, Congress made $13.4 billion available to Louisiana for disaster recovery, of which Louisiana allocated $11.5 billion to the Road Home Homeowner Program (GAO 2010).

The Mississippi Homeowner Assistance Program was designed to provide a one-time grant payment, up to a maximum of $150,000, to eligible homeowners who lived outside of the flood plain and suffered flood damage to their primary residence as a result of Hurricane Katrina (GAO 2010, 52). Congress made $5.5 billion available to Mississippi for disaster recovery, of which Mississippi allocated $1.96 billion to the Mississippi Homeowner Assistance Program (GAO 2010). Mississippi's Homeowner

Assistance Program was made available to residents in the state's four coastal counties (Hancock, Harrison, Jackson, and Pearl River), while the Louisiana Road Home Homeowner Program provided funds in numerous parishes, including six non-GO Zone counties.[22]

Therefore, when appropriate and when available, data for these grants provided for housing recovery will be used as an independent control variable. The GAO (2010) noted, however, that the funds were not always used for their intended purpose and the response to Hurricanes Katrina and Rita highlights the need to re-evaluate how housing assistance for homeowners and rental property owners is delivered after a disaster. Therefore, the data used as independent control variables may not have been actually spent as intended.

Whether disaster assistance is always provided to the most deserving areas is a debatable topic. Government officials in charge of agencies such as FEMA will cater to those who determine their budgetary allocations, rather than to the individuals they are supposed to serve (Sobel and Leeson 2006). Politicians have the incentive to help themselves by distributing the money in ways that will benefit their political careers (Sobel and Leeson 2006). Garrett and Sobel (2003) examined the impact of political influence on FEMA disaster payments and concluded that presidential and congressional influences affect disaster declarations and the allocation of FEMA disaster expenditures. States politically important to the president have a higher rate of disaster declaration, and disaster expenditures are higher in states having congressional representation on FEMA oversight committees (Garrett and Sobel 2003). Garrett and

[22] Appendix B contains information on the number of homeowner units funded and the amount of grant assistance awarded by state and parish/county.

Sobel (2003) predicted that nearly half of all disaster relief is motivated politically rather than by actual need.

Congress has raised questions about how federal funds for housing recovery have been allocated for the repair of homeowner and rental housing units, particularly under programs for which states have discretion regarding the amount and types of assistance available to homeowners and rental property owners (GAO 2010). However, the determination of the GO Zone disaster area and the allocation of disaster assistance is outside the scope of this research. The purpose of the research is to assess the effectiveness of tax policy investment incentives at the regional level, not to investigate how the region was selected to receive these incentives. This research will focus on the impact of the tax policy investment incentives provided by the GO Zone Act on numerous dependent variables, and when appropriate, federal disaster assistance amounts will be included as an independent control variable. Future research could focus on the selection of the GO Zone core disaster area and analyze the federal disaster assistance payments to determine whether politics or actual need provided the most significant influence on the selection process.

Commercial casinos are significant contributors to the nation's economy, with gross gaming revenues totaling more than $32.5 billion in 2008 (AGA 2010). Casinos are particularly vital to the states where they operate, creating jobs, providing business opportunities for local vendors and suppliers, and generating tax revenues. In 2008, the commercial casino industry employed more than 375,000 people earning more than $13 billion in total wages, which represented more direct employees than the United States automobile industry, software manufacturers or wireless phone carriers (AGA 2010).

The casino industry in Mississippi represents the third largest commercial casino market in the United States, behind only Las Vegas and Atlantic City, and the Louisiana commercial casino market is significant as well (Walker and Jackson 2008).

Walker and Jackson (2008) examined the impact of the casino industry on economic growth after Hurricane Katrina. They had previously published studies measuring the impact of the casino industry on economic growth, based on per capita income at the state level, with conflicting results. In their 1998 study, which covered a sample period of 1991 to 1996, they found statistically significant evidence that casinos spurred economic growth. In a 2007 study, covering 1991 to 2005, they found no significant effects at the state level. Walker and Jackson (2008) interpreted these contradictory results as showing that casinos may have a short-run economic stimulus effect on a state's economy, but in the longer-run, these effects decrease. In their initial study of Katrina, based solely on Louisiana and Mississippi, Walker and Jackson found evidence that the casino industry had a significantly positive impact on the states' economies. In their more recent study, Walker and Jackson (2008) developed a model consisting of four states damaged by Hurricanes Katrina and Rita, two with casinos (Louisiana and Mississippi), as well as two states (Texas and Alabama) without commercial casinos. Based on their research findings, Walker and Jackson (2008) concluded that the commercial casino industry has had a significantly positive impact on state-level personal income in the hurricane-affected states of Louisiana and Mississippi. Although previous analysis had used per capita income as the variable measuring economic growth, Walker and Jackson (2008) instead used personal income because they felt that the significant migration caused by Hurricane Katrina would

affect per capita income measures. Based on these results, a dummy variable controlling for the location of casinos by county or parish will be created and used as an independent control variable when applicable.

According to information obtained from the Mississippi Gaming Commission, Mississippi has commercial casino operations, excluding Native American casinos, located in seven different counties. Appendix C contains a list of casinos operating in Mississippi. According to the Louisiana Gaming Control Board, Louisiana has land-based or riverboat casino operations, excluding Native American casinos, located in seven different parishes. Parishes that contained only racetrack operations or video poker facilities were not included in the creation of the control variable used in this research. Appendix D contains a list of casinos operating in Louisiana. Alabama does not house any commercial casino operations, excluding Native American casinos.

Based on the relevant literature, additional control variables will be included in the analysis, such as population density, federal government expenditures, unemployment rate, and race. Population density will be calculated by dividing total population by total square miles for each county. Federal government expenditures encompass the total dollar amount of federal government expenditures by county. The unemployment control variable is comprised of the civilian labor force unemployment rate from the Bureau of Labor Statistics. The race control variable represents the percentage of the resident population that is white for each county. In addition, control variables for county, state, and time period will also be included in the analysis.

Measuring Lagged Data

The GO Zone tax policy investment incentives primarily cover the time period of 2006 through 2008. Some researchers believe there is inefficiency associated with the use of tax policy investment incentives that impact only short-term investment decisions. Clark (1993) claims that tax stimulus incentives are poor instruments for fine-tuning investment demand over the business cycle due to the delays in the market response. Chirinko (1986) noted that it takes time before the decision to invest is made and the delivery is complete and explained the existing lag caused by this time delay between delivery and useful incorporation into the production process. Nordhaus felt that the delayed reaction to tax stimulus was very important and had the following comment concerning Shapiro's (1986) work: "one of the important messages of Shapiro's paper is that previous studies may have missed the significant effect of capital prices on investment decisions in large part because they did not allow for sufficient lags" (162).[23]

Hall and Jorgenson (1967) recommended tax incentive lags of two years for manufacturing industries and about 1.3 years for non-manufacturing industries. Rennie (1977) noted a lag of three years in the electric utility industry. The data utilized in this research encompasses 2002 through 2008. However, the period impacted by the GO Zone investment incentives covers only late 2005 through 2008. Therefore, based on previous empirical studies, one would expect the investment incentives provided by the GO Zone Act to provide their greatest benefit during 2007 and 2008. Any additional limitations will be noted as discovered.

[23] From the *Comments and Discussion* section of Shapiro's (1986) research.

CHAPTER III

METHODOLOGY

Congress has used tax incentives such as bonus depreciation, larger expense allowances, and investment tax credits for more than 50 years to increase business spending and stimulate economic growth. Frequent use over the past 50 years suggests that Congress believes that tax incentives are an effective tool for achieving these goals. The theory behind the use of tax incentives is that by providing businesses with accelerated tax deductions and other investment tax credits, the cost of capital needed to purchase new plant and equipment is reduced through the time value of money. A U.S. House Committee relied on this theory when implementing the Job Creation and Worker Assistance Act of 2002 and the Growth Tax Relief Reconciliation Act of 2003. The committee felt that bonus depreciation incentives would stimulate equipment purchases and foster economic recovery by increasing employment and expanding business opportunities (U.S. Congress 2003).

Hurricane Katrina made landfall on the Gulf Coast on August 29, 2005, and was the worst natural disaster in our nation's history in terms of geographic scope, the severity of its destruction, and the number of persons displaced from their homes (GAO 2010, 1). Katrina was by far the most economically costly hurricane to strike the United States, with estimated damages in excess of $200 billion (Congleton 2006). In addition, Hurricanes Katrina, Rita, and Wilma, all of which made landfall during a six-week period, were three of the costliest hurricanes in the history of the United States based on insured losses, with Katrina being the costliest ($38.1 billion estimated insured loss), Wilma the third costliest ($8.4 billion) and Rita the seventh costliest ($5 billion)

(Rothman and Altieri 2006). The Gulf Opportunity Zone Act of 2005 provided tax incentives for businesses and individuals to encourage rebuilding, rehabilitation, and investment in these hurricane stricken areas.

Despite the continued use of tax investment incentives by policy-makers, empirical evidence concerning the effectiveness of tax incentives is inconclusive. To date, however, very little empirical research has been performed on the impact of tax policy investment incentives at the regional level. Although Congress has implemented multiple tax policy investment incentives in the past, the Gulf Opportunity Zone Act of 2005 provided incentives separately from other provisions to a specific region of the United States and for a specific period of time. As a result, this research can evaluate the effectiveness of tax policy incentives at the regional level and also investigate the economic impact these incentives may have on the surrounding regions. This research evaluates the economic impact of tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005 on numerous economic indicators in the GO Zone and whether these incentives cause negative results on the same economic indicators in surrounding regions.

A panel data set has both a cross-sectional and a time-series dimension and is sometimes called longitudinal data. Panel data sets are fairly easy to collect for school districts, cities, counties, states, and countries, and policy analysis is greatly enhanced by using panel data sets (Wooldridge 2009). The key feature that distinguishes panel data from pooled-time-series-cross-sectional data is that panel data tracks the same variable for the same cross-sectional units (in this case counties) over a given period of time. Having multiple observations on the same unit or subject allows one to control

for certain unobserved characteristics of the dependent variable, in this case counties and parishes. However, having multiple observations on the same county over time creates certain econometric issues when analyzing panel data; primarily, one cannot assume that the observations are independently distributed across time, violating the independence assumption in OLS regression. For this reason, different methods have been developed to analyze panel data.

Two common approaches for analyzing panel data are fixed effects and random effects specifications. Fixed effects modeling attempts to control for the unobserved, time-constant effects in the model by eliminating this value because one believes this effect is directly correlated with the explanatory variables (Wooldridge 2009). The basic fixed effects model assumes that no serial correlation exists and no correlation across subjects exists (Frees 2004). A fixed effects transformation requires the explanatory variables to vary over time periods. If the key explanatory variable is constant over time, the fixed effects approach cannot be used to estimate its effect on the dependent variable because time-constant variables in fixed effects models are perfectly collinear with subject-specific intercepts and hence are inestimable (Frees 2004).

The random effects transformation approach assumes that the unobserved effect is uncorrelated with all explanatory variables, whether the explanatory variables vary over time or not. The random effects approach allows for explanatory variables that are constant over time, and when implementing this technique as many time-constant controls as possible should be included among the explanatory variables (Wooldridge 2009). The random effects model, if consistent, yields more efficient estimators than

the fixed effects model, because the random effects model allows for more degrees of freedom compared to the fixed effects model, which, *ceteris paribus,* gives more efficient estimators (Peavy 2007). The random effects approach can be extended to a linear mixed effects model to allow for variable slopes, serial correlation, and heteroscedasticity (Frees 2004). The mixed effects approach allows for the model to contain a random-effects portion and fixed-effects portion. The linear mixed effects approach is one technique that will be implemented in this research to perform data analysis on the actual values for each dependent variable.

Multiple regression is the most widely used multivariate statistical analysis technique, primarily because of its ability to predict and explain metric variables (Hair et al. 2006). Multiple regression is a statistical technique used to analyze the relationship between a dependent variable and a set of independent or explanatory variables. The objective of multiple regression analysis is to use known independent variables to predict the single dependent variable analyzed by the researcher (Hair et al. 2006). Multiple regression techniques are the foundation for business forecasting models and are commonly used for the testing of economic models; however, multiple regression analysis is a statistical tool that should be used only when both the dependent and independent variables are metric (Hair et al. 2006).[24] Panel data sets are most useful when controlling for time-constant unobserved features, which might be correlated with the explanatory variables included in the model (Wooldridge 2009). One method to remove the unobserved effect is to difference the data in adjacent time periods; then, a standard multiple regression analysis on the differences can be used to

[24] According to Hair et al. (2006), under certain circumstances it is possible to use nonmetric independent dummy variables in multiple regression.

analyze the data (Wooldridge 2009). Yearly changes will be calculated for each dependent variable and these values will be analyzed using OLS regression procedures. By calculating annual changes and utilizing these values, the violation of the independence assumption can be avoided and standard OLS regression techniques can be used to analyze the data.

The use of a non-metric dependent variable (in this case binary) makes the use of multiple regression unsuitable (Hair et al. 2006). The second part of phase two of this research will be conducted using a binary dependent variable. The binary nature of the dependent variable has properties that violate the assumptions of standard multiple regression: first, the error term of a discrete variable follows a binomial distribution, thus invalidating all statistical testing based on the assumptions of normality and, second, the variance of a binary variable is not constant, creating instances of heteroscedasticity as well (Hair et al. 2006). In the case of a non-metric dependent variable (in this case GO Zone counties versus non-GO Zone counties), logistic regression is one technique that can be implemented to analyze the relationship between a dependent variable and multiple independent variables.

Binary logistic regression is a special form of regression in which the dependent variable is a non-metric, dichotomous (binary) variable, and the interpretation is quite similar to linear regression (Hair et al. 2006). Logistic regression is a generalized linear model that applies maximum likelihood estimation after transforming the dependent variable and can be used to determine whether group membership can be predicted by the independent variables and which variables, if any, are significant in the prediction of group membership. Logistic regression has many analogies to multiple regression: the

coefficients in both methods correspond to each other, the standardized coefficients in logistic regression correspond to beta weights in multiple regression, and there is a statistical measure for both techniques that summarizes the strength of the relationship between the dependent and independent variables. However, logistic regression, unlike multiple regression, does not assume that a linear relationship must exist between the dependent and independent variables, does not require that variables be normally distributed, and does not assume homoscedasticity. In general, logistic regression imposes less stringent requirements than does standard multiple regression. This research utilizes mixed effects modeling, binary logistic regression and multiple regression to identify any statistical differences between GO Zone and non-GO Zone counties and to analyze the impact of these variables on the affected regions.

The research questions are analyzed with a matched sample panel data set using annual data from 2002 through 2008. The data set consists of the 91 counties and parishes included in the GO Zone core disaster area and 91 non-GO Zone counties and parishes surrounding the affected region for a total sample of 182 counties. The 91 counties and parishes included in the GO Zone core disaster area include 49 counties in Mississippi, 31 parishes in Louisiana, and 11 counties in Alabama. Mississippi is comprised of 82 counties, and Louisiana has 64 parishes. The 91 non-GO Zone counties selected to create the matched sample for this research include the remaining 33 non-GO Zone counties in Mississippi, the remaining 33 non-GO zone parishes in Louisiana, and 25 non-GO Zone counties in Alabama. The 25 non-GO Zone Alabama counties were selected first based on proximity to the GO Zone core disaster area, and then matched on population from 2002.

The purpose of the research is to assess the effectiveness of tax policy investment incentives at the regional level and to identify statistically significant variables that can be utilized to predict economic growth at the county level. Additionally, the research examines whether these regional tax policy investment incentives create economic growth within policy coverage areas at the expense of the surrounding regions. Specifically, this research addresses the following research questions:

1) Do tax policy investment incentives promote economic growth and spur business investment spending at the regional level?

2) Are regional tax policy investment incentives a zero-sum game, where growth in one local area comes at the expense of reduced growth in other local areas?

The first phase of the research utilizes mixed effects modeling and multiple regression with a matched sample panel data set from 2002 through 2008 to determine whether the economic variables included in this study are significant predictors of GO Zone versus non-GO Zone counties. This approach will determine whether tax policy investment incentives provided by the GO Zone Act created significant differences on key economic indicators included in this study. Therefore, the first hypothesis, stated in the null form, is:

H1: The tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005 have no impact on economic growth in the affected region.

The second phase of the research utilizes multiple regression and binary logistic regression with a matched sample panel data set using data from 2002 through 2008 to

determine whether tax policy investment incentives at the regional level are a zero-sum game. The majority of the economic indicators evaluated in the first phase of this research will be evaluated individually in this phase of the research to determine if economic growth in GO Zone counties came at the expense of the surrounding counties. Therefore, the second hypothesis, stated in the null form, is:

> H2: The tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005 have no impact on economic growth in the surrounding region.

Research Question One

The first research question examines the impact of tax policy investment incentives at the regional level and asks whether these incentives promote economic growth. Research question 1 will be tested with the following dependent variables at the county level: annual industry earnings, manufacturing industry earnings, construction industry earnings, per capita income, personal income, average wages per job, median household income, total employment for all industries, total manufacturing employment, total construction employment, housing unit number estimates, and the number of building permits issued annually. Each dependent variable will be analyzed individually with mixed effects modeling procedures for the GO Zone timeframe (2006-2008) and for the three-year period preceding Hurricane Katrina (2002-2004); 2005 will not be included in either combined sample due to the fact that it overlaps both groups. Annual changes for each dependent variable covering 2003 through 2008 will be calculated and subsequent statistical procedures will be performed on these values. The year-over-year changes in each dependent variable will be analyzed individually with

OLS regression procedures on an annual basis for the period covering 2003 through 2008 and will also be analyzed individually for the GO Zone timeframe (2006-2008) and for the two-year period preceding Hurricane Katrina (2003-2004). The year 2005 will not be included in either combined sample due to the fact that it overlaps both groups. The primary independent variable used for research question 1 will be a dichotomous variable created for GO Zone and non-GO Zone counties in the sample.[25] Population density, federal government expenditures, the unemployment rate, race, county, and state variables will be included as control variables in the majority of the regression models. In addition, when appropriate, grant funds provided to specific counties for hurricane victims and commercial casinos by county/parish will also be used as independent variables for control purposes.[26] The mixed effects models used in analyzing research question 1 are as follows:

$$AIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 HUD_t + \beta_3 CAS_t + \beta_4 PDE_t + \beta_5 FGE_t + \beta_6 UNR_t + \beta_7 RAC_t + \beta_8 COU_t + \beta_9 STA_t + \varepsilon_t$$

$$MIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$CIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 HUD_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$PCI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

[25] Appendix A contains a listing of GO Zone and non-GO Zone counties/parishes.
[26] Appendices B, C and D contain information for these control variables.

$$PEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$TEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$HSE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$MEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$CEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$BDP_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$MHI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$AWJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

where, for a given county/parish at a time period *t*:

GOZ	=	GO Zone county (1=yes, 0=no);
AIE	=	annual industry earnings;
MIE	=	total manufacturing earnings;
CIE	=	total construction earnings;
PCI	=	per capita income;
PEI	=	personal income;
TEI	=	total employment for all industries;
HSE	=	housing unit estimates;
MEJ	=	total manufacturing employment;
CEJ	=	total construction employment;

BDP	=	number of building permits issued annually;
MHI	=	median household income;
AWJ	=	average wages per job;
HUD	=	grant money provided to rebuild damaged housing;
CAS	=	dummy variable for casinos by county (1=yes, 0=no);
PDE	=	population density;
FGE	=	total federal government expenditures by county;
UNR	=	civilian labor force unemployment rate by county;
RAC	=	percentage of the resident population that is white;
COU	=	county identification control variable;
STA	=	state identification control variable;

The OLS regression models used in analyzing research question 1 are as follows:

$$\Delta AIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 HUD_t + \beta_3 CAS_t + \beta_4 PDE_t + \beta_5 FGE_t + \beta_6 UNR_t + \beta_7 RAC_t + \beta_8 COU_t + \beta_9 STA_t + \varepsilon_t$$

$$\Delta MIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta CIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 HUD_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta PCI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta PEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta TEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta HSE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta MEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta CEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta BDP_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta MHI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta AWJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

where, for a given county/parish at a time period *t*:

GOZ	=	GO Zone county (1=yes, 0=no);
ΔAIE	=	change in annual industry earnings;
ΔMIE	=	change in total manufacturing earnings;
ΔCIE	=	change in total construction earnings;
ΔPCI	=	change in per capita income;
ΔPEI	=	change in personal income;
ΔTEI	=	change in total employment for all industries;
ΔHSE	=	change in housing unit estimates;
ΔMEJ	=	change in total manufacturing employment;
ΔCEJ	=	change in total construction employment;
ΔBDP	=	change in the number of building permits issued annually;
ΔMHI	=	change in the median household income;
ΔAWJ	=	change in the average wages per job;
HUD	=	grant money provided to rebuild damaged housing;

CAS	=	dummy variable for casinos by county (1=yes, 0=no);
PDE	=	population density;
FGE	=	total federal government expenditures by county;
UNR	=	civilian labor force unemployment rate by county;
RAC	=	percentage of the resident population that is white;
COU	=	county identification control variable;
STA	=	state identification control variable;

The Congressional Budget Office (2006) estimates that the tax benefits related to the GO Zone Act will amount to about $4 billion in 2006, $3 billion in 2007, and $2 billion over the years from 2008 to 2015 (Richardson 2006). The major tax provisions generating these tax benefits are the 50 percent bonus depreciation, the Section 179 expensing, and the broadening of the employee retention tax credit to all companies regardless of size (Richardson 2006). Based on these primary incentives, one would expect to see increases in total employment (particularly in manufacturing industries), increases in total earnings (particularly in manufacturing industries), increases in average wages per job, and increases in personal income. Property damage caused by Hurricane Katrina should cause significant changes in the construction industry and significant changes in this area will not be viewed as tax-policy related. Personal income, manufacturing employment and earnings, and average wages per job will be used as the primary measures of economic growth, instead of per capita income, due to the potential impact of population migration caused by the hurricanes on per capita income, as noted by Walker and Jackson (2008).

The primary sources of information are the United States Census Bureau, the Bureau of Economic Analysis, and the Bureau of Labor Statistics. Total population

statistics, building permit statistics, federal government expenditures, race data and housing unit estimates were obtained from the U.S. Census Bureau. Statistical information for all other dependent variables was obtained from the Bureau of Economic Analysis. Civilian labor force unemployment rates were obtained from the Bureau of Labor Statistics. Annual data were gathered for years 2002 through 2008 to calculate the necessary year over year change occurring during the GO Zone incentive timeframe (2006-2008) and the two-year period preceding Hurricane Katrina (2003-2004) for use with OLS regression.

Annual industry earnings represent net earnings by place of work (the sum of wage and salary disbursements, supplements to wages and salaries, and proprietors' income) less contributions for government social insurance, plus an adjustment to convert earnings by place of work to a place-of-residence basis. Personal income is the income received by all persons from all sources and is measured before the deduction of personal income taxes. Personal income is the sum of net earnings by place of residence, rental income of persons, personal dividend income, personal interest income, and current personal transfer receipts. Per capita personal income is calculated as the personal income of residents of a given area divided by the resident population of the area. In computing per capita personal income, the Bureau of Economic Analysis uses the Census Bureau's annual midyear population estimates. To account for inflation during the sample time period, all dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.

The independent variable, GO Zone county (1=yes, 0=no), was created, based on information obtained from IRS Publication 4492, for GO Zone and non-GO Zone

counties in the sample. The grant funds control variable was created based on information obtained from the GAO. The funds identified by GAO Report 10-17, were allocated in the following manner in the creation of this control variable: 2006 – 50 percent, 2007, 35 percent, and 2008 15 percent.[27] The casino control variable by county/parish was created based on information pertaining to commercial casino operations obtained from the Mississippi Gaming Commission and the Louisiana Gaming Control Board. Alabama does not authorize land-based commercial casino operations. Population density is calculated by dividing total population by total square miles for each county or parish. Federal government expenditures encompass the total dollar amount of federal government expenditures by county. The unemployment control variable is comprised of the county/parish civilian labor force unemployment rate from the Bureau of Labor Statistics. The race control variable represents the percentage of the resident population that is white for each county or parish.

Research Question Two

The second research question examines whether tax policy investment incentives at the regional level are a zero-sum game, where economic growth created by incentives are at the expense of the surrounding regions. The second phase of the research utilizes multiple regression on the same panel data set used during the first research phase. Research question 2 will be tested with many of the same economic indicators included in research question 1; however, research question 2 will examine

[27] GAO Report 10-17 only provides information for total dollar amounts awarded during 2006 through 2008, with no annual amounts identified. Estimates were developed based on information from the GAO and the Congressional Budget Office concerning annual government expenditures from 2006 through 2008.

the percentage change in each of these variables individually at the county level and will attempt to determine whether any increases in the affected core disaster area are offset by decreases in the surrounding counties. Each dependent variable will be analyzed individually for the GO Zone timeframe (2006-2008) and for the two-year period preceding Hurricane Katrina (2003-2004). The models are as follows:

$$\%\Delta AIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta MIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta CIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta PCI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta PEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta TEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta MEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta CEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta MHI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta AWJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

where, for a given county or parish at a time period *t*:

GOZ = GO Zone county (1=yes, 0=no);

$\%\Delta AIE$ = percentage change in annual industry earnings;

%ΔMIE	=	percentage change in manufacturing industry earnings;
%ΔCIE	=	percentage change in construction industry earnings;
%ΔPCI	=	percentage change in per capita income;
%ΔPEI	=	percentage change in personal income;
%ΔTEI	=	percentage change in total employment for all industries;
%ΔMEJ	=	percentage change in total manufacturing employment;
%ΔCEJ	=	percentage change in total construction employment;
%ΔMHI	=	percentage change in the median household income;
%ΔAWJ	=	percentage change in the average wage per job;
PDE	=	population density;
FGE	=	total federal government expenditures by county;
UNR	=	civilian labor force unemployment rate by county;
STA	=	state identification control variable;

The year-over-year percentage change will be calculated at the county/parish level by taking current year minus previous year divided by previous year. For example, to calculate the population change for 2006, the 2005 population figure will be subtracted from the 2006 population figure and the resulting number will be divided by the 2005 population figure and then converted to a percentage (by multiplying by 100) to calculate the change for 2006. The percentage change at the county level for each variable will be calculated, and the data will then be analyzed to determine whether growth in the GO Zone region came at the expense of the surrounding region.

In addition, research question 2 will be analyzed with binary logistic regression utilizing certain economic indicators implemented in research question 1; however, this model will consider all of the variables simultaneously to determine if statistically significant differences exist between GO Zone counties and non-GO Zone counties.

This model will analyze the two-year period (2003-2004) preceding Hurricane Katrina to determine whether differences existed between GO Zone counties and non-GO Zone counties prior to the 2005 hurricanes and will also analyze the three-year GO Zone timeframe (2006-2008) to determine whether differences existed between GO Zone counties and non-GO Zone counties after the hurricanes. The models are as follows:

$$GOZ_t = \beta_0 + \beta_1 \Delta MIE_t + \beta_2 \Delta CIE_t + \beta_3 \Delta PEI_t + \beta_4 \Delta MEJ_t + \beta_5 \Delta CEJ_t + \beta_6 \Delta MHI_t + \beta_7 \Delta AWJ_t + \beta_8 PDE_t + \beta_9 FGE_t + \beta_{10} UNR_t + \beta_{11} STA_t + \varepsilon_t$$

where, for a given county at a time period *t*:

GOZ	=	GO Zone county (1=yes, 0=no);
ΔMIE	=	change in total manufacturing earnings;
ΔCIE	=	change in total construction earnings;
ΔPEI	=	change in personal income;
ΔMEJ	=	change in total manufacturing employment;
ΔCEJ	=	change in total construction employment;
ΔMHI	=	change in the median household income;
ΔAWJ	=	change in the average wage per job;
PDE	=	population density;
FGE	=	total federal government expenditures by county;
UNR	=	civilian labor force unemployment rate by county;
STA	=	state identification control variable;

Conclusion

The purpose of this study involves measuring the impact of tax policy investment incentives, such as bonus depreciation and more generous Section 179 allowances, on economic growth at the regional level. In addition, the study identifies

the economic indicators that are significant for evaluating the impact of regional tax policy investment incentives and the impact these incentives have on the surrounding regions. Prior relevant literature and research support the independent variables chosen for this study, which should increase the internal validity of the study. The matched sample panel data set used in this research was comprehensive, however, interpretations and generalizations to other regions should be made with care.

The expected results of this study should support the Brown (1955) hypothesis that "businessmen in pursuit of a gain will find the purchase of capital goods more attractive if they cost less" (Hall and Jorgenson 1967, 391). Significantly increased economic growth for GO Zone counties compared to non-GO Zone counties should support some form of the neoclassical theory of optimal capital accumulation reported by Hall and Jorgenson (1967), who found that tax incentives did have a substantial effect on investment decisions. Non-significant results could indicate the lack of impact of tax policy incentives at the regional level. This study should also provide evidence of the impact of regional tax incentives on surrounding areas. Depending on the direction of the outcome, significant results could dispute or support Liard-Muriente (2007), who noted that regional development policies could be described as a zero-sum game.

The results of this study, as with all forms of research, are subject to a few important limitations. Archival empirical data for the affected region make this study possible but also limit the ability to generalize these results to other regions. In addition, empirical research utilizing real-world data can be prone to internal validity issues that arise due to lack of environmental control and other possible causal factors.

The purpose of this research study is to determine whether tax policy investment incentives have an impact on economic growth at the regional level and also to determine the impact on surrounding regions. Therefore, explanation and generalization are not the primary factors of this research study.

The time limitation of the study and the temporary nature of the tax policy investment incentives impose additional limitations on any findings. Even though the most currently available data were used, these tax policy investment incentives were short-lived, and Friedman's permanent income hypothesis indicates that investing patterns may not change with temporary reductions in tax burdens (Meghir 2004). Also, these temporary investment incentives may have shifted capital investment spending forward in time, which would indicate a temporary investment change with no significant impact on economic growth in the long run. Future studies addressing tax policy investment incentives could help to clarify some of these temporary and time-related limitations.

CHAPTER IV

RESULTS

This research evaluates the economic impact of tax incentives provided by the Gulf Opportunity Zone Act of 2005. Tax policy incentives included in the Act, such as bonus depreciation and a more generous Section 179 deduction, were intended to spur capital investments by businesses and promote economic growth within the core disaster area. This research studies the economic impact of these incentives at the county/parish level in the affected regions, controlling for other relevant explanatory variables, such as federal government expenditures, population density, the unemployment rate, and the location of commercial casinos. The purpose of the research is to assess the effectiveness of tax policy investment incentives at the regional level and to examine whether these regional tax policy investment incentives create economic growth within policy coverage areas at the expense of the surrounding regions. As discussed in the methodology chapter, this study specifically addresses the two following research questions:

1) Do tax policy investment incentives promote economic growth and spur business investment spending at the regional level?

2) Are regional tax policy investment incentives a zero-sum game, where growth in one local area comes at the expense of reduced growth in other local areas?

One might assume that the results of this study would support the Brown (1955) hypothesis that "businessmen in pursuit of a gain will find the purchase of capital goods more attractive if they cost less" (Hall and Jorgenson 1967, 391). Significantly greater economic growth for GO Zone counties compared to non-GO Zone counties should

support some form of the neoclassical theory of optimal capital accumulation reported by Hall and Jorgenson (1967), who found that tax incentives did have a substantial effect on investment decisions. Non-significant results could indicate the lack of impact of tax policy incentives at the regional level. This research will also provide evidence of the impact of regional tax incentives on surrounding areas. This chapter discusses the results of this research.

The Sample

This research utilizes a matched sample panel data set using relevant information from 2002 through 2008. The data set consists of the 91 counties and parishes included in the GO Zone core disaster area and 91 non-GO Zone counties and parishes surrounding the affected region for a total sample of 182 counties. A panel data set has both a cross-sectional and a time-series dimension and is sometimes called longitudinal data. The key feature that distinguishes panel data from pooled-time-series-cross-sectional data is that panel data tracks the same variable for the same cross-sectional units (in this case counties/parishes) over a given period of time. Having multiple observations on the same unit or subject allows one to control for certain unobserved characteristics of the dependent variable, in this case counties and parishes.

The following dependent variables at the county level will be utilized in this research: annual industry earnings, manufacturing industry earnings, construction industry earnings, per capita income, personal income, average wages per job, median household income, total employment for all industries, total manufacturing employment, total construction employment, housing unit estimates, and the number of

building permits issued annually. The dataset consists of 1,274 observations for each variable.[28] All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator. Table 4.1 provides descriptive statistics for the dependent variables over the full sample.[29]

Table 4.1

Descriptive Statistics – Dependent Variables

Variable	N	Range	Min.	Max.	Mean	Std. Dev.
Median Household Income	1274	51675	20624	72299	35290	7796.20
Personal Income	1274	28714	35	28749	1840.52	3306.14
Average Wages Per Job	1274	33724	22365	56089	31785	5860.44
Per Capita Income	1274	52903	16732	69635	27347	5248.70
Building Permits	1274	6715	0	6715	295.03	671.59
Housing Unit Estimates	1274	309740	883	310623	24901.58	37628.92
Total Employment	1274	482014	664	482678	31424.42	57599.35
Construction Employment*	1196	31286	31	31317	2341.49	4252.28
Manufacturing Employment*	1210	32869	10	32879	2975.78	3994.22
Total Industry Earnings	1274	26256	14.39	26270.24	1342.09	2892.56
Construction Earnings*	1195	2119	.36	2119.75	104.84	242.86
Manufacturing Earnings*	1203	2176	0	2176.24	179.83	276.28

Based on the dataset of 1,274 observations for the years 2002-2008.

Note: Median Household Income, Per Capita Income, and Average Wages Per Job are in dollars. Personal Income and Earnings information are in millions of dollars.

All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.

*Data were missing for a few counties in the Construction and Manufacturing Industries.

[28] Data were unavailable for certain counties in the construction and manufacturing industries.

[29] Appendices BA through BL contain information by state pertaining to actual values for each dependent variable.

The primary independent variable used for research question 1 will be a dichotomous variable created for GO Zone and non-GO Zone counties in the sample.[30] Other independent variables include population density, federal government expenditures, the unemployment rate, race, the presence of commercial casinos, and, when appropriate, grant funds provided to specific counties for hurricane victims. Table 4.2 provides descriptive statistics for the independent variables.

Table 4.2

Descriptive Statistics – Independent Variables

Variable	Range	Min.	Max.	Mean	Std. Dev.
Go Zone	1	0	1	.50	.500
Time	6	2	8	5.00	2.00
State Code	2	1	3	2.25	.765
Casino	1	0	1	.08	.267
Population Density	1345.60	3.75	1349.35	84.61	139.02
Fed. Gov. Expenditures	18549.02	15.52	18564.54	495.64	1128.40
Unemployment Rate	14.10	2.30	16.40	6.70	2.24
Race	84.10	13.30	97.40	62.52	18.51
Community Grant Funds	1227.50	0.00	1227.50	5.67	52.08

Based on the dataset of 1,274 observations for the years 2002-2008.
Note: Federal Government Expenditures and Community Grant Funds are in millions of dollars. The Unemployment Rate and Race are both percentages.

The correlation matrix, shown in Table 4.3, provides the first insight to the assessment of the relationship of the variables. All of the independent variables exhibit some level of significant correlation (two-tailed) with the dependent variables,

[30] Appendix A contains a listing of GO Zone and non-GO Zone counties/parishes.

indicating that relevant variables have been utilized in this research. The first test of the data is for possible collinearity of the independent variables. Collinearity can have substantial effects on the predictive ability of the model and on the estimation of regression coefficients. The most obvious means of identifying collinearity is an examination of the correlation matrix. The presence of high correlations (generally 0.90 and higher) is the first indication of substantial collinearity (Hair et al. 2006).

Table 4.3

Correlation Matrix & Collinearity Statistics

Pearson Correlations	Go Zone	Time	Casino	Pop. Density	FGE	Unemp. Rate	Race	CGBF
Go Zone	1.000	.000	.082	.116	.100	-.064	-.095	.108
Time	.000	1.000	.000	-.002	.070	-.190	-.015	.090
Casino	.082	.000	1.000	.393	.371	-.012	-.125	.245
Pop. Density	.116	-.002	.393	1.000	.737	-.304	.033	.241
FGE	.100	.070	.371	.737	1.000	-.233	-.038	.480
Unemp. Rate	-.064	-.190	-.012	-.304	-.233	1.000	-.533	-.079
Race	-.095	-.015	-.125	.033	-.038	-.533	1.000	.003
CGBF	.108	.090	.245	.241	.480	-.079	.003	1.000

Collinearity Statistics	Go Zone	Time	Casino	Pop. Density	FGE	Unemp. Rate	Race	CGBF
Tolerance	.880	.913	.785	.394	.349	.482	.643	.719
VIF	1.136	1.095	1.274	2.538	2.862	2.076	1.556	1.390

Based on the dataset of 1,274 observations for the years 2002-2008.

This examination reveals that none of the variables exhibit a high level of correlation with other independent variables. Lack of high correlation values, however, does not guarantee no collinearity. Collinearity can be caused by the combined effect of two or more independent variables, creating multicollinearity (Hair et al. 2006). To assess multicollinearity, a statistical procedure is performed in which each independent variable becomes a dependent variable and is regressed against the remaining independent variables. Two common measures for assessing multicollinearity are tolerance and its inverse, the variance inflation factor (VIF). Tolerance is a direct measure of multicollinearity and is defined as the amount of variability of the selected independent variable not explained by the other independent variables (Hair et al. 2006). A high tolerance value indicates a small degree of multicollinearity. A common cutoff threshold is a tolerance value of 0.10, which corresponds to a VIF value of 10. Table 4.3 provides tolerance and VIF values for each of the independent variables. The results indicate that no significant multicollinearity exists between the independent variables used in this research.

The Results

The first phase of the research utilizes linear mixed effects modeling and multiple regression with a matched sample panel data set using data from 2002 through 2008 to determine whether the economic variables included in this study are significant predictors of GO Zone versus non-GO Zone counties. The second phase of the research utilizes multiple regression and binary logistic regression on a matched sample panel data set using data from 2002 through 2008 to determine whether tax policy investment

incentives at the regional level are a zero-sum game. The majority of the economic indicators evaluated in the first phase of this research will be tested individually in this phase of the research to determine whether economic growth in GO Zone counties came at the expense of the surrounding counties. The remainder of the chapter provides a discussion of the results of the data analysis for each model.

Research Question One

As noted in Chapter Three, research question 1 will be analyzed with the following dependent variables at the county level: annual industry earnings, manufacturing industry earnings, construction industry earnings, per capita income, personal income, average wages per job, median household income, total employment for all industries, total manufacturing employment, total construction employment, housing unit estimates, and the number of building permits issued annually. Each dependent variable will be analyzed individually with mixed effects modeling procedures for the GO Zone timeframe (2006-2008) and for the three-year period preceding Hurricane Katrina (2002-2004); 2005 is not be included in either combined sample due to the fact that it overlaps both groups. Annual changes for each dependent variable covering 2003 through 2008 will be calculated and subsequent statistical procedures will be performed on these values. The year-over-year changes for each dependent variable will be analyzed individually with OLS regression procedures on a yearly basis for the period covering 2003 through 2008 and will also be analyzed individually for the GO Zone timeframe (2006-2008) as well as for the two-year period preceding Hurricane Katrina (2003-2004); 2005 is not be included in either combined

sample due to the fact that it overlaps both groups. The primary independent variable used for research question 1 will be a dichotomous variable created for GO Zone versus non-GO Zone counties in the sample. Population density, federal government expenditures, the unemployment rate, race, county/parish, and state identifying variables will be included as control variables in the majority of the regression models. When appropriate, grant funds provided to specific counties for hurricane victims and commercial casinos by county/parish will also be used as independent variables for control purposes. The mixed effects models used in analyzing research question 1 are as follows:

$$AIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 HUD_t + \beta_3 CAS_t + \beta_4 PDE_t + \beta_5 FGE_t + \beta_6 UNR_t + \beta_7 RAC_t + \beta_8 COU_t + \beta_9 STA_t + \varepsilon_t$$

$$MIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$CIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 HUD_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$PCI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$PEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$TEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$HSE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$MEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$CEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$BDP_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$MHI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$AWJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

where, for a given county/parish at a time period *t*:

GOZ	=	GO Zone county (1=yes, 0=no);
AIE	=	annual industry earnings;
MIE	=	total manufacturing earnings;
CIE	=	total construction earnings;
PCI	=	per capita income;
PEI	=	personal income;
TEI	=	total employment for all industries;
HSE	=	housing unit estimates;
MEJ	=	total manufacturing employment;
CEJ	=	total construction employment;
BDP	=	number of building permits issued annually;
MHI	=	median household income;
AWJ	=	average wages per job;
HUD	=	grant money provided to rebuild damaged housing;
CAS	=	dummy variable for casinos by county (1=yes, 0=no);
PDE	=	population density;
FGE	=	total federal government expenditures by county;
UNR	=	civilian labor force unemployment rate by county;

RAC = percentage of the resident population that is white;
COU = county identification control variable;
STA = state identification control variable;

Random effects modeling assumes that the unobserved effect is uncorrelated with all explanatory variables, and allows for explanatory variables that are constant over time. The random effects approach can be extended to a linear mixed effects model to allow for variable slopes, serial correlation, and heteroscedasticity (Frees 2004). The mixed effects approach allows for the model to contain both a random-effects factor and a fixed-effects factor. Table 4.4 provides results from the first linear mixed effects models implemented in this research. The results in Table 4.4 compare GO Zone counties to non-GO Zone counties pre- and post-Katrina.[31] Each overall model analyzed was statistically significant below the alpha level of 0.05.

Based on the linear mixed effects procedures, only three of the dependent variables showed a statistically significant change, at the alpha level equal 0.05, when comparing the pre-Katrina time period (2002-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were construction employment, with a post-Katrina p-value of 0.011, per capita income, with a post-Katrina p-value of 0.019, and the number of building permits issued annually, with a post-Katrina p-value of 0.015. These significant differences were not unexpected and can be explained by the physical property damage and the population migration caused by Hurricane Katrina. The physical property damage would lead to an increase in construction employment and building permits

[31] Appendices E through P contain information by state pertaining to Table 4.4.

issued; the population out-migration caused by Katrina would have a large impact on per capita income.[32]

The dependent variables median household income and average wages per job were both significantly different when comparing GO Zone counties to non-GO Zone counties, but these statistical differences existed pre-Katrina and post-Katrina, so no change occurred post-Katrina. After controlling for the independent variables included in each model, the remaining seven dependent variables analyzed showed no statistically significant differences pre-Katrina or post-Katrina, indicating that no significant changes occurred in the GO Zone counties post-Katrina that would distinguish them from non-GO Zone counties. Overall, the results shown in Table 4.4 do not indicate that the tax incentives provided to the GO Zone counties have had a statistically significant impact on key economic indicators.

[32] Appendices CI and CJ contain population data by state.

Table 4.4

Summary Table Comparing GO Zone to Non-GO Zone Counties Pre- and Post-Katrina using Actual Values and Linear Mixed Effects Modeling

Variables	Pre-Katrina		Post-Katrina	
	F- statistic	P-value	F- statistic	P-value
Personal Income (DV)				
Overall Model		0.000		0.000
Go Zone	.028	**0.866**	2.615	**0.108**
Casino	.084	0.773	25.020	0.000
State Code	4.630	0.011	7.966	0.001
Time	22.801	0.000	95.207	0.000
Population Density	328.082	0.000	153.795	0.000
Federal Gov. Expenditures	228.494	0.000	48.102	0.000
Unemployment Rate	.706	0.401	31.390	0.000
Race	.091	0.763	.383	0.536
Average Wage Per Job (DV)				
Overall Model		0.000		0.000
Go Zone	13.914	**0.000**	29.455	**0.000**
Casino	3.881	0.050	6.850	0.010
State Code	9.392	0.000	14.507	0.000
Time	143.682	0.000	78.238	0.000
Population Density	4.684	0.031	6.377	0.012
Federal Gov. Expenditures	1.689	0.194	5.085	0.025
Unemployment Rate	1.861	0.173	2.316	0.126
Race	3.480	0.064	4.026	0.046
Per Capita Income (DV)				
Overall Model		0.000		0.000
Go Zone	.552	**0.459**	5.626	**0.019**
Casino	3.792	0.053	12.519	0.001
State Code	2.803	0.063	2.124	0.122
Time	190.935	0.000	69.400	0.000
Population Density	15.935	0.000	5.765	0.017
Federal Gov. Expenditures	6.343	0.012	69.297	0.000
Unemployment Rate	8.555	0.004	25.384	0.000
Race	22.091	0.000	6.398	0.012
Median Household Inc. (DV)				
Overall Model		0.000		0.000
Go Zone	9.154	**0.003**	11.500	**0.001**
Casino	.758	0.385	.133	0.716
State Code	1.741	0.178	.633	0.532
Time	61.765	0.000	113.399	0.000
Population Density	28.923	0.000	34.476	0.000
Federal Gov. Expenditures	8.841	0.003	3.388	0.066
Unemployment Rate	.002	0.967	6.899	0.009
Race	139.17	0.000	102.424	0.000
Housing Units (DV)				
Overall Model		0.000		0.000
Go Zone	.230	**0.632**	2.631	**0.107**
State Code	8.416	0.000	8.389	0.000
Time	31.717	0.000	81.089	0.000
Population Density	757.155	0.000	275.540	0.000
Federal Gov. Expenditures	214.990	0.000	55.038	0.000
Unemployment Rate	.147	0.701	16.254	0.000
Race	1.868	0.172	1.676	0.196

Table 4.4 - Continued

Variables	Pre-Katrina		Post-Katrina	
	F- statistic	P-value	F- statistic	P-value
Building Permits (DV)				
Overall Model		0.000		0.000
Go Zone	3.455	**0.065**	6.021	**0.015**
State Code	.907	0.406	2.393	0.094
Time	18.345	0.000	16.142	0.000
Population Density	.884	0.348	99.336	0.000
Federal Gov. Expenditures	40.808	0.000	12.700	0.000
Unemployment Rate	.002	0.965	.205	0.651
Race	12.701	0.000	5.097	0.025
Total Industry Earnings (DV)				
Overall Model		0.000		0.000
Go Zone	.044	**0.833**	2.678	**0.104**
Casino	.124	0.725	29.302	0.000
State Code	3.514	0.032	5.688	0.004
Time	29.431	0.000	30.281	0.000
Population Density	351.640	0.000	2.993	0.084
Federal Gov. Expenditures	247.714	0.000	58.339	0.000
Unemployment Rate	.656	0.418	5.933	0.015
Race	4.278	0.040	9.912	0.002
Community Grant Funding (Post K)			36.359	0.000
Construction Earnings (DV)				
Overall Model		0.000		0.000
Go Zone	.210	**0.648**	1.441	**0.232**
State Code	1.748	0.177	2.624	0.077
Time	2.307	0.130	5.096	0.025
Population Density	95.149	0.000	127.360	0.000
Federal Gov. Expenditures	139.978	0.000	.001	0.971
Unemployment Rate	.213	0.645	9.102	0.003
Race	.112	0.738	.045	0.832
Community Grant Funding (Post K)			86.141	0.000
Manufacturing Earnings (DV)				
Overall Model		0.000		0.000
Go Zone	.189	**0.664**	1.619	**0.205**
State Code	5.448	0.005	7.046	0.001
Time	.460	0.498	2.806	0.095
Population Density	53.900	0.000	95.813	0.000
Federal Gov. Expenditures	10.467	0.001	6.522	0.011
Unemployment Rate	.859	0.355	17.283	0.000
Race	2.514	0.115	1.206	0.274
Total Employment (DV)				
Overall Model		0.000		0.000
Go Zone	.020	**0.889**	2.133	**0.146**
Casino	.669	0.414	23.385	0.000
State Code	4.687	0.010	7.901	0.001
Time	3.886	0.049	100.819	0.000
Population Density	597.041	0.000	212.601	0.000
Federal Gov. Expenditures	60.844	0.000	6.664	0.010
Unemployment Rate	2.323	0.129	31.951	0.000
Race	.012	0.912	.591	0.442

Table 4.4 - Continued

Variables	**Pre-Katrina**		**Post-Katrina**	
	F- statistic	P-value	F- statistic	P-value
Construction Employment (DV)				
Overall Model		0.000		0.000
Go Zone	1.777	**0.184**	6.726	**0.011**
State Code	3.014	0.052	5.095	0.007
Time	1.362	0.244	32.825	0.000
Population Density	167.533	0.000	1.954	0.163
Federal Gov. Expenditures	43.002	0.000	.875	0.350
Unemployment Rate	.001	0.978	11.588	0.001
Race	2.381	0.125	.576	0.449
Manufacturing Employment (DV)				
Overall Model		0.000		0.000
Go Zone	.318	**0.574**	.305	**0.582**
State Code	10.186	0.000	9.246	0.000
Time	18.975	0.000	1.089	0.297
Population Density	99.497	0.000	85.878	0.000
Federal Gov. Expenditures	.459	0.499	9.142	0.003
Unemployment Rate	4.181	0.042	23.613	0.000
Race	4.272	0.040	3.780	0.053

Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables (DV) represent actual value by county for each variable.

GO Zone versus GO Zone, Non-GO Zone versus Non-GO Zone Pre- and Post-Katrina

In addition to the previous linear mixed effects modeling procedures listed above, additional tests were performed comparing GO Zone counties to themselves pre- and post-Katrina. Table 4.5 provides the results from these additional linear mixed effects models. An alternate version of the *GO Zone* independent variable was created and named *Katrina* to identify pre-Katrina versus post-Katrina time periods. These statistical tests were performed to determine whether statistically significant differences existed in GO Zone counties post-Katrina when compared to GO Zone counties pre-Katrina. Significant results on the primary dependent variables of interest (personal income, average wages per job, manufacturing employment, and manufacturing

earnings) would provide support for the effectiveness of tax policy investment incentives.

The results in Table 4.5 compare GO Zone counties to GO Zone counties pre- and post-Katrina and non-GO Zone counties to non-GO Zone counties pre- and post-Katrina.[33] Each overall model analyzed was statistically significant below the alpha level of 0.05. Based on the additional linear mixed effects procedures, only two of the dependent variables showed a statistically significant change at the alpha level equal to 0.05 when comparing the GO Zone counties for the pre-Katrina time period (2002-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were median household income, with a p-value of 0.002, and total industry net earnings, with a p-value of 0.002. The significant differences in median household income can be explained by the physical property damage and the population migration caused by Hurricane Katrina. The explanation for the statistically significant change in total industry net earnings for GO Zone counties pre- and post-Katrina is not as clear; however, total industry net earnings were also statistically significantly different for the non-GO Zone counties pre- and post-Katrina indicating that the change in the GO Zone counties was not caused by GO Zone tax incentives. After controlling for the independent variables included in each model, the remaining ten dependent variables analyzed showed no statistically significant differences in GO Zone counties when comparing pre-Katrina to post-Katrina, indicating that no significant changes occurred in the GO Zone counties post-Katrina. Overall, the results shown in Table 4.5 do not indicate that the tax incentives

[33] Appendices Q through AB contain information by state pertaining to Table 4.5.

provided to the GO Zone counties have had a statistically significant impact on key economic indicators.

Table 4.5

Summary Table Comparing Pre-Katrina GO Zone Counties to Post-Katrina GO Zone Counties and Pre-Katrina Non-GO Zone Counties to Post-Katrina Non-GO Zone Counties using Actual Values and Linear Mixed Effects Modeling

Variables	GO Zone		Non-GO Zone	
	F- statistic	P-value	F- statistic	P-value
Personal Income (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	.929	**0.336**	5.230	**0.023**
Casino	25.349	0.000	.137	0.712
State Code	4.373	0.016	.889	0.415
Time	20.231	0.000	9.189	0.003
Population Density	201.410	0.000	467.743	0.000
Federal Gov. Expenditures	65.681	0.000	483.387	0.000
Unemployment Rate	14.089	0.000	4.462	0.035
Race	1.625	0.205	.001	0.970
Average Wages Per Job (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	.030	**0.862**	22.151	**0.000**
Casino	7.193	0.009	4.322	0.041
State Code	15.028	0.000	2.856	0.063
Time	48.451	0.000	93.511	0.000
Population Density	8.167	0.004	7.571	0.006
Federal Gov. Expenditures	7.644	0.006	6.029	0.014
Unemployment Rate	5.887	0.016	36.114	0.000
Race	.036	0.851	1.618	0.206
Per Capita Income (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	.006	**0.941**	17.006	**0.000**
Casino	19.765	0.000	3.060	0.084
State Code	6.091	0.004	1.193	0.309
Time	28.916	0.000	156.909	0.000
Population Density	15.634	0.000	32.864	0.000
Federal Gov. Expenditures	58.434	0.000	4.282	0.039
Unemployment Rate	24.624	0.000	20.362	0.000
Race	7.706	0.007	3.152	0.079
Median Household Inc. (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	9.568	**0.002**	31.214	**0.000**
Casino	.680	0.412	2.643	0.108
State Code	6.512	0.002	1.670	0.194
Time	73.287	0.000	72.310	0.000
Population Density	.121	0.728	30.379	0.000
Federal Gov. Expenditures	3.534	0.061	.010	0.920
Unemployment Rate	.342	0.559	14.891	0.000
Race	59.561	0.000	74.080	0.000
Housing Units (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	3.657	**0.056**	4.839	**0.028**
State Code	6.311	0.003	4.718	0.012
Time	7.092	0.008	7.688	0.006
Population Density	3438.091	0.000	676.117	0.000
Federal Gov. Expenditures	18.975	0.000	484.735	0.000
Unemployment Rate	3.947	0.048	1.162	0.282
Race	6.024	0.015	1.422	0.234

Table 4.5 - Continued

Variables	GO Zone		Non-GO Zone	
	F- statistic	P-value	F- statistic	P-value
Building Permits (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	.778	**0.378**	.034	**0.854**
State Code	4.549	0.013	.237	0.789
Time	.333	0.564	2.609	0.107
Population Density	12.223	0.001	89.733	0.000
Federal Gov. Expenditures	53.826	0.000	.821	0.366
Unemployment Rate	.320	0.572	6.580	0.011
Race	16.414	0.000	.299	0.586
Total Industry Earnings (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	10.029	**0.002**	8.701	**0.003**
Casino	26.613	0.000	1.051	0.308
State Code	3.316	0.042	1.160	0.319
Time	28.810	0.000	8.909	0.003
Population Density	463.764	0.000	216.775	0.000
Federal Gov. Expenditures	91.981	0.000	144.297	0.000
Unemployment Rate	19.391	0.000	15.073	0.000
Race	3.052	0.083	.424	0.516
Community Grant Funding	19.667	0.000	.229	.632
Construction Earnings (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	.844	**0.359**	.000	**0.995**
State Code	2.110	0.128	.246	0.783
Time	5.710	0.017	.120	0.729
Population Density	134.507	0.000	131.726	0.000
Federal Gov. Expenditures	100.678	0.000	3.379	0.067
Unemployment Rate	8.197	0.004	9.441	0.002
Race	.066	0.799	.861	0.356
Community Grant Funding	52.276	0.000	.206	.650
Manufacturing Earnings (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	.014	**0.907**	2.574	**0.109**
State Code	3.619	0.031	2.523	0.088
Time	1.113	0.292	1.777	0.183
Population Density	4.681	0.031	99.362	0.000
Federal Gov. Expenditures	.970	0.325	65.524	0.000
Unemployment Rate	2.158	0.143	18.979	0.000
Race	2.606	0.109	.205	0.652
Total Employment (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	2.459	**0.118**	1.318	**0.252**
Casino	20.864	0.000	.929	0.338
State Code	3.564	0.033	1.547	0.219
Time	17.163	0.000	2.425	0.120
Population Density	1947.620	0.000	680.222	0.000
Federal Gov. Expenditures	61.882	0.000	254.623	0.000
Unemployment Rate	12.836	0.000	10.745	0.001
Race	.021	0.885	1.046	0.307

Table 4.5 - Continued

Variables	GO Zone		Non-GO Zone	
	F- statistic	P-value	F- statistic	P-value
Construction Employment (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	1.708	**0.192**	.095	**0.759**
State Code	3.585	0.033	1.163	0.317
Time	5.694	0.017	4.424	0.036
Population Density	72.284	0.000	641.735	0.000
Federal Gov. Expenditures	99.968	0.000	34.393	0.000
Unemployment Rate	1.501	0.221	7.525	0.006
Race	.060	0.807	.447	0.505
Manufacturing Employment (DV)				
Overall Model		0.000		0.000
Katrina (Pre-K vs. Post-K)	.835	**0.361**	.363	**0.547**
State Code	1.983	0.144	5.259	0.008
Time	.824	0.365	19.126	0.000
Population Density	24.936	0.000	173.735	0.000
Federal Gov. Expenditures	2.420	0.121	.022	0.882
Unemployment Rate	3.641	0.057	33.836	0.000
Race	7.945	0.006	.241	0.625

Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
The Katrina independent variable is used to identify pre- and post-Katrina time periods. Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables (DV) represent actual value by county for each variable.

Research Question One - Multiple Regression Procedures

Multiple regression is the most widely used multivariate dependence technique, primarily because of its ability to predict and explain metric variables (Hair et al. 2006). The second step in phase one of the research utilizes multiple OLS regression procedures to analyze the data. The OLS regression models used in analyzing research question 1 are as follows:

$$\Delta AIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 HUD_t + \beta_3 CAS_t + \beta_4 PDE_t + \beta_5 FGE_t + \beta_6 UNR_t + \beta_7 RAC_t + \beta_8 COU_t + \beta_9 STA_t + \varepsilon_t$$

$$\Delta MIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta CIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 HUD_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta PCI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta PEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta TEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta HSE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta MEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta CEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta BDP_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 RAC_t + \beta_6 COU_t + \beta_7 STA_t + \varepsilon_t$$

$$\Delta MHI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

$$\Delta AWJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 CAS_t + \beta_3 PDE_t + \beta_4 FGE_t + \beta_5 UNR_t + \beta_6 RAC_t + \beta_7 COU_t + \beta_8 STA_t + \varepsilon_t$$

where, for a given county/parish at a time period *t*:

GOZ	=	GO Zone county (1=yes, 0=no);
ΔAIE	=	change in annual industry earnings;
ΔMIE	=	change in total manufacturing earnings;
ΔCIE	=	change in total construction earnings;
ΔPCI	=	change in per capita income;
ΔPEI	=	change in personal income;
ΔTEI	=	change in total employment for all industries;
ΔHSE	=	change in housing unit estimates;
ΔMEJ	=	change in total manufacturing employment;
ΔCEJ	=	change in total construction employment;
ΔBDP	=	change in the number of building permits issued annually;
ΔMHI	=	change in the median household income;
ΔAWJ	=	change in the average wages per job;
HUD	=	grant money provided to rebuild damaged housing;
CAS	=	dummy variable for casinos by county (1=yes, 0=no);
PDE	=	population density;
FGE	=	total federal government expenditures by county;
UNR	=	civilian labor force unemployment rate by county;
RAC	=	percentage of the resident population that is white;
COU	=	county identification control variable;
STA	=	state identification control variable;

Multiple regression is a statistical technique used to analyze the relationship between a dependent variable and a set of independent variables. Yearly changes were calculated for each dependent variable and these values were analyzed using OLS multiple regression procedures.[34] Table 4.6 contains results from the multiple regression procedures implemented in this research.[35]

[34] Appendices BM through BX contain information by state pertaining to the annual change values for

Since the second phase of data analysis on research question one used in this research study utilizes standard multiple regression equations, the models must be tested for violations of the regression assumptions. The models must first satisfy the assumption of linearity. Partial regression plots of each independent variable on the dependent variables exhibit no curvilinear patterns that would violate the linearity assumption in this model. The second assumption concerns homoscedasticity or constant variance of the error term. A review of the studentized residuals plotted against each dependent variable shows no presence of unequal variances or heteroscedasticity through a constant pattern in the residuals. The residuals are randomly spread over the plot.

Panel data sets contain repeated observations from the same unit of measurement and violate the independence assumption. One method to remove the unobserved effect is to difference the data in adjacent time periods; then, a standard multiple regression analysis on the differences can be used to analyze the data (Wooldridge 2009). By calculating annual changes and utilizing these values, the violation of the independence assumption can be avoided and standard OLS regression techniques can be used to analyze the data. The residual plots show no consistent patterns related to independence of the error term and the partial regression plots indicate no major violations of the independence of the error term for the predicted variables.

The normality assumption refers to the shape of the data distribution for dependent variables. Normality was examined through the use of histograms of the

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each dependent variable.

[35] Appendices AC through AN contain information by state pertaining to Table 4.6.

residuals and normal probability plots. The histogram distributions for the majority of the dependent variables approximated normal distributions, and the normal probability plots showed only minimal deviations from the normal diagonal for most variables. There were a few of the dependent variables, however, that showed leptokurtic tendencies. The shape of any distribution can be described by two measures: kurtosis and skewness (Hair et al. 2006). Kurtosis refers to the "peakedness" or "flatness" of the distribution compared to the normal distribution, and skewness refers to whether the distribution is shifted to one side or whether the distribution is balanced and symmetrical (Hair et al. 2006). Distributions that are taller than the normal distribution are referred to as leptokurtic, which occurs in some of the dependent variables used in this research, including three of the primary dependent variables of interests (average wages per job, manufacturing employment, and manufacturing earnings). Statistical tests were performed to test the normality assumption and certain variables were confirmed to be leptokurtic and to potentially violate the normality assumption. These "peaked" distributions appear to be caused by extreme values for certain counties on the coastline of Louisiana and Mississippi where hurricane damage was the greatest. Nonnormality in small sample sizes of 50 or fewer observations can have a substantial impact on the results; however the effects are negligible for sample sizes of 200 or more (Hair et al. 2006). The usual tests used in regression analysis are robust in the sense that only extreme departures from normality yield spurious results (Kleinbaum et al. 2008). These results indicate no major violations of the regression assumptions required for appropriate multiple regression models and no transformations are

necessary to proceed with the interpretation of the results; however, additional statistical procedures will be performed during a sensitivity analysis to verify results.

The results in Table 4.6 compare the annual change values for GO Zone counties to non-GO Zone counties pre- and post-Katrina. Each overall model analyzed was statistically significant below the alpha level of 0.05. Based on the multiple regression procedures, six of the dependent variables showed a statistically significant change at the alpha level equal to 0.05 when comparing the yearly change values from the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were construction employment, with a post-Katrina p-value of 0.001, construction net earnings, with a post-Katrina p-value of 0.001, average wages per job, with a post-Katrina p-value of 0.000, total industry net earnings, with a post-Katrina p-value of 0.000, manufacturing employment, with a post-Katrina p-value of 0.000, and manufacturing net earnings, with a post-Katrina p-value of 0.000.

Additional statistical procedures were performed on the full dataset examining the interaction between GO Zone versus non-GO Zone counties pre- and post-Katrina; essentially testing whether the pre-Katrina and post-Katrina regression coefficients reported in Table 4.6 for the *GO Zone* variable in each model were statistically different. Based on these multiple regression procedures, five of the dependent variables showed a statistically significant change at the alpha level equal to 0.05 when comparing the *GO Zone* variable regression coefficient from the pre-Katrina time period to the coefficient from the post-Katrina time period, after controlling for the independent variables included in each model. These variables were construction

employment, with p-value of 0.017, construction earnings, with p-value of 0.021, total industry net earnings, with a p-value of 0.015, average wages per job, with a p-value of 0.000, and manufacturing employment, with a p-value of 0.004. These results verify previously reported statistical differences concerning these variables.

The significant differences in the construction industry were not unexpected and can be explained by the physical property damage caused by Hurricane Katrina. Based on actual values used in the previous linear mixed effects models (see Table 4.4), total industry net earnings and average wages per job were both statistically significantly different pre- and post-Katrina, indicating that GO Zone incentives had not caused these differences. In addition, the significant difference in the annual change values of average wages per job appear to be driven primarily by extreme values or outliers along the southern coast of Louisiana, indicating that these findings could be caused by Hurricane Katrina. The significant differences in manufacturing net earnings and employment could provide support for the effectiveness of regional tax incentives, but additional procedures analyzing pre-Katrina GO Zone counties to themselves post-Katrina need to be performed to verify results before conclusions can be drawn.

Table 4.6

Summary Table Comparing GO Zone to Non-GO Zone Counties Pre- and Post-Katrina using Annual Change Values and Multiple Regression

	Pre-Katrina			Post-Katrina		
Variables	Beta	t - statistic	P-value	Beta	t – statistic	P-value
Personal Income (DV)						
Overall Model			0.000			0.000
Go Zone	-.044	-1.266	**0.206**	.057	1.536	**0.125**
Casino	-.053	-1.468	0.143	.025	.654	0.514
State Code	-.108	-1.247	0.213	-.069	-.747	0.455
Time	.112	3.401	0.001	-.048	-1.331	0.184
Population Density	.108	1.710	0.088	.674	12.159	0.000
Federal Gov. Expenditures	.646	10.188	0.000	-.225	-4.183	0.000
Unemployment Rate	-.133	-2.834	0.005	-.112	-1.978	0.048
Race	-.005	-.110	0.913	.010	.229	0.819
County ID	.073	.871	0.384	.022	.246	0.806
Average Wage Per Job (DV)						
Overall Model			0.025			0.000
Go Zone	.005	.098	**0.922**	.180	4.116	**0.000**
Casino	-.039	-.664	0.507	.007	.151	0.880
State Code	-.255	-1.845	0.066	.163	1.494	0.136
Time	.137	2.613	0.009	.036	.852	0.394
Population Density	.006	.060	0.952	-.171	-2.637	0.009
Federal Gov. Expenditures	.115	1.129	0.260	.256	4.057	0.000
Unemployment Rate	.022	.288	0.773	-.229	-3.462	0.001
Race	-.082	-1.190	0.235	.011	.203	0.839
County ID	.295	2.196	0.029	-.174	-1.667	0.096
Per Capita Income (DV)						
Overall Model			0.000			0.000
Go Zone	-.158	-2.968	**0.003**	.056	1.270	**0.204**
Casino	-.004	-.080	0.936	.038	.834	0.405
State Code	-.298	-2.272	0.024	.034	.305	0.760
Time	.151	3.028	0.003	-.009	-.219	0.827
Population Density	-.061	-.639	0.523	-.363	-5.515	0.000
Federal Gov. Expenditures	.053	.552	0.581	.437	6.820	0.000
Unemployment Rate	-.170	-2.398	0.017	-.104	-1.552	0.121
Race	-.362	-5.516	0.000	.036	.677	0.498
County ID	.301	2.357	0.019	-.045	-.428	0.669
Median Household Inc. (DV)						
Overall Model			0.000			0.000
Go Zone	-.114	-2.137	**0.033**	.062	1.366	**0.172**
Casino	-.063	-1.144	0.253	.015	.320	0.749
State Code	-.168	-1.287	0.199	.155	1.372	0.171
Time	-.257	-5.174	0.000	.114	2.574	0.010
Population Density	-.090	-.942	0.347	.000	.002	0.999
Federal Gov. Expenditures	-.065	-.682	0.496	.028	.428	0.668
Unemployment Rate	-.174	-2.463	0.014	-.233	-3.403	0.001
Race	.058	.884	0.377	.008	.140	0.889
County ID	.307	2.413	0.016	-.129	-1.201	0.230

Table 4.6 - Continued

	Pre-Katrina			Post-Katrina		
Variables	Beta	t - statistic	P-value	Beta	t – statistic	P-value
Housing Units (DV)						
Overall Model			0.000			0.000
Go Zone	.057	1.237	**0.217**	-.001	-.036	**0.971**
State Code	.047	.418	0.676	.002	.018	0.986
Time	.013	.303	0.762	.041	1.020	0.308
Population Density	.095	1.151	0.250	.444	7.368	0.000
Federal Gov. Expenditures	.319	3.818	0.000	-.713	-12.244	0.000
Unemployment Rate	-.239	-3.862	0.000	-.060	-.976	0.330
Race	.108	1.901	0.058	-.026	-.528	0.598
County ID	-.107	-.971	0.332	-.001	-.014	0.989
Building Permits (DV)						
Overall Model			0.000			0.000
Go Zone	.067	1.259	**0.209**	.029	.662	**0.508**
State Code	-.009	-.068	0.946	.058	.532	0.595
Time	-.026	-.525	0.600	-.194	-4.475	0.000
Population Density	-.108	-1.134	0.257	-.257	-3.928	0.000
Federal Gov. Expenditures	.371	3.840	0.000	.257	4.068	0.000
Unemployment Rate	-.072	-1.008	0.314	.155	2.310	0.021
Race	.094	1.428	0.154	.028	.522	0.602
County ID	-.062	-.488	0.626	-.050	-.473	0.636
Total Industry Earnings (DV)						
Overall Model			0.000			0.000
Go Zone	-.044	-1.452	**0.147**	.127	4.169	**0.000**
Casino	-.014	-.454	0.650	.120	3.739	0.000
State Code	-.032	-.430	0.667	-.038	-.502	0.616
Time	.017	.597	0.551	-.058	-1.959	0.051
Population Density	.179	3.246	0.001	.694	15.470	0.000
Federal Gov. Expenditures	.645	11.681	0.000	.087	1.835	0.067
Unemployment Rate	-.136	-3.334	0.001	-.029	-.636	0.525
Race	-.033	-.890	0.374	.041	1.139	0.255
County ID	.031	.425	0.671	-.024	-.332	0.740
Community Grant Funding (Post K)				-.452	-12.955	0.000
Construction Earnings (DV)						
Overall Model			0.000			0.000
Go Zone	-.136	-2.649	**0.008**	.137	3.366	**0.001**
State Code	-.226	-1.770	0.078	.172	1.735	0.083
Time	.045	.929	0.354	-.170	-4.319	0.000
Population Density	.137	1.499	0.135	-.113	-1.919	0.056
Federal Gov. Expenditures	.276	2.970	0.003	.664	10.646	0.000
Unemployment Rate	-.170	-2.425	0.016	.029	.480	0.632
Race	-.037	-.571	0.569	.117	2.552	0.011
County ID	.175	1.396	0.164	-.183	-1.906	0.057
Community Grant Funding (Post K)				-.179	-3.952	0.000
Manufacturing Earnings (DV)						
Overall Model			0.001			0.000
Go Zone	-.054	-.931	**0.353**	.158	3.722	**0.000**
State Code	-.142	-.998	0.319	-.157	-1.500	0.134
Time	-.044	-.816	0.415	-.101	-2.436	0.015
Population Density	-.190	-1.861	0.064	.274	4.410	0.000
Federal Gov. Expenditures	.322	3.108	0.002	.090	1.495	0.136
Unemployment Rate	-.179	-2.281	0.023	-.110	-1.724	0.085
Race	-.050	-.703	0.483	.007	.139	0.889
County ID	.147	1.061	0.289	.059	.588	0.557

Table 4.6 - Continued

	Pre-Katrina			Post-Katrina		
Variables	Beta	t - statistic	P-value	Beta	t – statistic	P-value
Total Employment (DV)						
Overall Model			0.000			0.000
Go Zone	.002	.045	**0.965**	.054	1.309	**0.191**
Casino	.020	.371	0.711	-.003	-.065	0.948
State Code	-.115	-.883	0.378	.040	.392	0.695
Time	.090	1.820	0.070	-.023	-.566	0.571
Population Density	-.002	-.022	0.982	.641	10.499	0.000
Federal Gov. Expenditures	.034	.352	0.725	-.617	-10.400	0.000
Unemployment Rate	-.281	-3.973	0.000	-.108	-1.743	0.082
Race	.078	1.200	0.231	-.005	-.109	0.913
County ID	.024	.189	0.850	-.050	-.513	0.608
Construction Employment (DV)						
Overall Model			0.002			0.000
Go Zone	-.084	-1.461	**0.145**	.142	3.350	**0.001**
State Code	-.238	-1.671	0.096	.103	.980	0.328
Time	-.021	-.387	0.699	-.201	-4.856	0.000
Population Density	-.019	-.184	0.854	-.024	-.395	0.693
Federal Gov. Expenditures	.013	.128	0.899	.402	6.691	0.000
Unemployment Rate	-.191	-2.438	0.015	.029	.466	0.641
Race	.042	.581	0.562	.182	3.756	0.000
County ID	.160	1.147	0.252	-.119	-1.173	0.241
Manufacturing Employment (DV)						
Overall Model			0.000			0.000
Go Zone	.033	.595	**0.552**	.176	3.882	**0.000**
State Code	-.003	-.021	0.983	.057	.505	0.614
Time	.152	2.897	0.004	-.152	-3.437	0.001
Population Density	-.043	-.439	0.661	.023	.344	0.731
Federal Gov. Expenditures	-.292	-2.916	0.004	-.124	-1.929	0.054
Unemployment Rate	-.172	-2.228	0.027	-.241	-3.536	0.000
Race	-.102	-1.450	0.148	-.086	-1.631	0.104
County ID	.045	.334	0.739	-.071	-.654	0.513

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
An analysis of variance (ANOVA) was calculated to determine the overall significance of each model.

When performing research with time-series observations, the data should be analyzed for serial correlation, also called autocorrelation. Serial correlation occurs in time-series studies when the errors associated with a given time period carry over into future time periods. Serial correlation will not affect the unbiasedness or consistency of

OLS estimators, but it does affect their efficiency, which can lead to inaccurate parameter estimates. The most common statistical test for serial correlation is the Durbin-Watson test. The Durbin-Watson critical values for data with 200 cases and nine variables (including the intercept) at the 0.01 significance level are dL = 1.582 and dU = 1.768. These critical values will be used in this research to analyze the data for serial correlation. Based on the null hypothesis that error terms are not autocorrelated, the Durbin-Watson statistic for each dependent variable will be compared to the lower limit critical value of 1.582, and if the Durbin-Watson statistic is below the critical value then the null hypothesis will be rejected and existence of serial correlation will be confirmed.

Table 4.7 provides additional information for the regression models analyzed in Table 4.6. Table 4.7 provides the Durbin-Watson statistic for each dependent variable for both pre- and post-Katrina, and also provides the R-Squared and Adjusted R-Squared for each variable, which provides insight into the explanatory power of each model. Based on the Durbin-Watson test statistic, the only dependent variable that exhibits serial correlation is pre-Katrina housing unit estimates. The primary timeframe of interest in this research is post-Katrina and housing unit estimates is not a primary variable of interest, so no adjustments will be made to correct this serial correlation. For the remaining 11 dependent variables, the null hypothesis of non-autocorrelated errors can be accepted and statistical analysis can thus continue with no corrections for positive or negative serial correlation in these time-series models.

Table 4.7

Supplemental Information for Summary Table 4.6

Dependent Variables	Pre-Katrina			Post-Katrina		
	R-Squared	Adj. R-Squared	Durbin-Watson	R-Squared	Adj. R-Squared	Durbin-Watson
Personal Income	.629	.620	1.788	.365	.354	2.346
Average Wage Per Job	.052	.028	2.290	.129	.114	2.067
Per Capita Income	.146	.125	2.343	.103	.088	2.486
Median Household Inc.	.152	.130	2.139	.066	.050	2.581
Housing Units	.352	.337	1.083	.234	.222	1.947
Building Permits	.133	.114	1.780	.096	.083	2.124
Total Industry Earnings	.719	.712	1.775	.586	.579	1.976
Construction Earnings	.256	.237	1.794	.327	.315	1.757
Manufacturing Earnings	.081	.058	1.651	.235	.223	1.785
Total Employment	.156	.135	1.725	.230	.217	1.981
Construction Employment	.073	.050	2.077	.246	.234	1.806
Manufacturing Employment	.123	.102	1.704	.122	.108	1.884

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
An analysis of variance (ANOVA) was calculated to determine the overall significance of each model.

GO Zone versus GO Zone, Non-GO Zone versus Non-GO Zone Pre- and Post-Katrina

In addition to the multiple regression procedures listed above, additional tests were performed comparing GO Zone counties to themselves pre- and post-Katrina. Table 4.8 provides the results from these additional multiple regression tests. An alternate version of the *GO Zone* independent variable was created and named *Katrina* to identify pre-Katrina versus post-Katrina time periods. These statistical tests were performed to determine whether statistically significant differences existed in GO Zone

counties post-Katrina when compared to GO Zone counties pre-Katrina. Significant results on the primary dependent variables of interest (personal income, average wages per job, manufacturing employment, and manufacturing earnings) would provide support for the effectiveness of tax policy investment incentives.

The models were tested for violations of the multiple regression assumptions. Partial regression plots of each independent variable on the dependent variables exhibit no curvilinear patterns that would violate the linearity assumption in this model. A review of the studentized residuals plotted against each dependent variable shows no presence of unequal variances or heteroscedasticity through a constant pattern in the residuals. The residual plots show no consistent patterns related to independence of the error term and the partial regression plots indicate no major violations of the independence of the error term for the predicted variables. Once again, several of the dependent variables showed leptokurtic (kurtosis) tendencies, indicating nonnormality. Due to the large sample sizes used in this research, however, these "peaked" distributions should not lead to spurious results. The graphical analysis indicates no major violations of the regression assumptions required for appropriate multiple regression models and no transformations are necessary to proceed with the interpretation of the results; however, additional statistical procedures will be performed during a sensitivity analysis to verify results.

The results in Table 4.8 compare of GO Zone counties to GO Zone counties pre- and post-Katrina and non-GO Zone counties to non-GO Zone counties pre- and post-Katrina.[36] Each overall model analyzed was statistically significant below the alpha level of 0.05. Based on the additional multiple regression procedures, only three of the

[36] Appendices AO through AZ contain information by state pertaining to Table 4.8.

dependent variables showed a statistically significant change, at the alpha level equal to 0.05, when comparing the GO Zone counties for the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were construction employment, with a p-value of 0.000, construction net earnings, with a p-value of 0.000, and the number of building permits issued annually, with a p-value of 0.009. These significant differences were not unexpected and confirm earlier results from the linear mixed effects models. The physical property damage caused by Katrina would lead to the increased annual changes in construction employment, construction net earnings and building permits issued.

In the previous multiple regression procedures (see Table 4.6); significant differences existed in average wages per job when comparing GO Zone to non-GO Zone counties post-Katrina. Results shown in Table 4.8 provide insight into this difference in average wages per job. In GO Zone counties the year-over-year change in average wages per job were not significantly different when comparing pre-Katrina time periods to post-Katrina time periods; however, in non-GO Zone counties, average wages per job decreased post-Katrina and these changes were statistically significant (p-value 0.029), providing an explanation for the earlier findings. The significant differences in manufacturing net earnings and manufacturing employment from previous regressions were not supported, and these results do not provide support for the effectiveness of regional tax incentives. Overall, findings reported in Table 4.8 do not indicate that the tax incentives provided to the GO Zone counties have had a statistically significant impact on key economic indicators evaluated in this research.

Table 4.8

Summary Table Comparing GO Zone Counties to GO Zone Counties and non-GO Zone Counties to non-GO Zone Counties Pre- and Post-Katrina using Annual Change Values and Multiple Regression						
	GO Zone			Non-GO Zone		
Variables (Yearly Changes)	Beta	t - statistic	P-value	Beta	t – statistic	P-value
Personal Income (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.113	1.050	**0.294**	-.001	-.019	**0.985**
Casino	.009	.195	0.846	.011	.407	0.684
State Code	-.027	-.245	0.807	-.024	-.357	0.721
Time	-.038	-.360	0.719	-.026	-.365	0.716
Population Density	.522	8.702	0.000	.535	9.554	0.000
Federal Gov. Expenditures	-.115	-2.020	0.044	.295	5.320	0.000
Unemployment Rate	-.163	-2.682	0.008	-.070	-1.696	0.091
Race	.039	.749	0.454	-.043	-1.251	0.212
County ID	-.019	-.182	0.855	.008	.125	0.901
Average Wage Per Job (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.196	1.610	**0.108**	-.278	-2.193	**0.029**
Casino	-.013	-.237	0.813	-.020	-.422	0.673
State Code	-.066	-.528	0.597	.191	1.652	0.099
Time	-.005	-.043	0.965	.274	2.253	0.025
Population Density	-.105	-1.548	0.122	-.211	-2.183	0.030
Federal Gov. Expenditures	.232	3.594	0.000	.212	2.223	0.027
Unemployment Rate	-.104	-1.515	0.131	-.352	-4.970	0.000
Race	.042	.700	0.484	-.130	-2.178	0.030
County ID	.013	.109	0.913	-.144	-1.266	0.206
Per Capita Income (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.120	.971	**0.332**	-.431	-3.399	**0.001**
Casino	.002	.042	0.966	.074	1.528	0.127
State Code	-.001	-.007	0.994	-.140	-1.210	0.227
Time	-.103	-.855	0.393	.334	2.737	0.006
Population Density	-.280	-4.078	0.000	-.201	-2.076	0.038
Federal Gov. Expenditures	.371	5.680	0.000	.179	1.866	0.063
Unemployment Rate	-.092	-1.320	0.188	-.270	-3.802	0.000
Race	.012	.205	0.838	-.235	-3.933	0.000
County ID	-.033	-.273	0.785	.165	1.456	0.146
Median Household Inc. (DV)						
Overall Model			0.000			0.014
Katrina (Pre-K vs. Post-K)	.045	.369	**0.712**	.004	.030	**0.976**
Casino	-.016	-.296	0.767	-.002	-.032	0.975
State Code	-.018	-.145	0.885	.140	1.182	0.238
Time	.187	1.581	0.115	.104	.838	0.402
Population Density	-.053	-.789	0.431	.052	.521	0.603
Federal Gov. Expenditures	.084	1.308	0.192	-.072	-.733	0.464
Unemployment Rate	-.177	-2.585	0.010	-.173	-2.382	0.018
Race	.064	1.082	0.280	-.028	-.459	0.647
County ID	.005	.040	0.968	-.124	-1.068	0.286

Table 4.8 - Continued

	GO Zone			Non-GO Zone		
Variables	Beta	t - statistic	P-value	Beta	t – statistic	P-value
Housing Units (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	-.106	-.934	**0.351**	.081	1.085	**0.278**
State Code	.048	.413	0.680	.149	2.199	0.028
Time	.140	1.272	0.204	-.086	-1.204	0.229
Population Density	.370	6.065	0.000	.882	15.531	0.000
Federal Gov. Expenditures	-.651	-11.087	0.000	-.109	-1.936	0.053
Unemployment Rate	-.057	-.884	0.377	-.145	-3.473	0.001
Race	.015	.265	0.791	-.059	-1.726	0.085
County ID	-.050	-..450	0.653	-.067	-1.000	0.318
Building Permits (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.327	2.632	**0.009**	.058	.458	**0.647**
State Code	.030	.241	0.810	-.045	-.391	0.696
Time	-.472	-3.902	0.000	-.270	-2.214	0.027
Population Density	-.075	-1.116	0.265	-.200	-2.075	0.039
Federal Gov. Expenditures	.198	3.072	0.002	.024	.248	0.805
Unemployment Rate	.109	1.544	0.123	.019	.265	0.791
Race	.038	.624	0.533	.005	.080	0.936
County ID	-.022	-.180	0.857	.023	.204	0.839
Total Industry Earnings (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.117	1.328	**0.185**	-.024	-.335	**0.738**
Casino	.080	2.079	0.038	.039	1.393	0.164
State Code	-.052	-.582	0.561	.037	.560	0.576
Time	-.039	-.452	0.651	-.104	-1.499	0.135
Population Density	.563	11.430	0.000	.355	6.392	0.000
Federal Gov. Expenditures	.189	3.617	0.000	.480	8.751	0.000
Unemployment Rate	-.097	-1.958	0.51	-.076	-1.862	0.063
Race	.056	1.319	0.188	-.047	-1.362	0.174
County ID	.003	.037	0.971	-.028	-.434	0.664
Community Grant Funding	-.405	-10.092	0.000	.014	.507	0.612
Construction Earnings (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.375	3.564	**0.000**	.195	1.462	**0.145**
State Code	.000	-.001	0.999	-.030	-.246	0.806
Time	-.294	-2.895	0.004	-.369	-2.870	0.004
Population Density	-.085	-1.507	0.133	.118	1.171	0.242
Federal Gov. Expenditures	.746	12.046	0.000	.002	.017	0.987
Unemployment Rate	-.011	-.209	0.834	-.147	-1.941	0.053
Race	.121	2.535	0.012	-.058	-.941	0.347
County ID	-.050	-.481	0.631	.037	.309	0.758
Community Grant Funding	-.238	-5.046	0.000	.044	.897	0.370
Manufacturing Earnings (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.186	1.485	**0.138**	.089	.744	**0.457**
State Code	-.038	-.295	0.768	-.152	-1.372	0.171
Time	-.139	-1.141	0.254	-.246	-2.122	0.034
Population Density	.095	1.411	0.159	-.059	-.646	0.518
Federal Gov. Expenditures	.129	1.993	0.047	.463	5.135	0.000
Unemployment Rate	-.185	-2.706	0.007	-.107	-1.567	0.118
Race	.002	.036	0.971	-.008	-.143	0.887
County ID	.037	.299	0.765	.091	.843	0.400

Table 4.8 - Continued

Variables	GO Zone			Non-GO Zone		
	Beta	t - statistic	P-value	Beta	t – statistic	P-value
Total Employment (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.076	.641	**0.522**	.095	.958	**0.338**
Casino	-.027	-.523	0.601	.076	2.018	0.044
State Code	.035	.285	0.776	.099	1.101	0.272
Time	.025	.213	0.831	-.097	-1.018	0.309
Population Density	.419	6.353	0.000	.515	6.824	0.000
Federal Gov. Expenditures	-.469	-7.482	0.000	-.010	-.131	0.896
Unemployment Rate	-.112	-1.671	0.095	-.285	-5.158	0.000
Race	.066	1.147	0.252	-.050	-1.070	0.285
County ID	-.062	-.528	0.598	-.092	-1.046	0.296
Construction Employment (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.549	4.656	**0.000**	.165	1.260	**0.209**
State Code	-.103	-.854	0.394	-.036	-.299	0.765
Time	-.436	-3.815	0.000	-.247	-1.964	0.050
Population Density	-.106	-1.670	0.096	.374	3.828	0.000
Federal Gov. Expenditures	.427	7.008	0.000	-.264	-2.706	0.007
Unemployment Rate	.011	.184	0.854	-.196	-2.644	0.009
Race	.213	3.970	0.000	-.026	-.428	0.669
County ID	.039	.333	0.740	.029	.252	0.801
Manufacturing Employment (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.140	1.072	**0.284**	-.050	-.407	**0.684**
State Code	.036	.276	0.782	.043	.385	0.700
Time	-.082	-.648	0.517	-.078	-.665	0.507
Population Density	-.042	-.600	0.549	-.749	-8.114	0.000
Federal Gov. Expenditures	-.100	-1.484	0.139	.355	3.884	0.000
Unemployment Rate	-.201	-2.862	0.004	-.459	-6.516	0.000
Race	-.033	-.537	0.592	-.148	-2.612	0.009
County ID	.008	.065	0.948	.015	.136	0.892

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
The Katrina independent variable is used to identify pre- and post-Katrina time periods.
An analysis of variance (ANOVA) was calculated to determine the overall significance of each model.

The data used for these regression procedures was analyzed for serial correlation. Table 4.9 provides additional information for the regression models analyzed in Table 4.8. Table 4.9 provides the Durbin-Watson statistic for each dependent variable for both GO Zone and non-GO Zone counties, and also reports the

R-Squared and Adjusted R-Squared for each variable, which provides insight into the explanatory power of each model. Based on the Durbin-Watson test statistic (evaluated at dL = 1.582), the dependent variables that exhibit serial correlation are non-GO Zone housing unit estimates, non-GO Zone personal income, and non-GO Zone construction earnings. The primary counties/parishes of interest in this research are GO Zone, so no adjustments will be made to correct this serial correlation. For the remaining dependent variables, the null hypothesis of non-autocorrelated errors can be accepted and it is possible to continue with no corrections for positive or negative serial correlation in these time-series models.

Table 4.9

Supplemental Information for Summary Table 4.8

	GO Zone			Non-GO Zone		
Dependent Variables	R-Squared	Adj. R-Squared	Durbin-Watson	R-Squared	Adj. R-Squared	Durbin-Watson
Personal Income	.308	.294	2.209	.694	.688	1.461
Average Wage Per Job	.113	.095	2.031	.088	.069	2.325
Per Capita Income	.092	.074	2.489	.085	.067	2.343
Median Household Inc.	.123	.105	2.479	.045	.026	2.646
Housing Units	.233	.219	1.952	.681	.676	0.674
Building Permits	.076	.059	2.014	.082	.066	1.973
Total Industry Earnings	.544	.533	1.779	.702	.695	1.815
Construction Earnings	.401	.388	1.691	.079	.059	1.406
Manufacturing Earnings	.112	.095	1.704	.256	.242	1.896
Total Employment	.164	.147	1.827	.445	.434	1.584
Construction Employment	.238	.223	1.922	.113	.096	1.831
Manufacturing Employment	.046	.028	1.753	.220	.205	1.660

All dependent variables represent average annual change by county for each variable for 2003, 2004, 2006, 2007, and 2008.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.

Based on the combined data analysis from all of the models tested with linear mixed effects and multiple regression procedures, statistical evidence supporting the rejection of hypothesis number one (H1) does not exist. The null hypothesis, therefore, is supported and the conclusion is drawn that the tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005 have no impact on economic growth in the affected region. Additional statistical procedures will be performed during a sensitivity analysis to help confirm or deny these conclusions.

Research Question Two

As noted in Chapter Three, the second research question examines whether tax policy investment incentives at the regional level are a zero-sum game, where economic growth created by incentives in one region come at the expense of the surrounding regions. The second phase of the research utilizes multiple regression implementing the same panel data set used during the first research phase. Research question 2 will be tested with many of the same economic indicators implemented in research question 1; however research question 2 will examine the percentage change in each of these variables individually at the county level and will attempt to determine whether any increases in economic growth in the affected core disaster area are offset by decreases in the surrounding counties. Each dependent variable will be analyzed individually for the GO Zone timeframe (2006-2008) and for the two-year period preceding Hurricane Katrina (2003-2004). The models are as follows:

$$\%\Delta AIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta MIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta CIE_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta PCI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta PEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta TEI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta MEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta CEJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta MHI_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

$$\%\Delta AWJ_t = \beta_0 + \beta_1 GOZ_t + \beta_2 PDE_t + \beta_3 FGE_t + \beta_4 UNR_t + \beta_5 STA_t + \varepsilon_t$$

where, for a given county/parish at a time period *t*:

GOZ	=	GO Zone county (1=yes, 0=no);
$\%\Delta AIE$	=	percentage change in annual industry earnings;
$\%\Delta MIE$	=	percentage change in manufacturing industry earnings;
$\%\Delta CIE$	=	percentage change in construction industry earnings;
$\%\Delta PCI$	=	percentage change in per capita income;
$\%\Delta PEI$	=	percentage change in personal income;
$\%\Delta TEI$	=	percentage change in total employment for all industries;
$\%\Delta MEJ$	=	percentage change in total manufacturing employment;
$\%\Delta CEJ$	=	percentage change in total construction employment;
$\%\Delta MHI$	=	percentage change in the median household income;

%ΔAWJ	=	percentage change in the average wage per job;
PDE	=	population density;
FGE	=	total federal government expenditures by county;
UNR	=	civilian labor force unemployment rate by county;
STA	=	state identification control variable;

The year-over-year percentage change is calculated at the county level by taking current year minus previous year divided by previous year.[37] For example, to calculate the population change for 2006, the 2005 population figure will be subtracted from the 2006 population figure and the resulting number will be divided by the 2005 population figure and then converted (by multiplying by 100) to a percentage to calculate the change for 2006. The percentage change at the county level for each variable will be calculated, and the data will then be analyzed to determine whether growth in the GO Zone region came at the expense of surrounding regions. As in the multiple regression analysis of research question 1, research question 2 will be tested by comparing GO Zone counties to non-GO Zone counties pre- and post-Katrina, and will also be tested by comparing GO Zone counties to GO Zone counties and comparing non-GO Zone counties to non-GO Zone counties pre- and post-Katrina.

Since the data analysis on research question 2 in this research study utilizes standard multiple regression equations, the models must be tested for violations of the regression assumptions. Partial regression plots of each independent variable on the dependent variables exhibit no curvilinear patterns that would violate the linearity assumption of this model. A review of the studentized residuals plotted against each

[37] Appendices BY through CH contain information by state pertaining to the annual percentage change values for each dependent variable.

dependent variable shows no presence of unequal variances or heteroscedasticity by exhibiting a constant pattern in the residuals. The residual plots show no consistent patterns related to independence of the error term and the partial regression plots indicate no major violations of the independence of the error term for the predicted variables. Normality was analyzed by examining the histograms of the residuals and normal probability plots. The histogram distributions approximated normal distributions, and the normal probability plots showed only minimal deviations from the normal diagonal. The graphical analysis indicates no major violations of the regression assumptions required for appropriate multiple regression models and no transformations are necessary to proceed with the interpretation of the results.

The results reported in Table 4.10 compare the annual percentage change values for GO Zone counties versus non-GO Zone counties pre- and post-Katrina. Each overall model analyzed was statistically significant below the alpha level of 0.05, except for pre-Katrina construction industry earnings, personal income, average wage per job, and post-Katrina median household income. Based on the multiple regression procedures, eight of the ten dependent variables tested showed statistically significant differences, at the alpha level equal to 0.05, between GO Zone and non-GO Zone counties post-Katrina, and these differences did not exist during the pre-Katrina time period (2003-2004), after controlling for the independent variables included in each model. These variables were personal income, with a post-Katrina p-value of 0.011, construction employment, with a post-Katrina p-value of 0.014, construction net earnings, with a post-Katrina p-value of 0.018, average wage per job, with a post-Katrina p-value of 0.001, total industry net earnings, with a post-Katrina p-value of

0.003, manufacturing employment, with a post-Katrina p-value of 0.033, manufacturing net earnings, with a post-Katrina p-value of 0.003, and total employment, with a post-Katrina p-value of 0.001.

Additional statistical procedures were performed on the full dataset examining the interaction between GO Zone versus non-GO Zone counties pre- and post-Katrina; essentially testing whether the pre-Katrina and post-Katrina regression coefficients reported in Table 4.10 for the *GO Zone* variable in each model were statistically different. Based on these multiple regression procedures, three of the dependent variables showed a statistically significant change at the alpha level equal to 0.05 when comparing the *GO Zone* variable regression coefficient from the pre-Katrina time period to the coefficient from the post-Katrina time period, after controlling for the independent variables included in each model. These variables were construction employment, with p-value of 0.039, average wages per job, with a p-value of 0.028, and total employment, with a p-value of 0.033. These results verify previously reported statistical differences concerning these variables.

These significant differences in the construction industry were not unexpected and can be explained by the physical property damage caused by Hurricane Katrina. The significant differences in annual percentage change values in the remaining dependent variables could provide support for the theory that regional tax incentives are a zero-sum game, but additional procedures need to be performed before such conclusions can be drawn. Evidence in support of the zero-sum game theory will exist if additional statistical tests show that the annual percentage change in GO Zone counties post-Katrina (2006-2008) were significantly greater than the annual percentage

change pre-Katrina (2003-2004), and if statistical tests also show that the annual percentage change in non-GO Zone counties post-Katrina were significantly smaller than the annual percentage change in non-GO Zone counties pre-Katrina.

Table 4.10

Summary Table Comparing GO Zone to Non-GO Zone Counties Pre- and Post-Katrina using Annual Percentage Change Values and Multiple Regression						
	Pre-Katrina			**Post-Katrina**		
Variables	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Personal Income (DV)						
Overall Model			0.263			0.000
Go Zone	-.093	-1.691	**0.092**	.110	2.545	**0.011**
State Code	.057	1.004	0.316	.061	1.181	0.238
Time	.096	1.815	0.070	.077	1.813	0.070
Population Density	-.035	-.347	0.729	.100	1.538	0.125
Federal Gov. Expenditures	-.001	-.009	0.993	-.180	-2.865	0.004
Unemployment Rate	-.005	-.080	0.937	-.289	-5.397	0.000
Average Wage Per Job (DV)						
Overall Model			0.055			0.000
Go Zone	-.035	-.640	**0.523**	.141	3.226	**0.001**
State Code	.081	1.433	0.153	.043	.830	0.407
Time	.121	2.306	0.022	-.001	-.029	0.977
Population Density	-.056	-.556	0.579	-.206	-3.142	0.002
Federal Gov. Expenditures	.078	.785	0.433	.226	3.555	0.000
Unemployment Rate	.103	1.784	0.075	-.219	-4.047	0.000
Per Capita Income (DV)						
Overall Model			0.001			0.000
Go Zone	-.090	-1.657	**0.098**	.066	1.518	**0.130**
State Code	.015	.272	0.786	-.001	-.014	0.989
Time	.100	1.932	0.054	-.012	-.278	0.781
Population Density	-.092	-.928	0.354	-.364	-5.566	0.000
Federal Gov. Expenditures	.073	.738	0.461	.420	6.651	0.000
Unemployment Rate	.181	3.159	0.002	-.109	-2.025	0.043
Median Household Inc. (DV)						
Overall Model			0.000			0.078
Go Zone	-.126	-2.448	**0.015**	.037	.832	**0.406**
State Code	.103	1.969	0.050	.019	.358	0.720
Time	-.253	-5.166	0.000	.082	1.848	0.065
Population Density	-.157	-1.678	0.094	-.064	-.945	0.345
Federal Gov. Expenditures	-.040	-.428	0.669	.058	.890	0.374
Unemployment Rate	.064	1.184	0.237	-.141	-2.533	0.012
Manufacturing Employment (DV)						
Overall Model			0.000			0.000
Go Zone	.028	.498	**0.619**	.094	2.136	**0.033**
State Code	.033	.581	0.562	.056	1.078	0.282
Time	.197	3.719	0.000	-.125	-2.883	0.004
Population Density	-.086	-.849	0.397	-.042	-.640	0.523
Federal Gov. Expenditures	.032	.323	0.747	-.022	-.349	0.727
Unemployment Rate	-.187	-3.183	0.002	-.322	-5.875	0.000

Table 4.10 - Continued

	Pre-Katrina			Post-Katrina		
Variables	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Total Industry Earnings (DV)						
Overall Model			0.012			0.000
Go Zone	-.082	-1.502	**0.134**	.129	3.037	**0.003**
State Code	.094	1.678	0.094	.084	1.668	0.096
Time	-.130	-2.500	0.013	.067	1.599	0.110
Population Density	-.051	-.508	0.612	.037	.573	0.567
Federal Gov. Expenditures	.013	.132	0.895	-.062	-1.005	0.316
Unemployment Rate	.065	1.123	0.262	-.371	-7.055	0.000
Construction Earnings (DV)						
Overall Model			0.486			0.002
Go Zone	-.056	-.979	**0.328**	.111	2.381	**0.018**
State Code	-.104	-1.784	0.075	.054	.978	0.328
Time	-.005	-.091	0.927	-.102	-2.225	0.027
Population Density	.057	.540	0.590	-.093	-1.338	0.181
Federal Gov. Expenditures	-.077	-.742	0.459	.070	1.037	0.300
Unemployment Rate	.005	.079	0.937	-.102	-1.762	0.079
Manufacturing Earnings (DV)						
Overall Model			0.029			0.000
Go Zone	-.015	-.258	**0.797**	.130	2.944	**0.003**
State Code	.043	.744	0.457	.048	.928	0.354
Time	.074	1.360	0.175	-.139	-3.184	0.002
Population Density	-.115	-1.112	0.267	-.025	-.376	0.707
Federal Gov. Expenditures	.086	.833	0.406	-.006	-.089	0.929
Unemployment Rate	-.190	-3.155	0.002	-.283	-5.154	0.000
Total Employment (DV)						
Overall Model			0.000			0.000
Go Zone	-.027	-.533	**0.595**	.134	3.329	**0.001**
State Code	-.072	-1.388	0.166	.120	2.497	0.013
Time	.153	3.149	0.002	-.073	-1.849	0.065
Population Density	-.003	-.035	0.972	.271	4.475	0.000
Federal Gov. Expenditures	-.043	-.471	0.638	-.397	-6.780	0.000
Unemployment Rate	-.361	-6.735	0.000	-.371	-7.443	0.000
Construction Employment (DV)						
Overall Model			0.043			0.002
Go Zone	-.058	-1.013	**0.312**	.115	2.459	**0.014**
State Code	-.135	-2.332	0.020	.052	.943	0.346
Time	-.016	-.300	0.764	-.123	-2.675	0.008
Population Density	.012	.119	0.905	-.104	-1.490	0.137
Federal Gov. Expenditures	-.093	-.908	0.364	.084	1.247	0.213
Unemployment Rate	-.110	-1.824	0.069	-.052	-.902	0.367

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual percentage change by county for each variable.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
An analysis of variance (ANOVA) was calculated to determine the overall significance of each model.

The data used for these regression procedures were analyzed for serial correlation. Table 4.11 provides additional information for the regression models reported in Table 4.10. Table 4.11 provides the Durbin-Watson statistic for each dependent variable for both the pre- and post-Katrina time periods, and also provides the R-Squared and Adjusted R-Squared for each variable. Based on the Durbin-Watson test statistic (evaluated at dL = 1.582), no dependent variables exhibit serial correlation. The null hypothesis of non-autocorrelated errors can be accepted and it is possible to continue with no corrections for serial correlation in these time-series models.

Table 4.11

Supplemental Information for Summary Table 4.10

	Pre-Katrina			Post-Katrina		
Dependent Variables	R-Squared	Adj. R-Squared	Durbin-Watson	R-Squared	Adj. R-Squared	Durbin-Watson
Personal Income	.021	.005	2.281	.097	.087	2.672
Average Wage Per Job	.034	.017	2.237	.082	.071	2.089
Per Capita Income	.059	.043	2.202	.092	.082	2.273
Median Household Inc.	.155	.141	1.983	.021	.010	2.556
Total Industry Earnings	.045	.029	2.322	.133	.124	2.262
Construction Earnings	.016	-.002	2.108	.041	.030	2.025
Manufacturing Earnings	.042	.024	1.616	.125	.115	1.888
Total Employment	.173	.159	1.840	.219	.210	1.861
Construction Employment	.038	.021	2.111	.042	.030	2.097
Manufacturing Employment	.081	.064	1.703	.128	.118	1.837

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual percentage change by county for each variable.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.

GO Zone versus GO Zone, Non-GO Zone versus Non-GO Zone Pre- and Post-Katrina

Additional tests were performed comparing GO Zone counties to GO Zone counties pre- and post-Katrina and non-GO Zone counties to non-GO Zone counties pre- and post-Katrina. Table 4.12 reports the results from these multiple regression tests. An alternate version of the *GO Zone* independent variable was created and named *Katrina* to identify pre-Katrina versus post-Katrina time periods. These statistical tests were performed to determine if statistically significant increases in the annual percentage changes in values existed in GO Zone counties post-Katrina when compared to GO Zone counties pre-Katrina, if statistically significant decreases in annual percentage change values existed in non-GO Zone counties post-Katrina when compared to non- GO Zone counties pre-Katrina. Significant results would provide support for the theory that regional tax incentives are a zero-sum game.

The models were tested for violations of the multiple regression assumptions. Partial regression plots of each independent variable on the dependent variables exhibit no curvilinear patterns that would violate the linearity assumption for this model. A review of the studentized residuals plotted against each dependent variable shows no presence of unequal variances or heteroscedasticity by exhibiting an obvious pattern in the residuals. The residual plots show no consistent patterns related to independence of the error term and the partial regression plots indicate no major violations of the assumption of independence of the error term for the predicted variables. Normality was examined by examining the histograms of the residuals and normal probability plots. The histogram distributions approximated normal distributions, and the normal probability plots showed only minimal deviations from the normal diagonal. The

graphical analysis indicates no major violations of the assumptions required for appropriate multiple regression models and no transformations are necessary to proceed with the interpretation of the results.

The results reported in Table 4.12 compare GO Zone counties to GO Zone counties pre- and post-Katrina and non-GO Zone counties to non-GO Zone counties pre- and post-Katrina. Each overall model analyzed was statistically significant below the alpha level of 0.05, except for pre-Katrina construction industry earnings, and post-Katrina personal income, median household income, and construction employment. Based on the multiple regression procedures, four of the dependent variables showed a statistically significant change, at the alpha level equal to 0.05, when comparing the GO Zone counties for the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were construction employment, with a p-value of 0.020, total employment, with a p-value of 0.036, total industry net earnings, with a p-value of 0.008, and manufacturing industry net earnings, with a p-value of 0.008. Based on the standardized coefficients, these differences pointed to significant increases in the annual percentage change in each variable, except for annual industry net earnings, which showed smaller values post-Katrina compared to the pre-Katrina timeframe. Only two of the dependent variables produced a statistically significant change, at the alpha level equal to 0.05, when comparing the non-GO Zone counties for the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were construction employment, with a p-value of 0.026, and construction industry net earnings, with a p-

value of 0.004. Three of the four primary variables of interest (average wages per job, manufacturing employment, and manufacturing earnings) showed larger percentage changes post-Katrina in GO Zone counties and smaller percentage changes post-Katrina in non-GO Zone counties, providing support for the zero-sum game theory. These results, however, were not significant at the alpha level equal to 0.05, eliminating the possibility of drawing conclusions supporting the zero-sum game theory.

Table 4.12

Summary Table Comparing GO Zone Counties to GO Zone Counties and non-GO Zone Counties to non-GO Zone Counties Pre- and Post-Katrina using Annual Percentage Change Values and Multiple Regression						
	GO Zone			Non-GO Zone		
Variables	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Personal Income (DV)						
Overall Model			0.000			0.091
Katrina (Pre-K vs. Post-K)	-.153	-1.251	**0.212**	-.226	-1.757	**0.080**
State Code	.024	.486	0.627	.050	.877	0.381
Time	.232	1.930	0.054	.084	.672	0.502
Population Density	.039	.593	0.554	-.024	-.241	0.810
Federal Gov. Expenditures	-.150	-2.342	0.020	.002	.024	0.981
Unemployment Rate	-.252	-4.800	0.000	-.136	-2.170	0.031
Average Wage Per Job (DV)						
Overall Model			0.000			0.001
Katrina (Pre-K vs. Post-K)	.218	1.759	**0.079**	-.214	-1.775	**0.077**
State Code	.006	.114	0.910	.092	1.649	0.100
Time	-.099	-.817	0.415	.172	1.398	0.163
Population Density	-.135	-2.039	0.042	-.329	-3.402	0.001
Federal Gov. Expenditures	.184	2.833	0.005	.237	2.528	0.012
Unemployment Rate	-.099	-1.862	0.063	-.255	-4.125	0.000
Per Capita Income (DV)						
Overall Model			0.000			0.002
Katrina (Pre-K vs. Post-K)	.102	.833	**0.405**	-.240	-1.886	**0.060**
State Code	-.038	-.780	0.436	.021	.373	0.710
Time	-.103	-.854	0.394	.087	.709	0.479
Population Density	-.290	-4.425	0.000	-.276	-2.857	0.004
Federal Gov. Expenditures	.353	5.493	0.000	.217	2.311	0.021
Unemployment Rate	-.073	-1.395	0.164	.002	.036	0.971
Median Household Inc. (DV)						
Overall Model			0.000			0.203
Katrina (Pre-K vs. Post-K)	.089	.724	**0.469**	.076	.589	**0.556**
State Code	-.008	-.171	0.865	.023	.413	0.680
Time	.110	.910	0.364	.012	.095	0.924
Population Density	-.102	-1.550	0.122	-.129	-1.318	0.188
Federal Gov. Expenditures	.081	1.251	0.212	.047	.498	0.619
Unemployment Rate	-.114	-2.155	0.032	-.068	-1.092	0.275
Manufacturing Employment (DV)						
Overall Model			0.002			0.000
Katrina (Pre-K vs. Post-K)	.251	1.952	**0.052**	-.154	-1.231	**0.219**
State Code	.023	.450	0.653	.135	2.425	0.016
Time	-.190	-1.508	0.132	.079	.653	0.514
Population Density	-.004	-.057	0.955	-.363	-3.818	0.000
Federal Gov. Expenditures	-.052	-.778	0.437	.271	2.941	0.003
Unemployment Rate	-.185	-3.400	0.001	-.489	-7.945	0.000

Table 4.12 - Continued

Variables	GO Zone			Non-GO Zone		
	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Total Industry Earnings (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	-.328	-2.647	**0.008**	-.036	-.290	**0.772**
State Code	.057	1.151	0.250	.047	.868	0.386
Time	.180	1.484	0.139	-.282	-2.342	0.020
Population Density	-.022	-.331	0.741	-.102	-1.077	0.282
Federal Gov. Expenditures	-.034	-.524	0.600	.075	.824	0.411
Unemployment Rate	-.235	-4.430	0.000	-.088	-1.463	0.144
Construction Earnings (DV)						
Overall Model			0.369			0.000
Katrina (Pre-K vs. Post-K)	.187	1.412	**0.159**	.377	2.873	**0.004**
State Code	-.006	-.117	0.907	-.002	-.029	0.977
Time	-.099	-.764	0.445	-.547	-4.291	0.000
Population Density	-.050	-.705	0.481	-.101	-1.019	0.309
Federal Gov. Expenditures	.042	.614	0.540	.049	.507	0.612
Unemployment Rate	-.031	-.554	0.580	-.120	-1.896	0.059
Manufacturing Earnings (DV)						
Overall Model			0.001			0.000
Katrina (Pre-K vs. Post-K)	.389	3.037	**0.003**	-.200	-1.569	**0.118**
State Code	.047	.926	0.355	.104	1.841	0.066
Time	-.357	-2.841	0.005	.048	.384	0.701
Population Density	.003	.047	0.963	-.329	-3.410	0.001
Federal Gov. Expenditures	-.031	-.459	0.646	.274	2.921	0.004
Unemployment Rate	-.170	-3.131	0.002	-.449	-7.220	0.000
Total Employment (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.244	2.105	**0.036**	.049	.439	**0.661**
State Code	.032	.684	0.494	.089	1.811	0.071
Time	-.019	-.165	0.869	-.025	-.235	0.814
Population Density	.193	3.118	0.002	.051	.607	0.544
Federal Gov. Expenditures	-.322	-5.320	0.000	-.089	-1.076	0.283
Unemployment Rate	-.273	-5.513	0.000	-.548	-10.104	0.000
Construction Employment (DV)						
Overall Model			0.015			0.070
Katrina (Pre-K vs. Post-K)	.306	2.337	**0.020**	.299	2.227	**0.026**
State Code	-.011	-.222	0.824	-.057	-.966	0.335
Time	-.179	-1.401	0.162	-.336	-2.574	0.010
Population Density	-.089	-1.283	0.200	.028	.273	0.785
Federal Gov. Expenditures	.061	.893	0.372	-.079	-.801	0.423
Unemployment Rate	-.053	-.953	0.341	-.055	-.847	0.398

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual percentage change by county for each variable.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
The Katrina independent variable is used to identify pre- and post-Katrina time periods.
An analysis of variance (ANOVA) was calculated to determine the overall significance of each model.

The data used for these multiple regression procedures were tested for serial correlation. Table 4.13 provides additional information for the regression models reported in Table 4.12. Table 4.13 provides the Durbin-Watson statistic for each dependent variable for both GO Zone and non-GO Zone counties. The table also provides the R-Squared and Adjusted R-Squared for each variable. Based on the Durbin-Watson test statistic (evaluated at dL = 1.582), no dependent variables exhibit serial correlation. The null hypothesis of non-autocorrelated errors can be accepted and it is possible to continue with no corrections for serial correlation in these time-series models.

Table 4.13

Supplemental Information for Summary Table 4.12

	GO Zone			Non-GO Zone		
Dependent Variables	R-Squared	Adj. R-Squared	Durbin-Watson	R-Squared	Adj. R-Squared	Durbin-Watson
Personal Income	.080	.067	2.578	.024	.011	2.452
Average Wage Per Job	.056	.044	2.086	.047	.034	2.360
Per Capita Income	.078	.066	2.308	.045	.032	2.439
Median Household Inc.	.066	.053	2.560	.019	.006	2.585
Total Industry Earnings	.059	.047	1.904	.093	.080	2.465
Construction Earnings	.016	.001	2.078	.072	.058	2.119
Manufacturing Earnings	.054	.041	1.706	.136	.123	1.821
Total Employment	.178	.167	1.878	.266	.256	1.859
Construction Employment	.037	.023	2.102	.028	.014	2.102
Manufacturing Employment	.049	.036	1.677	.148	.136	1.949

All dependent variables represent average annual percentage change by county for each variable for 2003, 2004, 2006, 2007, and 2008.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.

Research Question Two - Logistic Regression Procedures

In addition, research question 2 was analyzed with binary logistic regression utilizing certain economic indicators implemented in research question 1; however this model will consider all of the variables simultaneously to determine whether statistically significant differences exist between GO Zone counties and non-GO Zone counties. This model analyzes the two-year period (2003-2004) preceding Hurricane Katrina to determine whether differences existed between GO Zone counties and non-GO Zone counties prior to the hurricanes and also analyzes the three-year GO Zone timeframe (2006-2008) to determine whether differences existed between GO Zone counties and non-GO Zone counties after the hurricanes. The models are as follows:

$$GOZ_t = \beta_0 + \beta_1 \Delta MIE_t + \beta_2 \Delta CIE_t + \beta_3 \Delta PEI_t + \beta_4 \Delta MEJ_t + \beta_5 \Delta CEJ_t + \beta_6 \Delta MHI_t + \beta_7 \Delta AWJ_t + \beta_8 PDE_t + \beta_9 FGE_t + \beta_{10} UNR_t + \beta_{11} STA_t + \varepsilon_t$$

where, for a given county/parish at a time period *t*:

GOZ	=	GO Zone county (1=yes, 0=no);
ΔMIE	=	change in total manufacturing earnings;
ΔCIE	=	change in total construction earnings;
ΔPEI	=	change in personal income;
ΔMEJ	=	change in total manufacturing employment;
ΔCEJ	=	change in total construction employment;
ΔMHI	=	change in the median household income;
ΔAWJ	=	change in the average wage per job;
PDE	=	population density;

FGE	=	total federal government expenditures by county;
UNR	=	civilian labor force unemployment rate by county;
STA	=	state identification control variable;

Binary logistic regression is a special form of regression in which the dependent variable is a non-metric, dichotomous (binary) variable. The binary nature of the dependent variable has properties that violate the assumptions of standard multiple regression: first, the error term of a discrete variable follows a binomial distribution, thus invalidating all statistical testing based on the assumptions of normality and, second, the variance of a binary variable is not constant, creating instances of heteroscedasticity as well (Hair et al. 2006). Logistic regression is a generalized linear model that applies maximum likelihood estimation after transforming the dependent variable and can be used to determine if group membership can be predicted by the independent variables and the variables that are significant in the prediction of group membership. Logistic regression has many analogies to multiple regression; however, logistic regression, unlike multiple regression, does not assume that a linear relationship must exist between the dependent and independent variables, does not require that variables be normally distributed, and does not assume homoscedasticity. In general, logistic regression imposes less stringent requirements than does standard multiple regression.

Results from the binary logistic regression data analysis comparing Go Zone counties to non-GO Zone counties post-Katrina produce similar findings to previously analyzed multiple regression models (see Table 4.6); however, the data do not fit the model. The recommended test for overall fit of a binary logistic regression model is the

Hosmer and Lemeshow test, also called the chi-square test (Hair et al. 2006). The Hosmer and Lemeshow test is used to assess the goodness of fit of a model and allows for any number of explanatory variables, which may be continuous or categorical. A finding of non-significance (p-value greater than 0.05) allows the researcher to conclude that the model adequately fits the data. In this case, the Hosmer and Lemeshow test performed on the binary logistic model comparing Go Zone counties to non-GO Zone counties post-Katrina shows a p-value of 0.000. This significant p-value indicates that the overall model is not a good fit for the data at an acceptable level. The Hosmer and Lemeshow test performed on the binary logistic model comparing non-Go Zone counties to non-GO Zone counties post-Katrina shows a p-value of 0.050, indicating a poor overall model fit for this model as well. Based on these significant findings, the binary logistic models will not be used to draw conclusions in this research study.

Based on the multiple regression data analysis from all of the models tested for research question 2, statistically significant evidence supporting the rejection of hypothesis number two (H2) does not exist. The null hypothesis, therefore, is not rejected and the conclusion is drawn that the tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005 have no significant impact on economic growth in the surrounding region.

Sensitivity Analysis

A sensitivity analysis will be performed in an attempt to eliminate the potential impact on research findings caused by Hurricane Katrina storm damage and to verify previously reported results. A subset of the full dataset will be created and tested with

multiple regression procedures. The subset sample will consist of GO Zone and non-GO Zone counties from Mississippi. The sample dataset will consist of the 20 most northern GO Zone counties in Mississippi and the 20 most southern non-GO Zone counties in the same state. The impact of Hurricane Katrina should be minimized by selecting the northern GO Zone counties where storm damage was minimal when compared to counties along the coastline. Appendix CK contains a list of the GO Zone and non-GO Zone counties included in the dataset. This sample dataset will be analyzed using the same multiple regression models examined in research question 1 and research question 2.

The models were tested for violations of the multiple regression assumptions. Partial regression plots of each independent variable on the dependent variables exhibit no curvilinear patterns that would violate the linearity assumption in this model. A review of the studentized residuals plotted against each dependent variable reveals no presence of unequal variances or heteroscedasticity by producing an obvious constant pattern in the residuals. The residual plots exhibit no consistent patterns related to independence of the error term and the partial regression plots indicate no major violations of the assumption of independence of the error term for the predicted variables. Normality was examined by plotting the histograms of the residuals and with the normal probability plots. The histogram distributions approximated normal distributions, and the normal probability plots showed only minimal deviations from the normal diagonal. The graphical analysis indicates no major violations of the assumptions required for appropriate multiple regression models and no transformations are therefore necessary to proceed with the interpretation of the results.

The results reported in Table 4.14 compare the annual change values for GO Zone counties to non-GO Zone counties pre- and post-Katrina for the restricted Mississippi sample. Based on the multiple regression procedures, no statistically significant results exist, at the alpha level equal to 0.05, that show any differences between GO Zone and non-GO Zone counties pre-Katrina or post-Katrina. Additional statistical procedures were performed on the full dataset examining the interaction between GO Zone versus non-GO Zone counties pre- and post-Katrina; essentially testing whether the pre-Katrina and post-Katrina regression coefficients reported in Table 4.14 for the *GO Zone* variable in each model were statistically different. Based on these multiple regression procedures, none of the dependent variables showed a statistically significant change at the alpha level equal to 0.05 when comparing the *GO Zone* variable regression coefficient from the pre-Katrina time period to the coefficient from the post-Katrina time period, after controlling for the independent variables included in each model. Additional multiple regression will be analyzed comparing GO Zone counties to GO Zone counties and non-GO Zone counties to non-GO Zone counties pre- and post-Katrina.

Table 4.14

Sensitivity Analysis Summary Table Comparing GO Zone to Non-GO Zone Counties Pre- and Post-Katrina using Annual Change Values for Subset Sample Dataset and Multiple Regression Procedures						
	Pre-Katrina			**Post-Katrina**		
Variables	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Personal Income (DV)						
Overall Model			0.000			0.000
Go Zone	.009	.125	**0.901**	.044	.784	**0.435**
Casino	-.090	-1.239	0.219	.004	.075	0.940
Time	.099	1.470	0.146	.023	.437	0.663
Population Density	.247	1.461	0.149	.309	3.573	0.001
Federal Gov. Expenditures	.470	2.882	0.005	.531	6.407	0.000
Unemployment Rate	-.238	-2.213	0.030	-.090	-1.211	0.228
Race	-.103	-1.037	0.303	.037	.562	0.576
County ID	.113	1.569	0.121	.003	.063	0.950
Average Wage Per Job (DV)						
Overall Model			0.148			0.094
Go Zone	-.147	-1.250	**0.215**	.136	1.411	**0.161**
Casino	-.114	-.967	0.337	.234	2.382	0.019
Time	.154	1.404	0.165	.010	.111	0.912
Population Density	.225	.815	0.418	.047	.307	0.760
Federal Gov. Expenditures	-.045	-.169	0.866	.072	.490	0.625
Unemployment Rate	.063	.361	0.719	-.048	-.366	0.715
Race	-.039	-.241	0.810	.062	.536	0.593
County ID	.316	2.695	0.009	-.036	-.374	0.709
Per Capita Income (DV)						
Overall Model			0.053			0.153
Go Zone	-.207	-1.802	**0.076**	-.047	-.478	**0.634**
Casino	-.128	-1.111	0.270	.126	1.294	0.198
Time	-.017	-.162	0.872	.243	2.580	0.011
Population Density	-.235	-.871	0.387	-.064	-.413	0.681
Federal Gov. Expenditures	.111	.429	0.669	.158	1.071	0.286
Unemployment Rate	-.236	-1.380	0.172	-.206	-1.557	0.122
Race	-.448	-2.837	0.006	-.093	-.795	0.428
County ID	.208	1.815	0.074	-.066	-.685	0.495
Median Household Inc. (DV)						
Overall Model			0.040			0.821
Go Zone	-.107	-.936	**0.352**	-.018	-.174	**0.862**
Casino	-.219	-1.911	0.060	.012	.117	0.907
Time	-.210	-1.969	0.053	-.056	-.580	0.563
Population Density	-.334	-1.248	0.216	.114	.718	0.474
Federal Gov. Expenditures	.121	.467	0.642	-.104	-.681	0.497
Unemployment Rate	-.337	-1.980	0.052	-.164	-1.198	0.234
Race	-.073	-.465	0.644	-.024	-.202	0.840
County ID	.298	2.619	0.011	-.007	-.067	0.946

Table 4.14 - Continued

	Pre-Katrina			Post-Katrina		
Variables	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Housing Units (DV)						
Overall Model			0.000			0.000
Go Zone	.118	1.358	**0.179**	.101	1.540	**0.126**
Time	.024	.301	0.764	.001	.0108	0.986
Population Density	.629	3.083	0.003	.368	3.611	0.000
Federal Gov. Expenditures	-.060	-.304	0.762	.309	3.155	0.002
Unemployment Rate	-.175	-1.355	0.180	-.148	-1.687	0.094
Race	.009	.076	0.940	.130	1.702	0.091
County ID	.025	.302	0.763	.039	.643	0.522
Building Permits (DV)						
Overall Model			0.341			0.062
Go Zone	.026	.218	**0.828**	-.062	-.636	**0.526**
Time	.095	.848	0.399	-.125	-1.341	0.183
Population Density	.144	.513	0.609	-.345	-2.271	0.025
Federal Gov. Expenditures	.132	.488	0.627	.289	1.979	0.050
Unemployment Rate	-.048	-.267	0.790	.123	.943	0.348
Race	.016	.097	0.923	-.006	-.048	0.961
County ID	.013	.116	0.908	-.045	-.499	0.618
Total Industry Earnings (DV)						
Overall Model			0.000			0.000
Go Zone	.024	.272	**0.786**	.036	.676	**0.500**
Casino	-.082	-.947	0.347	.002	.041	0.967
Time	-.003	-.033	0.974	.010	.193	0.847
Population Density	.336	1.653	0.103	.289	3.475	0.001
Federal Gov. Expenditures	.250	1.275	0.206	.553	6.916	0.000
Unemployment Rate	-.290	-2.242	0.028	-.123	-1.713	0.090
Race	-.138	-1.155	0.252	-.050	-.796	0.428
County ID	.107	1.240	0.219	-.015	-.278	0.782
Construction Earnings (DV)						
Overall Model			0.005			0.032
Go Zone	-.152	-1.351	**0.181**	.077	.751	**0.454**
Time	.081	.764	0.448	-.046	-.475	0.636
Population Density	.594	2.256	0.027	-.088	-.556	0.579
Federal Gov. Expenditures	-.267	-1.039	0.303	.390	2.569	0.012
Unemployment Rate	-.107	-.642	0.523	.006	.045	0.964
Race	-.100	-.642	0.523	.083	.693	0.490
County ID	.250	2.309	0.024	.107	1.129	0.262
Manufacturing Earnings (DV)						
Overall Model			0.395			0.000
Go Zone	.076	.597	**0.553**	.178	1.821	**0.072**
Time	-.015	-.126	0.900	-.127	-1.375	0.172
Population Density	-.252	-.848	0.400	-.516	-3.447	0.001
Federal Gov. Expenditures	.098	.339	0.736	.208	1.447	0.151
Unemployment Rate	-.409	-2.161	0.035	-.347	-2.640	0.010
Race	-.082	-.467	0.642	-.158	-1.385	0.169
County ID	.040	.330	0.743	.001	.008	0.994

Table 4.14 - Continued

Variables	Pre-Katrina			Post-Katrina		
	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Total Employment (DV)						
Overall Model			0.051			0.000
Go Zone	.097	.845	**0.401**	.056	.953	**0.343**
Casino	-.046	-.483	0.631	-.078	-1.365	0.175
Time	.144	1.339	0.185	-.057	-1.030	0.305
Population Density	.189	.702	0.485	.182	2.001	0.048
Federal Gov. Expenditures	-.442	-1.706	0.092	.513	5.893	0.000
Unemployment Rate	-.322	-1.885	0.064	-.267	-3.415	0.001
Race	-.050	-.315	0.754	-.006	-.081	0.936
County ID	.110	.964	0.338	.055	.968	0.335
Construction Employment (DV)						
Overall Model			0.012			0.000
Go Zone	-.139	-1.210	**0.231**	.036	.372	**0.711**
Time	.071	.651	0.517	-.039	-.426	0.671
Population Density	.687	2.565	0.013	.077	.516	0.607
Federal Gov. Expenditures	-.595	-2.277	0.026	.413	2.873	0.005
Unemployment Rate	-.103	-.607	0.546	.059	.446	0.657
Race	-.114	-.720	0.474	.107	.936	0.352
County ID	.280	2.546	0.013	.081	.897	0.372
Manufacturing Employment (DV)						
Overall Model			0.057			0.000
Go Zone	.104	.877	**0.384**	.142	1.713	**0.090**
Time	.120	1.073	0.287	-.049	-.618	0.538
Population Density	-.711	-2.522	0.014	-.862	-6.739	0.000
Federal Gov. Expenditures	.330	1.213	0.230	.318	2.579	0.011
Unemployment Rate	-.422	-2.298	0.025	-.500	-4.498	0.000
Race	-.058	-.347	0.729	-.267	-2.761	0.007
County ID	.052	.456	0.650	.004	.055	0.956

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable in the sensitivity analysis sample dataset.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
An analysis of variance (ANOVA) was calculated to determine the overall significance of each model.

The data used for these multiple regression procedures were analyzed for serial correlation. Table 4.15 provides additional information for the regression models reported in Table 4.14. Table 4.15 provides the Durbin-Watson statistic for each dependent variable for both pre- and post-Katrina time periods. The table also provides the R-Squared and Adjusted R-Squared for each variable. Based on the Durbin-Watson test statistic (evaluated at dL = 1.582), three dependent variables exhibit serial

correlation. These variables were housing unit estimates, manufacturing earnings, and manufacturing employment. Due to lack of statistical significance, no adjustments will be made to these variables. For the remaining dependent variables, the null hypothesis of non-autocorrelated errors can be accepted and the statistical analysis continued with no corrections for serial correlation in these time-series models.

Table 4.15

Supplemental Information for Summary Table 4.14

	Pre-Katrina			Post-Katrina		
Dependent Variables	R-Squared	Adj. R-Squared	Durbin-Watson	R-Squared	Adj. R-Squared	Durbin-Watson
Personal Income	.679	.643	1.805	.717	.696	2.152
Average Wage Per Job	.151	.055	2.230	.112	.048	2.242
Per Capita Income	.187	.095	2.393	.100	.035	2.049
Median Household Inc.	.197	.106	2.090	.038	-.032	2.630
Housing Units	.527	.481	1.425	.599	.574	0.829
Building Permits	.101	.013	2.594	.111	.055	2.457
Total Industry Earnings	.536	.484	1.701	.737	.718	2.062
Construction Earnings	.256	.177	1.739	.139	.079	2.507
Manufacturing Earnings	.107	.007	1.271	.225	.170	1.702
Total Employment	.188	.097	1.623	.687	.664	1.948
Construction Employment	.230	.149	2.110	.225	.171	2.590
Manufacturing Employment	.181	.094	1.152	.414	.374	1.651

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change values by county for each variable.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.

GO Zone versus GO Zone, Non-GO Zone versus Non-GO Zone Pre- and Post-Katrina

The results reported in Table 4.16 compare GO Zone counties to GO Zone counties pre- and post-Katrina and non-GO Zone counties to non-GO Zone counties pre- and post-Katrina for the sensitivity analysis sample dataset. These statistical tests were performed to determine whether statistically significant differences existed in GO Zone counties post-Katrina when compared to GO Zone counties pre-Katrina. A graphical analysis indicates no major violations of the assumptions required for multiple regression models and no transformations are necessary to proceed with the interpretation of the results. Based on the additional multiple regression procedures, only one of the dependent variables showed a statistically significant change, at the alpha level equal to 0.05, when comparing the GO Zone counties for the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. This variable was per capita income, with a p-value of 0.002; however, based on the sign of the standardized coefficient, the annual change in per capita income in the GO Zone counties fell post-Katrina. Results from the multiple regression procedures performed on annual change values in this sensitivity analysis provide no statistical evidence supporting the rejection of null hypothesis one (H1).

Table 4.16

Sensitivity Analysis Summary Table Comparing GO Zone Counties to GO Zone Counties and non-GO Zone Counties to non-GO Zone Counties Pre- and Post-Katrina using Annual Change Values for Subset Sample Dataset and Multiple Regression Procedures

	GO Zone			Non-GO Zone		
Variables (Yearly Changes)	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Personal Income (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	-.098	-.610	**0.543**	-.315	-1.804	**0.075**
Casino	-.057	-.924	0.358	.148	1.853	0.067
Time	.083	.523	0.603	.294	1.684	0.096
Population Density	.366	3.168	0.002	.577	5.993	0.000
Federal Gov. Expenditures	.467	4.538	0.000	.103	.971	0.334
Unemployment Rate	-.081	-.733	0.465	-.266	-3.216	0.002
Race	.046	.504	0.615	-.153	-1.733	0.087
County ID	.050	.766	0.446	-.015	-.216	0.830
Average Wage Per Job (DV)						
Overall Model			0.178			0.651
Katrina (Pre-K vs. Post-K)	.063	.231	**0.818**	-.351	-1.293	**0.199**
Casino	.037	.350	0.727	-.039	-.317	0.752
Time	.092	.342	0.733	.124	.458	0.648
Population Density	.218	1.108	0.271	.031	.206	0.837
Federal Gov. Expenditures	.018	.101	0.920	.061	.370	0.712
Unemployment Rate	.165	.881	0.381	.000	.000	1.000
Race	.136	.884	0.379	-.032	-.234	0.816
County ID	.246	2.225	0.029	.034	.318	0.751
Per Capita Income (DV)						
Overall Model			0.040			0.513
Katrina (Pre-K vs. Post-K)	-.833	-3.141	**0.002**	-.332	-1.230	**0.222**
Casino	.027	.262	0.794	.057	.463	0.645
Time	.799	3.050	0.003	.192	.712	0.478
Population Density	-.155	-.809	0.421	-.040	-.272	0.786
Federal Gov. Expenditures	.297	1.746	0.084	-.063	-.383	0.703
Unemployment Rate	-.191	-1.045	0.299	-.125	-.983	0.328
Race	-.185	-1.234	0.220	-.223	-1.641	0.104
County ID	.101	.940	0.350	.013	.118	0.906
Median Household Inc. (DV)						
Overall Model			0.639			0.850
Katrina (Pre-K vs. Post-K)	.147	.524	**0.601**	.405	1.476	**0.143**
Casino	-.021	-.192	0.848	.010	.079	0.937
Time	-.051	-.186	0.853	-.383	-1.400	0.165
Population Density	.149	.739	0.462	-.042	-.279	0.781
Federal Gov. Expenditures	-.129	-.719	0.474	-.077	-.460	0.647
Unemployment Rate	-.149	-.774	0.441	-.101	-.783	0.436
Race	-.023	-.144	0.886	-.012	-.088	0.930
County ID	.106	.929	0.355	-.024	-.221	0.826

Table 4.16 - Continued

	GO Zone			Non-GO Zone		
Variables	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Housing Units (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	.096	.531	**0.597**	.218	1.146	**0.255**
Time	-.049	-.272	0.786	-.053	-.281	0.779
Population Density	.609	4.647	0.000	.341	3.255	0.002
Federal Gov. Expenditures	.126	1.079	0.283	.264	2.461	0.016
Unemployment Rate	.035	.279	0.781	-.327	-3.632	0.000
Race	.293	2.869	0.005	.043	.452	0.653
County ID	.062	.878	0.382	-.021	-.292	0.771
Building Permits (DV)						
Overall Model			0.399			0.960
Katrina (Pre-K vs. Post-K)	-.027	-.096	**0.924**	-.056	-.205	**0.838**
Time	-.205	-.750	0.455	-.062	-.226	0.822
Population Density	-.164	-.823	0.413	.077	.508	0.613
Federal Gov. Expenditures	.166	.936	0.352	-.089	-.576	0.566
Unemployment Rate	-.051	-.270	0.787	.012	.091	0.928
Race	-.131	-.838	0.404	.006	.040	0.968
County ID	-.053	-.496	0.621	.003	.027	0.978
Total Industry Earnings (DV)						
Overall Model			0.000			0.000
Katrina (Pre-K vs. Post-K)	-.176	-.994	**0.323**	-.296	-1.570	**0.120**
Casino	-.043	-.625	0.534	.081	.944	0.348
Time	.026	.147	0.883	-.043	-.231	0.818
Population Density	.435	3.404	0.001	.421	4.055	0.000
Federal Gov. Expenditures	.325	2.854	0.005	.082	.713	0.478
Unemployment Rate	-.131	-1.074	0.285	-.369	-4.146	0.000
Race	-.044	-.440	0.661	-.230	-2.423	0.017
County ID	.027	.382	0.703	.035	.475	0.636
Construction Earnings (DV)						
Overall Model			0.021			0.023
Katrina (Pre-K vs. Post-K)	.140	.504	**0.616**	.274	1.018	**0.311**
Time	-.037	-.134	0.894	-.401	-1.492	0.139
Population Density	.117	.576	0.566	.180	1.301	0.197
Federal Gov. Expenditures	.254	1.436	0.155	.257	1.707	0.091
Unemployment Rate	.085	.427	0.671	.116	.914	0.363
Race	.154	.947	0.346	.044	.317	0.752
County ID	.254	2.320	0.023	.035	.345	0.731
Manufacturing Earnings (DV)						
Overall Model			0.598			0.000
Katrina (Pre-K vs. Post-K)	.010	0.35	**0.972**	-.245	-1.083	**0.282**
Time	-.180	-.617	0.539	.000	-.002	0.999
Population Density	-.122	-.561	0.577	-.569	-4.837	0.000
Federal Gov. Expenditures	-.036	-.189	0.851	.177	1.367	0.175
Unemployment Rate	-.276	-1.293	0.200	-.521	-4.830	0.000
Race	-.089	-.513	0.610	-.098	-.817	0.416
County ID	-.025	-.214	0.831	.083	.961	0.339

Table 4.16 - Continued

Variables	GO Zone			Non-GO Zone		
	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Total Employment (DV)						
Overall Model			0.005			0.000
Katrina (Pre-K vs. Post-K)	-.023	-.090	**0.929**	-.045	-.193	**0.848**
Casino	-.096	-.966	0.337	-.093	-.867	0.388
Time	.075	.295	0.768	.171	.731	0.466
Population Density	-.059	-.317	0.752	-.303	-2.345	0.021
Federal Gov. Expenditures	.348	2.106	0.038	.378	2.657	0.009
Unemployment Rate	-.128	-.722	0.472	-.518	-4.681	0.000
Race	.174	1.200	0.233	.027	.232	0.817
County ID	.124	1.187	0.238	.099	1.072	0.287
Construction Employment (DV)						
Overall Model			0.003			0.002
Katrina (Pre-K vs. Post-K)	.186	.690	**0.492**	.319	1.233	**0.221**
Time	-.020	-.074	0.941	-.173	-.668	0.506
Population Density	.122	.616	0.540	.469	3.519	0.001
Federal Gov. Expenditures	.295	1.722	0.089	-.028	-.192	0.848
Unemployment Rate	.155	.799	0.427	.071	.584	0.561
Race	.197	1.242	0.218	.032	.240	0.811
County ID	.298	2.798	0.006	.054	.560	0.577
Manufacturing Employment (DV)						
Overall Model			0.379			0.000
Katrina (Pre-K vs. Post-K)	-.225	-.767	**0.446**	-.204	-1.197	**0.235**
Time	.098	.341	0.734	.095	.557	0.579
Population Density	-.404	-1.886	0.063	-.916	-9.922	0.000
Federal Gov. Expenditures	.064	.341	0.734	.226	2.331	0.022
Unemployment Rate	-.352	-1.665	0.100	-.531	-6.518	0.000
Race	-.139	-.806	0.422	-.125	-1.426	0.157
County ID	-.051	-.445	0.658	.108	1.663	0.100

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable in the sensitivity analysis sample dataset.
The Katrina independent variable is used to identify pre- and post-Katrina time periods.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
An analysis of variance (ANOVA) was calculated to determine the overall significance of each model.

The data used for these multiple regression procedures were analyzed for serial correlation. Table 4.17 provides additional information for the regression models reported in Table 4.16. Table 4.17 provides the Durbin-Watson statistic for each dependent variable for both GO Zone and non-GO Zone counties. The table also provides the R-Squared and Adjusted R-Squared for each variable. Based on the

Durbin-Watson test statistic (evaluated at dL = 1.582), one dependent variable exhibits serial correlation. That variable was housing unit estimates, which is not a primary variable of interest, so no adjustments are made to correct this serial correlation. For the remaining dependent variables, the null hypothesis of non-autocorrelated errors can be accepted and the analysis can thus continue with no corrections for serial correlation in these time-series models.

Table 4.17

Supplemental Information for Summary Table 4.16

	GO Zone			Non-GO Zone		
Dependent Variables	R-Squared	Adj. R-Squared	Durbin-Watson	R-Squared	Adj. R-Squared	Durbin-Watson
Personal Income	.694	.667	1.982	.611	.577	1.738
Average Wage Per Job	.115	.037	1.963	.061	-.021	2.163
Per Capita Income	.158	.084	2.168	.074	-.007	2.114
Median Household Inc.	.063	-.020	2.433	.042	-.042	2.768
Housing Units	.602	.571	0.733	.532	.496	1.376
Building Permits	.074	.004	2.374	.021	-.053	2.167
Total Industry Earnings	.625	.592	1.797	.548	.509	2.176
Construction Earnings	.178	.108	2.088	.171	.102	2.073
Manufacturing Earnings	.063	-.017	1.858	.414	.362	1.919
Total Employment	.210	.141	1.712	.302	.240	2.072
Construction Employment	.225	.159	1.820	.232	.168	2.496
Manufacturing Employment	.085	.007	1.824	.646	.618	1.915

All dependent variables represent average annual change by county for each variable for 2003, 2004, 2006, 2007, and 2008.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.

Additional multiple regression procedures were run as a sensitivity analysis for research question 2. The second research question examines whether tax policy investment incentives at the regional level are a zero-sum game, by examining the percentage change in each dependent variable to determine if any increases in the affected core disaster area are offset by decreases in the surrounding counties. Each dependent variable was analyzed individually for the GO Zone timeframe (2006-2008) and for the two-year period preceding Hurricane Katrina (2003-2004). A graphical analysis indicates no major violations of the assumptions required for appropriate multiple regression models and no transformations therefore are necessary to proceed with the interpretation of the results.

The results reported in Table 4.18 compare the annual percentage changes for GO Zone counties to non-GO Zone counties pre- and post-Katrina. Based on the multiple regression procedures, no statistically significant results exist, at the alpha level equal to 0.05, that show any differences between GO Zone and non-GO Zone counties pre-Katrina or post-Katrina. Additional statistical procedures were performed on the full dataset examining the interaction between GO Zone versus non-GO Zone counties pre- and post-Katrina; essentially testing whether the pre-Katrina and post-Katrina regression coefficients reported in Table 4.18 for the *GO Zone* variable in each model were statistically different. Based on these multiple regression procedures, none of the dependent variables showed a statistically significant change at the alpha level equal to 0.05 when comparing the *GO Zone* variable regression coefficient from the pre-Katrina time period to the coefficient from the post-Katrina time period, after controlling for the independent variables included in each model. Additional multiple

regression models will be analyzed comparing GO Zone counties to GO Zone counties and non-GO Zone counties to non-GO Zone counties pre- and post-Katrina.

Table 4.18

Sensitivity Analysis Summary Table Comparing GO Zone to Non-GO Zone Counties Pre- and Post-Katrina using Annual Percentage Change Values for Subset Sample Dataset and Multiple Regression Procedures						
	Pre-Katrina			**Post-Katrina**		
Variables	Beta	t - statistic	P-value	Beta	t – statistic	P-value
Personal Income (DV)						
Overall Model			0.708			0.077
Go Zone	-.078	-.650	**0.517**	.017	.184	**0.855**
Time	-.086	-.749	0.456	.211	2.268	0.025
Population Density	-.272	-.971	0.335	-.064	-.417	0.678
Federal Gov. Expenditures	.195	.761	0.449	.137	.943	0.348
Unemployment Rate	.024	.165	0.870	-.201	-1.913	0.058
Average Wage Per Job (DV)						
Overall Model			0.559			0.247
Go Zone	-.116	-.976	**0.332**	.200	2.080	**0.040**
Time	.156	1.374	0.174	-.024	-.255	0.799
Population Density	.158	.566	0.573	-.078	-.501	0.618
Federal Gov. Expenditures	-.083	-.327	0.745	.060	.406	0.686
Unemployment Rate	.127	.893	0.375	-.081	-.756	0.451
Per Capita Income (DV)						
Overall Model			0.125			0.306
Go Zone	-.111	-.965	**0.288**	-.030	-.313	**0.754**
Time	-.085	-.769	0.444	.219	2.316	0.022
Population Density	-.310	-1.149	0.254	-.148	-.956	0.341
Federal Gov. Expenditures	.241	.975	0.333	.173	1.172	0.244
Unemployment Rate	.167	1.208	0.231	-.088	-.824	0.412
Median Household Inc. (DV)						
Overall Model			0.034			0.931
Go Zone	-.078	-.694	**0.490**	-.027	-.274	**0.785**
Time	-.201	-1.871	0.065	-.049	-.506	0.614
Population Density	-.449	-1.702	0.093	.017	.107	0.915
Federal Gov. Expenditures	.195	.809	0.421	-.060	-.401	0.689
Unemployment Rate	.022	.163	0.871	-.088	-.810	0.420
Manufacturing Employment (DV)						
Overall Model			0.133			0.000
Go Zone	.078	.645	**0.521**	.122	1.325	**0.188**
Time	.227	1.976	0.052	-.087	-.970	0.334
Population Density	-.361	-1.273	0.207	-.265	-1.813	0.073
Federal Gov. Expenditures	.165	.643	0.522	.060	.430	0.668
Unemployment Rate	-.245	-1.672	0.099	-.442	-4.367	0.000

Table 4.18 - Continued

	Pre-Katrina			Post-Katrina		
Variables	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Total Industry Earnings (DV)						
Overall Model			0.223			0.148
Go Zone	-.070	-.603	**0.549**	.034	.359	**0.720**
Time	-.211	-1.895	0.062	.115	1.224	0.223
Population Density	-.273	-1.000	0.320	-.002	-.013	0.990
Federal Gov. Expenditures	.172	.688	0.494	.060	.413	0.680
Unemployment Rate	.059	.422	0.674	-.218	-2.058	0.042
Construction Earnings (DV)						
Overall Model			0.772			0.808
Go Zone	-.070	-.564	**0.574**	-.013	-.123	**0.902**
Time	-.060	-.502	0.618	-.057	-.555	0.580
Population Density	.327	1.130	0.262	.074	.445	0.657
Federal Gov. Expenditures	-.204	-.766	0.446	.048	.306	0.761
Unemployment Rate	.158	1.071	0.288	-.037	-.320	0.750
Manufacturing Earnings (DV)						
Overall Model			0.416			0.000
Go Zone	.084	.672	**0.504**	.170	1.817	**0.072**
Time	.076	.628	0.532	-.133	-1.439	0.153
Population Density	-.340	-1.161	0.250	-.199	-1.332	0.186
Federal Gov. Expenditures	.169	.629	0.532	.034	.239	0.811
Unemployment Rate	-.272	-1.818	0.074	-.374	-3.612	0.000
Total Employment (DV)						
Overall Model			0.040			0.000
Go Zone	-.082	-.726	**0.470**	.083	.968	**0.335**
Time	.273	2.530	0.014	-.042	-.506	0.614
Population Density	.006	.024	0.981	-.231	-1.682	0.095
Federal Gov. Expenditures	-.018	-.073	0.942	.183	1.403	0.163
Unemployment Rate	-.260	-1.917	0.059	-.492	-5.197	0.000
Construction Employment (DV)						
Overall Model			0.533			0.949
Go Zone	-.158	-1.285	**0.203**	-.026	-.250	**0.803**
Time	-.030	-.257	0.798	.029	.279	0.781
Population Density	.387	1.354	0.180	.059	.353	0.725
Federal Gov. Expenditures	-.236	-.896	0.373	.056	.353	0.725
Unemployment Rate	.050	.341	0.734	.050	.431	0.667

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual percentage change by county for each variable in the sensitivity analysis sample dataset.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
An analysis of variance (ANOVA) was calculated to determine the overall significance of each model.

The data used for these multiple regression procedures were analyzed for serial correlation. Table 4.19 provides additional information for the regression models reported in Table 4.18. Table 4.19 provides the Durbin-Watson statistic for each

dependent variable for both pre- and post-Katrina time periods. The table also provides the R-Squared and Adjusted R-Squared for each variable. Based on the Durbin-Watson test statistic (evaluated at dL = 1.582), no dependent variables exhibit serial correlation. The null hypothesis of non-autocorrelated errors can be accepted and the analysis can thus continue with no corrections for serial correlation in these time-series models.

Table 4.19

Supplemental Information for Summary Table 4.18

	Pre-Katrina			Post-Katrina		
Dependent Variables	R-Squared	Adj. R-Squared	Durbin-Watson	R-Squared	Adj. R-Squared	Durbin-Watson
Personal Income	.038	-.027	2.251	.082	.042	2.047
Average Wage Per Job	.051	-.013	2.105	.056	.015	2.273
Per Capita Income	.108	.048	2.170	.051	.009	2.073
Median Household Inc.	.147	.090	1.648	.011	-.032	2.644
Total Industry Earnings	.088	.027	2.173	.068	.027	1.883
Construction Earnings	.036	-.035	2.311	.022	-.026	1.973
Manufacturing Earnings	.074	.001	1.728	.205	.166	1.622
Total Employment	.143	.085	1.854	.258	.226	1.653
Construction Employment	.057	-.012	1.983	.011	-.037	2.011
Manufacturing Employment	.115	.049	1.726	.217	.179	2.302

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual percentage change by county for each variable.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.

GO Zone versus GO Zone, Non-GO Zone versus Non-GO Zone Pre- and Post-Katrina

The results reported in Table 4.20 compare GO Zone counties with GO Zone counties pre- and post-Katrina and non-GO Zone counties with non-GO Zone counties pre- and post-Katrina for the sensitivity sample dataset. A graphical analysis indicates

no major violations of the assumptions required for appropriate multiple regression models and no transformations are thus necessary to proceed with the interpretation of the results. Based on the additional multiple regression procedures, only one of the dependent variables showed a statistically significant change, at the alpha level equal to 0.05, when comparing the GO Zone counties for the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. That variable was per capita income, with a p-value of 0.003; however, based on the sign of the standardized coefficient, the annual change in per capita income in the GO Zone counties decreased post-Katrina. Results from the multiple regression procedures performed on annual percentage change values in this sensitivity analysis provide no statistical evidence supporting the rejection of null hypothesis two (H2).

Table 4.20

Sensitivity Analysis Summary Table Comparing GO Zone Counties to GO Zone Counties and non-GO Zone Counties to non-GO Zone Counties Pre- and Post-Katrina using Annual Percentage Change Values for Subset Sample Dataset and Multiple Regression Procedures

	GO Zone			Non-GO Zone		
Variables	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Personal Income (DV)						
Overall Model			0.114			0.369
Katrina (Pre-K vs. Post-K)	-.727	-2.695	**0.008**	-.234	-.875	**0.384**
Time	.601	2.260	0.026	.010	.038	0.970
Population Density	-.225	-1.197	0.234	-.083	-.594	0.554
Federal Gov. Expenditures	.291	1.674	0.097	.024	.176	0.861
Unemployment Rate	-.118	-.992	0.324	-.036	-.337	0.737
Average Wage Per Job (DV)						
Overall Model			0.987			0.056
Katrina (Pre-K vs. Post-K)	.025	.088	**0.930**	-.434	-1.669	**0.098**
Time	.043	.156	0.876	.122	.470	0.639
Population Density	.042	.212	0.833	-.092	-.678	0.500
Federal Gov. Expenditures	-.013	-.070	0.945	.049	.378	0.706
Unemployment Rate	-.019	-.156	0.876	.027	.254	0.800
Per Capita Income (DV)						
Overall Model			0.045			0.147
Katrina (Pre-K vs. Post-K)	-.799	-3.001	**0.003**	-.248	-.941	**0.349**
Time	.642	2.445	0.016	-.002	-.007	0.994
Population Density	-.239	-1.273	0.206	-.152	-1.109	0.270
Federal Gov. Expenditures	.285	1.659	0.100	.046	.349	0.728
Unemployment Rate	.053	.453	0.651	.063	.593	0.555
Median Household Inc. (DV)						
Overall Model			0.988			0.595
Katrina (Pre-K vs. Post-K)	.080	.283	**0.777**	.336	1.245	**0.216**
Time	-.032	-.115	0.909	-.360	-1.336	0.185
Population Density	.044	.219	0.827	-.117	-.837	0.405
Federal Gov. Expenditures	-.089	-.493	0.623	-.029	-.216	0.829
Unemployment Rate	-.040	-.320	0.750	-.044	-.404	0.687
Manufacturing Employment (DV)						
Overall Model			0.522			0.000
Katrina (Pre-K vs. Post-K)	-.095	-.326	**0.745**	-.439	-1.772	**0.080**
Time	-.083	-.287	0.775	.307	1.242	0.218
Population Density	-.180	-.878	0.383	-.307	-2.418	0.018
Federal Gov. Expenditures	.054	.288	0.774	.125	1.019	0.311
Unemployment Rate	-.141	-1.105	0.272	-.477	-4.774	0.000

Table 4.20 - Continued

Variables	GO Zone			Non-GO Zone		
	Beta	t - statistic	P-value	Beta	t - statistic	P-value
Total Industry Earnings (DV)						
Overall Model			0.033			0.017
Katrina (Pre-K vs. Post-K)	-.484	-1.825	**0.071**	-.116	-.451	**0.653**
Time	.146	.560	0.577	-.245	-.957	0.341
Population Density	-.093	-.498	0.619	-.110	-.831	0.408
Federal Gov. Expenditures	.122	.714	0.477	.018	.139	0.890
Unemployment Rate	-.055	-.474	0.636	.002	.015	0.988
Construction Earnings (DV)						
Overall Model			0.940			0.213
Katrina (Pre-K vs. Post-K)	.142	.475	**0.636**	.218	.779	**0.438**
Time	-.105	-.359	0.720	-.400	-1.431	0.156
Population Density	.145	.697	0.488	-.051	-.374	0.709
Federal Gov. Expenditures	-.034	-.180	0.858	.224	1.668	0.099
Unemployment Rate	.025	.194	0.847	.051	.455	0.650
Manufacturing Earnings (DV)						
Overall Model			0.321			0.000
Katrina (Pre-K vs. Post-K)	.007	.025	**0.980**	-.426	-1.694	**0.094**
Time	-.238	-.833	0.407	.231	.917	0.362
Population Density	-.086	-.422	0.674	-.283	-2.277	0.025
Federal Gov. Expenditures	-.002	-.009	0.993	.144	1.181	0.241
Unemployment Rate	-.115	-.910	0.365	-.466	-4.556	0.000
Total Employment (DV)						
Overall Model			0.066			0.000
Katrina (Pre-K vs. Post-K)	.090	.336	**0.738**	-.283	-1.206	**0.231**
Time	.108	.408	0.685	.337	1.436	0.154
Population Density	.060	.316	0.752	-.365	-2.991	0.004
Federal Gov. Expenditures	-.005	-.031	0.976	.259	2.194	0.031
Unemployment Rate	-.225	-1.912	0.059	-.547	-5.766	0.000
Construction Employment (DV)						
Overall Model			0.355			0.679
Katrina (Pre-K vs. Post-K)	.157	.539	**0.591**	.317	1.107	**0.271**
Time	.063	.222	0.825	-.179	-.626	0.533
Population Density	.193	.951	0.344	.112	.799	0.426
Federal Gov. Expenditures	-.066	-.356	0.722	-.052	-.381	0.704
Unemployment Rate	.024	.190	0.850	.072	.632	0.529

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual percentage change by county for each variable in the sensitivity analysis sample dataset.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.
The Katrina independent variable is used to identify pre- and post-Katrina time periods.
An analysis of variance (ANOVA) was calculated to determine the overall significance of each model.

The data used for these multiple regression procedures were analyzed for serial correlation. Table 4.21 provides additional information for the regression models reported in Table 4.20. Table 4.21 provides the Durbin-Watson statistic for each

dependent variable for both GO Zone and non-GO Zone counties. The table also provides the R-Squared and Adjusted R-Squared for each variable. Based on the Durbin-Watson test statistic (evaluated at dL = 1.582), no dependent variables exhibit serial correlation. The null hypothesis of non-autocorrelated errors can be accepted and the analysis can thus continue with no corrections for serial correlation in these time-series models.

Table 4.21

Supplemental Information for Summary Table 4.20

	GO Zone			Non-GO Zone		
Dependent Variables	R-Squared	Adj. R-Squared	Durbin-Watson	R-Squared	Adj. R-Squared	Durbin-Watson
Personal Income	.089	.040	1.972	.055	.005	2.291
Average Wage Per Job	.006	-.046	1.937	.107	.059	1.927
Per Capita Income	.112	.065	2.159	.082	.033	2.081
Median Household Inc.	.006	-.047	2.555	.038	-.013	2.624
Total Industry Earnings	.120	.073	2.114	.134	.088	1.742
Construction Earnings	.014	-.044	1.932	.078	.024	2.397
Manufacturing Earnings	.066	.011	1.630	.257	.212	1.665
Total Employment	.103	.055	1.633	.272	.233	1.829
Construction Employment	.063	.007	1.682	.035	-.021	2.280
Manufacturing Employment	.048	-.009	1.734	.235	.192	1.605

Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual percentage change by county for each variable.
Data Sources: Regional Economic Information System, Bureau of Economic Analysis and U.S. Census Bureau.

CHAPTER V

CONCLUSIONS AND LIMITATIONS

Economic theory states that a decline in the total cost of productive assets would spur an increase in the quantity demanded, because, all else equal, lowering the cost of any item increases the quantity demanded of that item (U.S. Congress 2007). Politicians utilize tax policy investment incentives to foster economic growth and stimulate investment. On December 21, 2005, President Bush signed the Gulf Opportunity Zone Act of 2005, otherwise known as the GO Zone Act. The GO Zone Act provided tax incentives, such as bonus depreciation and tax-exempt bond financing, to stimulate economic growth and assist in the recovery and rebuilding efforts. Empirical research on the impact of tax incentives on economic growth has proven to be inconclusive, even though Congress is still implementing tax incentives to stimulate economic growth.

This research evaluates the economic impact of tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005. This study measures the economic impact of these incentives at the county level in the impact area, controlling for other relevant explanatory variables, such as population density, the unemployment rate, and the location of commercial casinos. The purpose of the research is to assess the effectiveness of tax policy investment incentives at the regional level. The first phase of the research estimates the impact of these regional tax incentives on several key economic variables, including manufacturing earnings, manufacturing employment, personal income, and average wages per job. The second phase of the research examines whether these regional tax policy investment incentives create economic

growth within policy coverage areas at the expense of the surrounding regions. The following sections of Chapter Five address the summary of the findings of these two research questions, the limitations inherent in the study, the possible suggestions for future research, the contributions of this research, and the overall conclusion.

Summary of the Findings

This research reports the results of linear mixed-effects modeling and multiple regression procedures analyzed to identify the significant variables that distinguish differences between GO Zone and non-GO Zone counties and standard empirical models to analyze the impact of these variables on the surrounding counties. The research questions are analyzed with a matched sample panel data set using observations from 2002 through 2008 to test whether tax policy investment incentives are effective at the regional level and to determine the impact of these incentives on the surrounding regions.

Findings for Research Question 1

The first research question examines the impact of tax policy investment incentives at the regional level and whether these incentives promote economic growth. Specifically, phase one of this research addresses the following research question:

1) Do tax policy investment incentives promote economic growth and spur business investment spending at the regional level?

The first phase of the research utilizes linear mixed effects modeling and multiple regression procedures on a matched sample panel data set from 2002 through 2008 to

determine whether tax policy investment incentives provided by the GO Zone Act created significant differences in the key economic indicators included in this study. Research question 1 was tested with the following dependent variables at the county level: annual industry earnings, manufacturing industry earnings, construction industry earnings, per capita income, personal income, average wages per job, median household income, total employment for all industries, total manufacturing employment, total construction employment, housing unit number estimates, and the number of building permits issued annually. Each dependent variable was analyzed individually with mixed effects modeling procedures for the GO Zone timeframe (2006-2008) and for the three-year period preceding Hurricane Katrina (2002-2004). Annual changes in each dependent variable covering 2003 through 2008 were calculated and subsequent statistical procedures were performed on these values. The year-over-year changes in each dependent variable were analyzed with multiple regression procedures individually for the GO Zone timeframe (2006-2008) and for the two-year period preceding Hurricane Katrina (2003-2004). Population density, federal government expenditures, unemployment rate, commercial casinos, race, county, and state variables were included as control variables in the majority of the regression models.

The linear mixed effects and multiple regression procedures produced the following results. Based on the linear mixed effects procedures, only three of the dependent variables showed a statistically significant change, at the alpha level equal to 0.05, when comparing GO Zone counties for the pre-Katrina time period (2002-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were construction employment, with

a post –Katrina p-value of 0.011, per capita income, with a post –Katrina p-value of 0.019, and the number of building permits issued annually, with a post –Katrina p-value of 0.015. Based on the multiple regression procedures, only three of the dependent variables showed a statistically significant change, at the alpha level equal to 0.05, when comparing GO Zone counties for the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were construction employment, with a p-value of 0.000, construction net earnings, with a p-value of 0.000, and the number of building permits issued annually, with a p-value of 0.009. These significant differences were not unexpected and can be explained by the physical property damage and the population migration caused by Hurricane Katrina. The physical property damage explains the increases in the construction industry earnings and employment and the number of building permits issued. The population out-migration caused by Katrina would have a large impact on per capita income.

A subsequent sensitivity analysis performed on a sample of the original dataset attempted to remove the effects of Hurricane Katrina by focusing on counties where the storm damage was minimal. Based on the sensitivity analysis, none of the dependent variables showed a statistically significant difference, at the alpha level equal to 0.05, when comparing GO Zone counties for the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for other independent variables. Overall, the results do not indicate that the tax incentives provided to the GO Zone counties have had a statistically significant impact on key economic indicators.

Findings for Research Question 2

The second research question examines whether tax policy investment incentives at the regional level are a zero-sum game, where economic growth created by incentives come at the expense of the surrounding regions. Specifically, phase two of this research addresses the following research question:

> 2) Are regional tax policy investment incentives a zero-sum game, where growth in one local area comes at the expense of reduced growth in other local areas?

The second phase of the research utilizes multiple regression implementing the same panel data set used for testing the first research phase. Research question 2 was tested with many of the same economic indicators implemented in research question 1; however research question 2 examined the percentage change in each of these variables individually at the county level and attempted to determine if any increases in the affected core disaster area are offset by decreases in the surrounding counties. Each dependent variable was analyzed for the GO Zone timeframe (2006-2008) and for the two-year period preceding Hurricane Katrina (2003-2004).

Based on the multiple regression procedures, four of the dependent variables showed a statistically significant change, at the alpha level equal to 0.05, when comparing GO Zone counties for the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were construction employment, with a p-value of 0.020, total employment, with a p-value of 0.036, total industry net earnings, with a p-value of 0.008, and manufacturing industry net earnings, with a p-value of 0.008. Based on the standardized coefficients, these significant differences represented

increases in the annual percentage change value for each variable, except for annual industry net earnings, which showed lower values post-Katrina compared to the pre-Katrina timeframe. Only two of the dependent variables showed a statistically significant change, at the alpha level equal to 0.05, when comparing the non-GO Zone counties for the pre-Katrina time period (2003-2004) to the post-Katrina time period (2006-2008), after controlling for the independent variables included in each model. These variables were construction employment, with a p-value of 0.026, and construction industry net earnings, with a p-value of 0.004.

Three of the four primary variables of interest (average wages per job, manufacturing employment, and manufacturing earnings) produced increased percentage changes in post-Katrina GO Zone counties and decreased percentage changes in post-Katrina non-GO Zone counties, providing support to the zero-sum game theory. These results, however, were not significant at the alpha level equal to 0.05, eliminating the possibility of drawing conclusions in support of the zero-sum game theory based on these changes.

A subsequent sensitivity analysis was also performed on research question 2 in an attempt to eliminate the impact of Hurricane Katrina. Based on the multiple regression procedures performed in this analysis, none of the dependent variables showed a statistically significant difference, at the alpha level equal to 0.05, after controlling for the independent variables included in each model. Overall, the results do not indicate that the tax incentives provided by the GO Zone Act has had a statistically significant negative impact on the surrounding region.

Limitations of the Study

As with all forms of research, some limitations are inherent in archival empirical research. Archival empirical data for the affected region make this study possible but also limit the ability to generalize these results to other regions. In addition, empirical research utilizing real-world data can be prone to internal validity issues that exist due to lack of environmental controls and other possible causal factors. The purpose of this research is to determine whether tax policy investment incentives have an impact on economic growth at the regional level and to determine the impact on surrounding regions. Therefore, explanation and generalization are not the primary factors of this research study.

The time limitation of the study and the temporary nature of the tax policy investment incentives impose additional limitations on any findings. Even though the most current available research were relied on, these tax policy investment incentives were temporary, and Friedman's permanent income hypothesis indicates that investing patterns may not change with temporary reductions in tax burdens (Meghir 2004). The short-term nature of these regional tax policy investment incentives restricts the data and limits the time available to identify a statistically significant impact. Also, these temporary investment incentives may have shifted capital investment spending forward in time, which would indicate a temporary change with no significant long-term impact on economic growth. Future studies covering tax policy investment incentives could help to clarify some of these temporary and time-related limitations.

Although the models used in this research were capable of explaining a large portion of the variation in the dependent variables, any missing and unexplained

variables can contribute omitted variable bias to this study. Unfortunately, some of these omitted variables are intangible and could not be measured. The physical property damage and population out-migration caused by Hurricane Katrina also creates potential limitations on any findings. Hurricane Katrina was the worst natural disaster in our nation's history in terms of geographic scope, the severity of its destruction, and the number of persons displaced from their homes (GAO 2010). These extraneous factors make drawing conclusions difficult in the counties and parishes most severely damaged by Hurricane Katrina.

Contributions of the Study

The results of this study contribute additional evidence to the conclusions found in prior empirical work concerning the impact of the cost of capital through tax incentives upon investment decisions. Most prior empirical research studies in this area have been cross-sectional studies based on industry-, firm-, or asset-level data and not typically tested at the regional level. Steinnes (1984) examined regional economic development and concluded that the use of pooled-time-series-cross-sectional data provides more accurate results when compared to research that only examines cross-sectional data for one time period. According to Wooldridge (2009), utilizing pooled cross sections from different years is an effective way of analyzing the effects of government policy. This research addresses these issues by utilizing a matched sample panel data set at the county level.

In general, counties are the smallest geographical regions for which significant data are available, and, to date, very little, if any, empirical research has been performed

on the effectiveness of tax investment incentives using real-world economic data at the county level. The GO Zone Act provides an opportunity for researching the effectiveness of tax-policy incentives on capital investment and economic growth at the county level over a finite period of time covering 2006 through 2008. According to Richardson (2006), Hurricanes Katrina and Rita may provide the ultimate test for tax policy in the United States. The Katrina Emergency Tax Relief Act of 2005 (KETRA) and, especially, the Gulf Opportunity Zone Act of 2005 give economists an opportunity to evaluate the effectiveness of tax policy (Richardson 2006).

The matched sample implemented in this research also allows the impact of tax incentives on surrounding regions to be examined. Multiple researchers have stated that regional tax incentives are potentially a zero-sum game, where the benefits provided to one region come at the expense of surrounding areas and that tax incentives do not produce growth at the regional level, but simply shift spending from one area to another with no net gain. This research minimizes some of these issues addressed by prior empirical research and provides evidence on the effectiveness of tax policy investment incentives at the regional level and estimates the impact of these incentives on surrounding regions.

This research adds to the existing literature concerning the effectiveness of tax policy investment incentives by using real-world, county-level economic indicators to test the impact of tax policy investment incentives at the regional level. This research also provides evidence of the impact that regional tax policy investment incentives have on the surrounding areas, helping to determine whether regionally tailored tax

incentives have a significant impact on the intended beneficiaries or are simply a zero-sum game that shifts spending from one geographic location to another.

Suggestions for Future Research

Regional tax investment incentives provide opportunities for future research. Very little empirical research has been performed on the effectiveness of tax investment incentives using real-world economic data. Additional research could be performed on the incentives provided by the GO Zone Act after additional time has passed to determine its potential long-term effects. The current study provides a foundation for future research by identifying significant independent control variables that explain a large portion of the variation in key economic indicators. If possible, research could be performed on regional tax incentives not created in response to a natural disaster of some type, eliminating potential extraneous factors. Future research on regional tax incentives could also be performed on a micro level, examining very specific North American Industry Classification System (NAICS) codes within specific industries.

Conclusion

The Gulf Opportunity Zone Act of 2005 implemented temporary regional tax investment incentives after Hurricane Katrina devastated the Gulf Coast. The Act provided tax incentives for businesses and individuals to encourage rebuilding, rehabilitation, and investment in these hurricane stricken areas. The Congressional Budget Office (2006) estimates that the tax benefits related to the GO Zone Act will amount to about $4 billion in 2006, $3 billion in 2007, and $2 billion over the years

from 2008 to 2015 (Richardson 2006). The major tax provisions generating these tax benefits are the 50 percent bonus depreciation, the Section 179 expensing, and the broadening of the employee retention tax credit for all companies regardless of size (Richardson 2006). The purpose of this study was to assess the effectiveness of tax policy investment incentives at the regional level and to examine whether these regional tax policy investment incentives create economic growth at the expense of the surrounding region.

The regional tax policy investment incentives provided by the GO Zone Act did not generate significant increases in key economic indicators included in this study. These tax incentives were intended to accelerate capital spending and spur economic recovery, but based on research findings, they do not appear to have had the impact desired by Congress. Based on the combined data analysis from all the models tested with linear mixed effects and multiple regression procedures, statistical evidence supporting the rejection of hypothesis number one (H1) does not exist. The null hypothesis, therefore, is supported and the conclusion is drawn that the tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005 have had no significant impact on economic growth in the affected region.

Bartik (1994) noted that success in one area could cause negative results in other areas. Liard-Muriente (2007) also noted that regional development policies could be described as a zero-sum game, with local job reshuffling as the outcome. Research results provided some tentative evidence supporting the zero-sum game theory; however, these results were not significant at the alpha level equal to 0.05. Based on the multiple regression data analysis from all of the models tested for research question

2, statistically significant evidence supporting the rejection of hypothesis number two (H2) does not exist. The null hypothesis, therefore, is supported and the conclusion is drawn that the tax policy investment incentives provided by the Gulf Opportunity Zone Act of 2005 have had no significant impact on economic growth in the surrounding region.

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LIST OF APPENDICES

Appendix A – Counties and Parishes included in research dataset

GO Zone Counties	non-GO Zone Counties
Baldwin, AL	Bibb, AL
Choctaw, AL	Calhoun, AL
Clarke, AL	Chilton, AL
Greene, AL	Coffee, AL
Hale, AL	Conecuh, AL
Marengo, AL	Covington, AL
Mobile, AL	Cullman, AL
Pickens, AL	Dale, AL
Sumter, AL	Dallas, AL
Tuscaloosa, AL	Elmore, AL
Washington, AL	Escambia, AL
Acadia, LA	Etowah, AL
Ascension, LA	Fayette, AL
Assumption, LA	Houston, AL
Calcasieu, LA	Jefferson, AL
Cameron, LA	Lamar, AL
East Baton Rouge, LA	Monroe, AL
East Feliciana, LA	Montgomery, AL
Iberia, LA	Morgan, AL
Iberville, LA	Perry, AL
Jefferson, LA	St. Clair, AL
Jefferson Davis, LA	Shelby, AL
Lafayette, LA	Talladega, AL
Lafourche, LA	Walker, AL
Livingston, LA	Wilcox, AL
Orleans, LA	Allen, LA
Plaquemines, LA	Avoyelles, LA
Pointe Coupee, LA	Beauregard, LA
St. Bernard, LA	Bienville, LA
St. Charles, LA	Bossier, LA
St. Helena, LA	Caddo, LA
St. James, LA	Caldwell, LA
St. John the Baptist, LA	Catahoula, LA

St. Martin, LA	Claiborne, LA
St. Mary, LA	Concordia, LA
St. Tammany, LA	De Soto, LA
Tangipahoa, LA	East Carroll, LA
Terrebonne, LA	Evangeline, LA
Vermilion, LA	Franklin, LA
Washington, LA	Grant, LA
West Baton Rouge, LA	Jackson, LA
West Feliciana, LA	La Salle, LA
Adams, MS	Lincoln, LA
Amite, MS	Madison, LA
Attala, MS	Morehouse, LA
Choctaw, MS	Natchitoches, LA
Claiborne, MS	Ouachita, LA
Clarke, MS	Rapides, LA
Copiah, MS	Red River, LA
Covington, MS	Richland, LA
Forrest, MS	Sabine, LA
Franklin, MS	St. Landry, LA
George, MS	Tensas, LA
Greene, MS	Union, LA
Hancock, MS	Vernon, LA
Harrison, MS	Webster, LA
Hinds, MS	West Carroll, LA
Holmes, MS	Winn, LA
Humphreys, MS	Alcorn, MS
Jackson, MS	Benton, MS
Jasper, MS	Bolivar, MS
Jefferson, MS	Calhoun, MS
Jefferson Davis, MS	Carroll, MS
Jones, MS	Chickasaw, MS
Kemper, MS	Clay, MS
Lamar, MS	Coahoma, MS
Lauderdale, MS	DeSoto, MS
Lawrence, MS	Grenada, MS
Leake, MS	Issaquena, MS

Lincoln, MS	Itawamba, MS
Lowndes, MS	Lafayette, MS
Madison, MS	Lee, MS
Marion, MS	Leflore, MS
Neshoba, MS	Marshall, MS
Newton, MS	Monroe, MS
Noxubee, MS	Montgomery, MS
Oktibbeha, MS	Panola, MS
Pearl River, MS	Pontotoc, MS
Perry, MS	Prentiss, MS
Pike, MS	Quitman, MS
Rankin, MS	Sharkey, MS
Scott, MS	Sunflower, MS
Simpson, MS	Tallahatchie, MS
Smith, MS	Tate, MS
Stone, MS	Tippah, MS
Walthall, MS	Tishomingo, MS
Warren, MS	Tunica, MS
Wayne, MS	Union, MS
Wilkinson, MS	Washington, MS
Winston, MS	Webster, MS
Yazoo, MS	Yalobusha, MS

Appendix B – Grant Assistance by Parish/County

Number of Homeowner Units Funded and Total Amounts Awarded through the Road Home Homeowner Program (Louisiana) and the Homeowner Assistance Program (Mississippi), by State and Parish/County			
Parish/County	**GO Zone (1 = yes)**	**Homeowner units funded**	**Assistance Awarded**
Acadia, LA	1	279	$5,544,470
Allen, LA	0	487	$10,075,978
Ascension, LA	1	136	$3,957,068
Assumption, LA	1	200	$3,486,988
Beauregard, LA	0	912	$19,027,802
Calcasieu, LA	1	12,313	$313,703,052
Cameron, LA	1	1,482	$58,486,809
East Baton Rouge, LA	1	174	$4,581,435
East Feliciana, LA	1	27	$516,317
Evangeline, LA	0	51	$905,100
Iberia, LA	1	977	$26,138,919
Iberville, LA	1	51	$1,215,867
Jefferson, LA	1	23,218	$928,511,348
Jefferson Davis, LA	1	819	$19,783,362
Lafayette, LA	1	107	$1,917,445
Lafourche, LA	1	743	$17,400,332
Livingston, LA	1	203	$4,686,996
Orleans, LA	1	40,783	$2,455,013,610
Plaquemines, LA	1	2,436	$86,614,182
Pointe Coupee, LA	1	14	$356,394
Sabine, LA	0	27	$412,876
St. Bernard, LA	1	10,221	$645,792,150
St. Charles, LA	1	914	$26,488,864
St. Helena, LA	1	252	$4,911,715
St. James, LA	1	355	$7,874,097
St. John the Baptist, LA	1	1,168	$21,771,460
St. Landry, LA	0	156	$4,158,029
St. Martin, LA	1	95	$1,464,994
St. Mary, LA	1	786	$13,017,832
St. Tammany, LA	1	10,463	$538,165,766
Tangipahoa, LA	1	1,440	$33,307,532

Terrebonne, LA	1	2,350	$57,426,077
Vermilion, LA	1	1,541	$51,310,723
Vernon, LA	0	139	$2,706,415
Washington, LA	1	1,252	$23,559,492
West Baton Rouge, LA	1	13	$487,795
West Feliciana, LA	1	3	$115,534
All Parishes		**116,587**	**$5,394,894,825**
Hancock, MS	1	6,278	$517,112,976
Harrison, MS	1	8,364	$654,079,862
Jackson, MS	1	10,113	$658,319,634
Pearl River, MS	1	92	$4,666,521
All Counties		**24,847**	**$1,834,178,993**
All Parishes and Counties		**141,434**	**$7,229,073,818**
Data Source: GAO 2010			

Appendix C – Mississippi Casinos

Name of Casino	Location	County
AMERISTAR CASINO	VICKSBURG, MS	WARREN
BALLY'S SALOON	TUNICA RESORTS, MS	TUNICA
BEAU RIVAGE RESORTS, INC.	BILOXI, MS	HARRISON
BOOMTOWN BILOXI CASINO	BILOXI, MS	HARRISON
DIAMONDJACKS	VICKSBURG, MS	WARREN
FITZGERALDS CASINO	TUNICA RESORTS, MS	TUNICA
GOLD STRIKE CASINO RESORT	TUNICA RESORTS, MS	TUNICA
GRAND CASINO	BILOXI, MS	HARRISON
HARD ROCK CASINO	BILOXI, MS	HARRISON
HARLOW'S CASINO RESORT	GREENVILLEE, MS	WASHINGTON
HARRAH'S CASINO	TUNICA RESORTS, MS	TUNICA
HOLLYWOOD CASINO	TUNICA RESORTS, MS	TUNICA
HOLLYWOOD CASINO	BAY ST LOUIS, MS	HANCOCK
HORIZON CASINO	VICKSBURG, MS	WARREN
HORSESHOE CASINO & HOTEL	TUNICA RESORTS, MS	TUNICA
IMPERIAL PALACE	BILOXI, MS	HARRISON
ISLAND VIEW CASINO	GULFPORT, MS	HARRISON
ISLE OF CAPRI – LULA	LULA, MS	COAHOMA
ISLE OF CAPRI – NATCHEZ	NATCHEZ, MS	ADAMS
ISLE OF CAPRI CASINO – BILOXI	BILOXI, MS	HARRISON
JUBILEE CASINO	GREENVILLE, MS	WASHINGTON
LIGHTHOUSE POINT CASINO	GREENVILLE, MS	WASHINGTON
NEW PALACE CASINO	BILOXI, MS	HARRISON
RAINBOW CASINO	VICKSBURG, MS	WARREN
RESORTS TUNICA HOTEL & CASINO	TUNICA RESORTS, MS	TUNICA
RIVERWALK CASINO AND HOTEL	VICKSBURG, MS	WARREN
SAM'S TOWN HOTEL	TUNICA RESORTS, MS	TUNICA
SHERATON CASINO	TUNICA RESORTS, MS	TUNICA
SILVER SLIPPER	BAY ST LOUIS, MS	HANCOCK
TREASURE BAY	BILOXI, MS	HARRISON
Data Source: Mississippi Gaming Commission		

Appendix D – Louisiana Casinos

Name of Casino	**Location**	**Parish**
Amelia Belle	Amelia	St. Mary
Belle of Baton Rouge	Baton Rouge	East Baton Rouge
Boomtown	Bossier City	Bossier
Boomtown Casino	Harvey	Jefferson
Diamond Jacks	Bossier City	Bossier
Eldorado Casino Resort	Shreveport	Caddo
Harrah's	New Orleans	Orleans
Hollywood	Baton Rouge	East Baton Rouge
Horseshoe	Bossier City	Bossier
Isle of Capri	Westlake	Calcasieu
Isle/Grand Palais	Lake Charles	Calcasieu
L' Auberge Du Lac	Lake Charles	Calcasieu
PNK	Baton Rouge	East Baton Rouge
Sam 's Town	Shreveport	Caddo
Sugar Cane Bay	Lake Charles	Calcasieu
Treasure Chest	Kenner	Jefferson
Data Source: Louisiana Gaming Control Board		

Appendix E

Actual Annual County Personal Income by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	2237.226 (3307.73) n = 33	2950.724 (5253.97) n = 75	0.039	2574.812 (3811.53) n = 33	3248.363 (5661.71) n = 75	0.010
Louisiana	3246.613 (4492.10) n = 93	1146.025 (1656.93) n = 99	0.472	3684.207 (4815.13) n = 93	1277.313 (1858.95) n = 99	0.037
Mississippi	1126.881 (1536.25) n = 147	736.999 (776.29) n = 99	0.038	1249.009 (1698.18) n = 147	799.270 (889.47) n = 99	0.051
Total	1983.205 (3213.89) N = 273	1493.493 (3090.96) N = 273	0.866	2238.844 (3515.21) N = 273	1645.454 (3356.99) N = 273	0.108

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix F

Actual Annual County Average Wages per Job by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	32534 (6351.87) n = 33	32269 (4883.90) n = 75	0.357	33789 (6003.99) n = 33	33190 (5448.96) n = 75	0.288
Louisiana	35716 (6335.92) n = 93	29099 (3598.61) n = 99	0.000	40507 (7309.09) n = 93	31018 (3898.09) n = 99	0.000
Mississippi	29471 (4543.96) n = 147	28411 (2916.32) n = 99	0.211	31194 (4904.63) n = 147	28955 (2716.04) n = 99	0.009
Total	31969 (6133.42) N = 273	29720 (4095.82) N = 273	0.000	34680 (7314.03) N = 273	30867 (4363.23) N = 273	0.000

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix G

Actual Annual Per Capita Income by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	26038 (3488.61) n = 33	28072 (5173.11) n = 75	0.719	28860 (3801.53) n = 33	30078 (5580.05) n = 75	0.256
Louisiana	28303 (4356.60) n = 93	25041 (3238.93) n = 99	0.094	34407 (7463.61) n = 93	27422 (3922.17) n = 99	0.000
Mississippi	24937 (4544.24) n = 147	24568 (3147.60) n = 99	0.935	26869 (5436.11) n = 147	26256 (2888.22) n = 99	0.745
Total	26217 (4616.63) N = 273	25702 (4099.51) N = 273	0.459	29678 (6956.65) N = 273	27729 (4400.57) N = 273	0.019

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix H

Actual Annual Median Household Income by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	33437 (6702.47) n = 33	37900 (9322.45) n = 75	0.314	34287 (7279.55) n = 33	38665 (9592.69) n = 75	0.284
Louisiana	40545 (6657.33) n = 93	31978 (4972.07) n = 99	0.000	42682 (7355.08) n = 93	33273 (5422.82) n = 99	0.000
Mississippi	33295 (6899.51) n = 147	32913 (6869.27) n = 99	0.745	34252 (7466.43) n = 147	32868 (6561.94) n = 99	0.237
Total	35782 (7589.12) N = 273	33944 (7460.70) N = 273	0.003	37128 (8393.61) N = 273	34608 (7578.54) N = 273	0.001

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix I

Actual Annual County Housing Unit Estimates by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	36232 (51251.87) n = 33	39349 (56902.33) n = 75	0.002	39140 (55176.44) n = 33	40914 (59488.85) n = 75	0.004
Louisiana	42245 (53980.68) n = 93	17891 (21401.15) n = 99	0.779	39937 (46739.62) n = 93	18615 (22279.20) n = 99	0.036
Mississippi	16831 (19503.84) n = 147	11628 (9060.99) n = 99	0.031	17229 (19631.13) n = 147	12245 (10452.24) n = 99	0.044
Total	27834 (40543.71) N = 273	21515 (34692.19) N = 273	0.632	27613 (37818.76) N = 273	22431 (36307.82) N = 273	0.107

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of houses.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix J

Actual Annual Building Permits by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	626.15 (1197.45) n = 33	403.47 (843.95) n = 75	0.017	726.55 (1321.87) n = 33	360.05 (745.88) n = 75	0.000
Louisiana	541.97 (730.91) n = 93	133.65 (255.42) n = 99	0.157	603.90 (859.59) n = 93	123.15 (232.28) n = 99	0.147
Mississippi	173.07 (403.01) n = 147	125.01 (419.52) n = 99	0.994	235.54 (578.05) n = 147	103.58 (352.41) n = 99	0.652
Total	353.51 (689.44) N = 273	204.64 (543.81) N = 273	0.065	420.38 (822.31) N = 273	181.14 (477.26) N = 273	0.015

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of permits.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix K

Average County Annual Total Industry Net Earnings by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	1577.459 (2595.29) n = 33	2280.068 (5062.07) n = 75	0.208	1784.915 (2943.30) n = 33	2424.696 (5172.89) n = 75	0.060
Louisiana	2524.074 (4011.39) n = 93	782.563 (1348.11) n = 99	0.755	2744.076 (4002.74) n = 93	858.489 (1473.60) n = 99	0.043
Mississippi	828.902 (1431.51) n = 147	488.303 (548.78) n = 99	0.124	882.731 (1489.18) n = 147	499.150 (574.70) n = 99	0.090
Total	1496.863 (2817.39) N = 273	1087.256 (2879.47) N = 273	0.833	1625.871 (2890.98) N = 273	1158.46 (2968.91) N = 273	0.104

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix L

Average County Construction Industry Earnings by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	121.433 (206.78) n = 33	170.846 (415.39) n = 75	0.176	152.140 (268.56) n = 33	175.346 (404.85) n = 75	0.017
Louisiana*	200.261 (314.77) n = 93	42.692 (69.29) n = 99	0.270	252.147 (388.50) n = 91	58.199 (91.43) n = 88	0.100
Mississippi**	50.127 (69.74) n = 147	30.570 (71.60) n = 99	0.595	65.547 (89.18) n = 133	32.989 (73.74) n = 92	0.034
Total	109.891 (214.22) N = 273	73.504 (232.70) N = 273	0.648	142.739 (271.18) N = 257	83.559 (237.07) N = 255	0.232

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix M

Average County Manufacturing Industry Earnings by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama**	260.285 (354.04) n = 33	309.863 (415.44) n = 73	0.083	269.625 (384.89) n = 33	321.749 (450.436) n = 75	0.083
Louisiana**	278.144 (312.84) n = 92	98.663 (171.98) n = 88	0.126	288.768 (296.91) n = 93	93.361 (156.56) n = 89	0.007
Mississippi**	114.819 (174.87) n = 136	118.145 (146.53) n = 91	0.371	118.890 (195.17) n = 137	100.826 (119.01) n = 93	0.950
Total	190.782 (268.13) N = 261	166.879 (275.50) N = 252	0.664	197.874 (275.07) N = 263	162.712 (287.47) N = 257	0.205

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Alabama, Mississippi and Louisiana.

Appendix N

Actual Average County Employment for all Industries by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	40163.18 (63873.26) n = 33	49923.77 (92530.55) n = 75	0.022	44938.09 (71151.87) n = 33	53642.96 (95639.32) n = 75	0.023
Louisiana	57218.24 (83002.26) n = 93	19728.11 (30299.24) n = 99	0.853	58355.23 (77585.60) n = 93	21245.25 (32899.86) n = 99	0.052
Mississippi	20802.91 (31380.51) n = 147	13349.19 (13081.31) n = 99	0.096	21939.60 (31872.12) n = 147	14021.69 (14831.88) n = 99	0.061
Total	35548.38 (60161.65) N = 273	25710.39 (54332.88) N = 273	0.889	37124.96 (58847.38) N = 273	27526.19 (56802.67) N = 273	0.146

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix O

Actual Average County Construction Employment by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	3024.18 (5039.80) n = 33	3268.96 (5974.93) n = 75	0.003	3807.79 (6409.94) n = 33	3625.25 (6066.63) n = 75	0.002
Louisiana**	4383.03 (5934.41) n = 89	1201.29 (1642.70) n = 91	0.322	5129.70 (6716.18) n = 91	1468.34 (1985.05) n = 88	0.006
Mississippi**	1410.86 (1704.82) n = 131	738.67 (886.27) n = 95	0.023	1749.59 (2198.47) n = 133	879.61 (1197.14) n = 92	0.003
Total	2666.84 (4347.38) N = 253	1627.06 (3536.70) N = 261	0.184	3210.72 (5094.13) N = 257	1890.32 (3729.08) N = 255	0.011

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix P

Actual Average County Manufacturing Employment by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	4044.45 (5105.76) n = 33	5363.57 (6315.88) n = 75	0.087	4139.00 (5551.22) n = 33	5347.68 (6280.45) n = 75	0.101
Louisiana**	3734.16 (4035.32) n = 92	1532.49 (2301.22) n = 88	0.314	3714.34 (3838.05) n = 93	1495.69 (2270.52) n = 89	0.026
Mississippi**	2278.11 (2786.57) n = 135	2482.76 (2980.15) n = 96	0.194	2238.38 (2855.30) n = 136	2162.86 (2504.22) n = 96	0.647
Total	3017.52 (3682.58) N = 260	2994.10 (4353.78) N = 259	0.574	3001.68 (3683.56) N = 262	2853.18 (4234.77) N = 260	0.582

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix Q

Actual Average County Personal Income by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	2237.226 (3307.73) n = 33	2574.812 (3811.53) n = 33	0.755	2950.724 (5253.97) n = 75	3248.363 (5661.71) n = 75	0.538
Louisiana	3246.613 (4492.10) n = 93	3684.207 (4815.13) n = 93	0.411	1146.025 (1656.93) n = 99	1277.313 (1858.95) n = 99	0.838
Mississippi	1126.881 (1536.25) n = 147	1249.009 (1698.18) n = 147	0.217	736.999 (776.29) n = 99	799.270 (889.47) n = 99	0.291
Total	1983.205 (3213.89) N = 273	2238.844 (3515.21) N = 273	0.336	1493.493 (3090.96) N = 273	1645.454 (3356.99) N = 273	0.023

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix R

Actual County Average Wages per Job by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	32534 (6351.87) n = 33	33789 (6003.99) n = 33	0.310	32269 (4883.90) n = 75	33190 (5448.96) n = 75	0.082
Louisiana	35716 (6335.92) n = 93	40507 (7309.09) n = 93	0.001	29099 (3598.61) n = 99	31018 (3898.09) n = 99	0.164
Mississippi	29471 (4543.96) n = 147	31194 (4904.63) n = 147	0.498	28411 (2916.32) n = 99	28955 (2716.04) n = 99	0.004
Total	31969 (6133.42) N = 273	34680 (7314.03) N = 273	0.862	29720 (4095.82) N = 273	30867 (4363.23) N = 273	0.000

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix S

Actual Average County Per Capita Income by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	26038 (3488.61) n = 33	28860 (3801.53) n = 33	0.753	28072 (5173.11) n = 75	30078 (5580.05) n = 75	0.068
Louisiana	28303 (4356.60) n = 93	34407 (7463.61) n = 93	0.007	25041 (3238.93) n = 99	27422 (3922.17) n = 99	0.242
Mississippi	24937 (4544.24) n = 147	26869 (5436.11) n = 147	0.119	24568 (3147.60) n = 99	26256 (2888.22) n = 99	0.012
Total	26217 (4616.63) N = 273	29678 (6956.65) N = 273	0.941	25702 (4099.51) N = 273	27729 (4400.57) N = 273	0.000

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix T

Actual Average County Median Household Income by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	33437 (6702.47) n = 33	34287 (7279.55) n = 33	0.667	37900 (9322.45) n = 75	38665 (9592.69) n = 75	0.396
Louisiana	40545 (6657.33) n = 93	42682 (7355.08) n = 93	0.626	31978 (4972.07) n = 99	33273 (5422.82) n = 99	0.207
Mississippi	33295 (6899.51) n = 147	34252 (7466.43) n = 147	0.035	32913 (6869.27) n = 99	32868 (6561.94) n = 99	0.000
Total	35782 (7589.12) N = 273	37128 (8393.61) N = 273	0.002	33944 (7460.70) N = 273	34608 (7578.54) N = 273	0.000

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix U

Actual Annual County Housing Unit Estimates by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	36232 (51251.87) n = 33	39140 (55176.44) n = 33	0.370	39349 (56902.33) n = 75	40914 (59488.85) n = 75	0.549
Louisiana	42245 (53980.68) n = 93	39937 (46739.62) n = 93	0.050	17891 (21401.15) n = 99	18615 (22279.20) n = 99	0.859
Mississippi	16831 (19503.84) n = 147	17229 (19631.13) n = 147	0.023	11628 (9060.99) n = 99	12245 (10452.24) n = 99	0.832
Total	27834 (40543.71) N = 273	27613 (37818.76) N = 273	0.056	21515 (34692.19) N = 273	22431 (36307.82) N = 273	0.028

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of houses.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix V

Actual Average County Building Permits by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	626.15 (1197.45) n = 33	726.55 (1321.87) n = 33	0.940	403.47 (843.95) n = 75	360.05 (745.88) n = 75	0.482
Louisiana	541.97 (730.91) n = 93	603.90 (859.59) n = 93	0.869	133.65 (255.42) n = 99	123.15 (232.28) n = 99	0.469
Mississippi	173.07 (403.01) n = 147	235.54 (578.05) n = 147	0.738	125.01 (419.52) n = 99	103.58 (352.41) n = 99	0.430
Total	353.51 (689.44) N = 273	420.38 (822.31) N = 273	0.378	204.64 (543.81) N = 273	181.14 (477.26) N = 273	0.854

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of permits.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix W

Actual Average County Total Net Earnings for all Industries by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	1577.459 (2595.29) n = 33	1784.915 (2943.30) n = 33	0.372	2280.068 (5062.07) n = 75	2424.696 (5172.89) n = 75	0.254
Louisiana	2524.074 (4011.39) n = 93	2744.076 (4002.74) n = 93	0.577	782.563 (1348.11) n = 99	858.489 (1473.60) n = 99	0.113
Mississippi	828.902 (1431.51) n = 147	882.731 (1489.18) n = 147	0.003	488.303 (548.78) n = 99	499.150 (574.70) n = 99	0.018
Total	1496.863 (2817.39) N = 273	1625.871 (2890.98) N = 273	0.002	1087.256 (2879.47) N = 273	1158.46 (2968.91) N = 273	0.003

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix X

Actual Average County Construction Industry Earnings by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	121.433 (206.78) n = 33	152.140 (268.56) n = 33	0.361	170.846 (415.39) n = 75	175.346 (404.85) n = 75	0.521
Louisiana**	200.261 (314.77) n = 93	252.147 (388.50) n = 91	0.869	42.692 (69.29) n = 99	58.199 (91.43) n = 88	0.558
Mississippi**	50.127 (69.74) n = 147	65.547 (89.18) n = 133	0.766	30.570 (71.60) n = 99	32.989 (73.74) n = 92	0.431
Total	109.891 (214.22) N = 273	142.739 (271.18) N = 257	0.814	73.504 (232.70) N = 273	83.559 (237.07) N = 255	0.968

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix Y

Actual Average County Manufacturing Industry Earnings by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	260.285 (354.04) n = 33	269.625 (384.89) n = 33	0.451	309.863 (415.44) n = 73	321.749 (450.436) n = 75	0.661
Louisiana*	278.144 (312.84) n = 92	288.768 (296.91) n = 93	0.529	98.663 (171.98) n = 88	93.361 (156.56) n = 89	0.175
Mississippi**	114.819 (174.87) n = 136	118.890 (195.17) n = 137	0.528	118.145 (146.53) n = 91	100.826 (119.01) n = 93	0.714
Total	190.782 (268.13) N = 261	197.874 (275.07) N = 263	0.907	166.879 (275.50) N = 252	162.712 (287.47) N = 257	0.109

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Alabama, Mississippi and Louisiana.

Appendix Z

Actual Average County Employment for all Industries by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	40163.18 (63873.26) n = 33	44938.09 (71151.87) n = 33	0.651	49923.77 (92530.55) n = 75	53642.96 (95639.32) n = 75	0.815
Louisiana	57218.24 (83002.26) n = 93	58355.23 (77585.60) n = 93	0.593	19728.11 (30299.24) n = 99	21245.25 (32899.86) n = 99	0.748
Mississippi	20802.91 (31380.51) n = 147	21939.60 (31872.12) n = 147	0.832	13349.19 (13081.31) n = 99	14021.69 (14831.88) n = 99	0.043
Total	35548.38 (60161.65) N = 273	37124.96 (58847.38) N = 273	0.118	25710.39 (54332.88) N = 273	27526.19 (56802.67) N = 273	0.252

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix AA

Actual Average County Construction Employment by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	3024.18 (5039.80) n = 33	3807.79 (6409.94) n = 33	0.626	3268.96 (5974.93) n = 75	3625.25 (6066.63) n = 75	0.259
Louisiana**	4383.03 (5934.41) n = 89	5129.70 (6716.18) n = 91	0.029	1201.29 (1642.70) n = 91	1468.34 (1985.05) n = 88	0.314
Mississippi**	1410.86 (1704.82) n = 131	1749.59 (2198.47) n = 133	0.793	738.67 (886.27) n = 95	879.61 (1197.14) n = 92	0.110
Total	2666.84 (4347.38) N = 253	3210.72 (5094.13) N = 257	0.192	1627.06 (3536.70) N = 261	1890.32 (3729.08) N = 255	0.759

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix AB

Actual Average County Manufacturing Employment by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	4044.45 (5105.76) n = 33	4139.00 (5551.22) n = 33	0.315	5363.57 (6315.88) n = 75	5347.68 (6280.45) n = 75	0.131
Louisiana*	3734.16 (4035.32) n = 92	3714.34 (3838.05) n = 93	0.734	1532.49 (2301.22) n = 88	1495.69 (2270.52) n = 89	0.740
Mississippi**	2278.11 (2786.57) n = 135	2238.38 (2855.30) n = 136	0.481	2482.76 (2980.15) n = 96	2162.86 (2504.22) n = 96	0.200
Total	3017.52 (3682.58) N = 260	3001.68 (3683.56) N = 262	0.361	2994.10 (4353.78) N = 259	2853.18 (4234.77) N = 260	0.547

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2002, 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Mississippi and Louisiana

Appendix AC

Average Annual County Change in Personal Income by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	87.025 (134.69) n = 22	139.363 (276.47) n = 50	0.449	141.412 (234.25) n = 33	137.765 (232.58) n = 75	0.003
Louisiana	111.830 (171.82) n = 62	47.887 (79.90) n = 66	0.246	208.083 (446.14) n = 93	60.508 (101.49) n = 99	0.851
Mississippi	44.211 (66.35) n = 98	32.003 (37.82) n = 66	0.737	57.150 (129.56) n = 147	31.851 (48.36) n = 99	0.725
Total	72.421 (124.10) N = 182	67.258 (159.76) N = 182	0.206	118.752 (296.02) N = 273	71.340 (145.25) N = 273	0.125

*P-value noted is for GO Zone variable, not the complete model.
Unit: Millions of dollars.
Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AD

Average Annual Change in Wages Per Job by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	947.59 (530.02) n = 22	1004.70 (366.20) n = 50	0.378	1174.42 (709.25) n = 33	1107.36 (632.40) n = 75	0.609
Louisiana	1034.35 (574.57) n = 62	983.70 (476.23) n = 66	0.352	2599.00 (2018.99) n = 93	1430.15 (1255.88) n = 99	0.000
Mississippi	1011.96 (947.13) n = 98	1006.89 (601.44) n = 66	0.902	1257.22 (1319.27) n = 147	832.09 (587.50) n = 99	0.033
Total	1011.81 (790.74) N = 182	997.88 (497.77) N = 182	0.922	1704.30 (1669.71) N = 273	1124.59 (930.93) N = 273	0.000

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AE

Average Annual County Change in Per Capita Income by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	1184.82 (537.02) n = 22	1215.30 (524.76) n = 50	0.655	1252.58 (573.13) n = 33	1129.11 (455.71) n = 75	0.603
Louisiana	894.73 (454.17) n = 62	1106.97 (1017.44) n = 66	0.106	2362.22 (6363.31) n = 93	1239.04 (845.04) n = 99	0.057
Mississippi	1005.26 (768.69) n = 98	1217.61 (1119.15) n = 66	0.033	1055.08 (1415.53) n = 147	935.25 (1171.64) n = 99	0.778
Total	989.31 (653.82) N = 182	1176.85 (948.10) N = 182	0.003	1524.24 (3895.88) N = 273	1098.67 (908.58) N = 273	0.204

*P-value noted is for GO Zone variable, not the complete model.
Unit: Dollars.
Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AF

Average Annual County Change in Median Household Income by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	760.18 (347.12) n = 22	947.80 (511.48) n = 50	0.714	1527.82 (1271.67) n = 33	1374.03 (1882.26) n = 75	0.828
Louisiana	764.21 (519.14) n = 62	926.33 (490.37) n = 66	0.089	2339.65 (2247.66) n = 93	1574.23 (1688.71) n = 99	0.037
Mississippi	926.36 (565.93) n = 98	969.76 (430.07) n = 66	0.231	1301.01 (1638.39) n = 147	1121.29 (1672.83) n = 99	0.765
Total	851.03 (532.07) N = 182	947.98 (473.22) N = 182	0.033	1682.25 (1889.20) N = 273	1354.98 (1742.71) N = 273	0.172

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AG

Average Annual County Change in Housing Unit Estimates by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	517.36 (943.44) n = 22	350.74 (653.75) n = 50	0.002	779.76 (1568.36) n = 33	381.59 (752.39) n = 75	0.001
Louisiana	455.48 (670.95) n = 62	141.27 (223.03) n = 66	0.633	-826.53 (12431.41) n = 93	197.94 (277.14) n = 99	0.345
Mississippi	166.51 (329.11) n = 98	129.27 (388.22) n = 66	0.968	106.86 (1443.08) n = 147	164.17 (425.60) n = 99	0.179
Total	307.36 (580.21) N = 182	194.47 (443.87) N = 182	0.217	-129.77 (7346.74) N = 273	236.15 (505.17) N = 273	0.971

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of houses.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AH

Average Annual County Change in Building Permits Issued by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	142.41 (419.48) n = 22	64.80 (184.07) n = 50	0.175	-142.55 (664.83) n = 33	-90.71 (308.28) n = 75	0.256
Louisiana	56.18 (191.76) n = 62	16.38 (103.33) n = 66	0.900	-41.51 (487.51) n = 93	-26.73 (108.88) n = 99	0.640
Mississippi	26.82 (121.01) n = 98	9.52 (69.10) n = 66	0.759	5.90 (274.02) n = 147	-28.65 (171.86) n = 99	0.291
Total	50.79 (204.93) N = 182	27.19 (123.57) N = 182	0.209	-28.19 (418.29) N = 273	-45.00 (203.87) N = 273	0.508

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of permits.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AI

Average Annual County Change in Total Industry Net Earnings by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	59.979 (89.59) n = 22	102.259 (207.45) n = 50	0.581	83.137 (170.93) n = 33	74.264 (158.04) n = 75	0.013
Louisiana	99.031 (157.15) n = 62	43.505 (77.12) n = 66	0.046	158.560 (320.46) n = 93	36.743 (72.24) n = 99	0.121
Mississippi	40.597 (69.01) n = 98	25.205 (30.40) n = 66	0.986	33.813 (73.46) n = 147	9.314 (24.70) n = 99	0.371
Total	62.846 (111.91) N = 182	53.009 (122.90) N = 182	0.147	82.272 (210.54) N = 273	37.105 (97.76) N = 273	0.000

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AJ

Average Annual County Change in Construction Industry Net Earnings by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	2.058 (11.99) n = 22	9.349 (22.58) n = 50	0.597	4.946 (21.51) n = 33	-.510 (24.21) n = 75	0.169
Louisiana**	5.728 (18.36) n = 59	2.486 (6.93) n = 58	0.296	21.377 (53.36) n = 89	4.285 (14.43) n = 85	0.024
Mississippi**	-.893 (12.31) n = 84	1.759 (6.95) n = 63	0.485	4.913 (17.68) n = 132	-1.005 (10.00) n = 90	0.153
Total	1.868 (14.96) N = 165	4.225 (13.85) N = 171	0.008	10.687 (35.67) N = 254	.942 (16.91) N = 250	0.001

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Mississippi and Louisiana.
All dependent variables represent average annual change by county for each variable.

Appendix AK

Average Annual County Change in Manufacturing Industry Net Earnings by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama**	3.530 (24.55) n = 22	13.034 (29.28) n = 47	0.541	10.409 (28.70) n = 33	8.664 (24.03) n = 75	0.171
Louisiana**	1.472 (22.50) n = 61	3.365 (24.79) n = 56	0.311	17.663 (26.10) n = 93	.271 (15.71) n = 82	0.003
Mississippi**	5.427 (28.97) n = 88	.399 (8.44) n = 59	0.776	3.454 (19.38) n = 134	-3.384 (10.64) n = 92	0.513
Total	3.772 (26.19) N = 171	5.09 (22.54) N = 162	0.353	9.419 (24.07) N = 260	1.449 (17.87) N = 249	0.000

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
**Data were missing for a few counties in Alabama, Mississippi and Louisiana.
All dependent variables represent average annual change by county for each variable.

Appendix AL

Average Annual County Change in Employment for all Industries by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	565.55 (1203.79) n = 22	637.64 (1412.80) n = 50	0.136	1193.82 (2195.20) n = 33	740.16 (1439.07) n = 75	0.000
Louisiana	413.13 (1398.55) n = 62	208.64 (606.68) n = 66	0.251	1251.78 (7450.51) n = 93	457.55 (836.73) n = 99	0.812
Mississippi	165.23 (1103.57) n = 98	1.80 (554.39) n = 66	0.355	393.71 (1153.74) n = 147	152.24 (779.45) n = 99	0.884
Total	298.07 (1225.87) N = 182	251.49 (920.59) N = 182	0.965	782.74 (4498.27) N = 273	424.47 (1043.75) N = 273	0.191

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of Jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AM

Average Annual County Change in Construction Employment by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	63.00 (246.00) n = 22	124.74 (232.19) n = 50	0.734	94.36 (313.12) n = 33	41.51 (174.72) n = 75	0.043
Louisiana**	31.25 (386.60) n = 59	20.17 (125.17) n = 58	0.805	254.75 (520.63) n = 89	63.08 (237.85) n = 85	0.084
Mississippi**	-9.51 (229.92) n = 84	21.35 (118.57) n = 63	0.880	93.30 (264.58) n = 132	25.13 (84.39) n = 90	0.170
Total	14.73 (296.77) N = 165	51.18 (167.84) N = 171	0.145	150.01 (385.84) N = 254	42.95 (175.94) N = 250	0.001

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of Jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix AN

Average Annual County Change in Manufacturing Employment by State Comparing GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	-128.73 (470.79) n = 22	-126.36 (399.14) n = 50	0.951	42.67 (341.54) n = 33	-82.59 (290.06) n = 75	0.351
Louisiana**	-93.11 (251.53) n = 61	-39.07 (130.61) n = 56	0.258	69.35 (300.13) n = 93	-32.21 (225.29) n = 82	0.095
Mississippi**	-8.52 (481.58) n = 88	-106.32 (240.65) n = 63	0.737	-30.33 (214.68) n = 133	-143.97 (257.20) n = 95	0.096
Total	-54.16 (413.21) N = 171	-89.96 (273.46) N = 169	0.552	14.76 (269.05) N = 259	-89.33 (261.09) N = 252	0.000

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of Jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix AO

Average Annual County Change in Personal Income by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	87.025 (134.69) n = 22	141.412 (234.25) n = 33	0.515	139.363 (276.47) n = 50	137.765 (232.58) n = 75	0.697
Louisiana	111.830 (171.82) n = 62	208.083 (446.14) n = 93	0.447	47.887 (79.90) n = 66	60.508 (101.49) n = 99	0.405
Mississippi	44.211 (66.35) n = 98	57.150 (129.56) n = 147	0.391	32.003 (37.82) n = 66	31.851 (48.36) n = 99	0.600
Total	72.421 (124.10) N = 182	118.752 (296.02) N = 273	0.294	67.258 (159.76) N = 182	71.340 (145.25) N = 273	0.985

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AP

Average Annual County Change in Wages Per Job by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	947.59 (530.02) n = 22	1174.42 (709.25) n = 33	0.096	1004.70 (366.20) n = 50	1107.36 (632.40) n = 75	0.387
Louisiana	1034.35 (574.57) n = 62	2599.00 (2018.99) n = 93	0.007	983.70 (476.23) n = 66	1430.15 (1255.88) n = 99	0.181
Mississippi	1011.96 (947.13) n = 98	1257.22 (1319.27) n = 147	0.788	1006.89 (601.44) n = 66	832.09 (587.50) n = 99	0.238
Total	1011.81 (790.74) N = 182	1704.30 (1669.71) N = 273	0.108	997.88 (497.77) N = 182	1124.59 (930.93) N = 273	0.029

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AQ

Average Annual County Change in Per Capita Income by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	1184.82 (537.02) n = 22	1252.58 (573.13) n = 33	0.996	1215.30 (524.76) n = 50	1129.11 (455.71) n = 75	0.188
Louisiana	894.73 (454.17) n = 62	2362.22 (6363.31) n = 93	0.075	1106.97 (1017.44) n = 66	1239.04 (845.04) n = 99	0.017
Mississippi	1005.26 (768.69) n = 98	1055.08 (1415.53) n = 147	0.006	1217.61 (1119.15) n = 66	935.25 (1171.64) n = 99	0.094
Total	989.31 (653.82) N = 182	1524.24 (3895.88) N = 273	0.332	1176.85 (948.10) N = 182	1098.67 (908.58) N = 273	0.001

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AR

Average Annual County Change in Median Household Income by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	760.18 (347.12) n = 22	1527.82 (1271.67) n = 33	0.276	947.80 (511.48) n = 50	1374.03 (1882.26) n = 75	0.501
Louisiana	764.21 (519.14) n = 62	2339.65 (2247.66) n = 93	0.997	926.33 (490.37) n = 66	1574.23 (1688.71) n = 99	0.891
Mississippi	926.36 (565.93) n = 98	1301.01 (1638.39) n = 147	0.632	969.76 (430.07) n = 66	1121.29 (1672.83) n = 99	0.229
Total	851.03 (532.07) N = 182	1682.25 (1889.20) N = 273	0.712	947.98 (473.22) N = 182	1354.98 (1742.71) N = 273	0.976

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AS

Average Annual County Change in Housing Unit Estimates by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	517.36 (943.44) n = 22	779.76 (1568.36) n = 33	0.451	350.74 (653.75) n = 50	381.59 (752.39) n = 75	0.779
Louisiana	455.48 (670.95) n = 62	-826.53 (12431.41) n = 93	0.457	141.27 (223.03) n = 66	197.94 (277.14) n = 99	0.121
Mississippi	166.51 (329.11) n = 98	106.86 (1443.08) n = 147	0.039	129.27 (388.22) n = 66	164.17 (425.60) n = 99	0.162
Total	307.36 (580.21) N = 182	-129.77 (7346.74) N = 273	0.351	194.47 (443.87) N = 182	236.15 (505.17) N = 273	0.278

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of houses.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AT

Average Annual County Change in Building Permits Issued by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	142.41 (419.48) n = 22	-142.55 (664.83) n = 33	0.749	64.80 (184.07) n = 50	-90.71 (308.28) n = 75	0.702
Louisiana	56.18 (191.76) n = 62	-41.51 (487.51) n = 93	0.032	16.38 (103.33) n = 66	-26.73 (108.88) n = 99	0.630
Mississippi	26.82 (121.01) n = 98	5.90 (274.02) n = 147	0.094	9.52 (69.10) n = 66	-28.65 (171.86) n = 99	0.598
Total	50.79 (204.93) N = 182	-28.19 (418.29) N = 273	0.009	27.19 (123.57) N = 182	-45.00 (203.87) N = 273	0.647

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of permits.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AU

Average Annual County Change in Total Industry Net Earnings by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	59.979 (89.59) n = 22	83.137 (170.93) n = 33	0.276	102.259 (207.45) n = 50	74.264 (158.04) n = 75	0.966
Louisiana	99.031 (157.15) n = 62	158.560 (320.46) n = 93	0.157	43.505 (77.12) n = 66	36.743 (72.24) n = 99	0.838
Mississippi	40.597 (69.01) n = 98	33.813 (73.46) n = 147	0.026	25.205 (30.40) n = 66	9.314 (24.70) n = 99	0.227
Total	62.846 (111.91) N = 182	82.272 (210.54) N = 273	0.185	53.009 (122.90) N = 182	37.105 (97.76) N = 273	0.738

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AV

Average Annual County Change in Construction Industry Net Earnings by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	2.058 (11.99) n = 22	4.946 (21.51) n = 33	0.106	9.349 (22.58) n = 50	-.510 (24.21) n = 75	0.391
Louisiana**	5.728 (18.36) n = 59	21.377 (53.36) n = 89	0.008	2.486 (6.93) n = 58	4.285 (14.43) n = 85	0.438
Mississippi**	-.893 (12.31) n = 84	4.913 (17.68) n = 132	0.342	1.759 (6.95) n = 63	-1.005 (10.00) n = 90	0.488
Total	1.868 (14.96) N = 165	10.687 (35.67) N = 254	0.000	4.225 (13.85) N = 171	.942 (16.91) N = 250	0.145

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix AW

Average Annual County Change in Manufacturing Industry Net Earnings by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	3.530 (24.55) n = 22	10.409 (28.70) n = 33	0.586	13.034 (29.28) n = 47	8.664 (24.03) n = 75	0.615
Louisiana**	1.472 (22.50) n = 61	17.663 (26.10) n = 93	0.053	3.365 (24.79) n = 56	.271 (15.71) n = 82	0.526
Mississippi**	5.427 (28.97) n = 88	3.454 (19.38) n = 134	0.831	.399 (8.44) n = 59	-3.384 (10.64) n = 92	0.417
Total	3.772 (26.19) N = 171	9.419 (24.07) N = 260	0.138	5.09 (22.54) N = 162	1.449 (17.87) N = 249	0.457

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix AX

Average Annual County Change in Total Employment by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	565.55 (1203.79) n = 22	1193.82 (2195.20) n = 33	0.381	637.64 (1412.80) n = 50	740.16 (1439.07) n = 75	0.137
Louisiana	413.13 (1398.55) n = 62	1251.78 (7450.51) n = 93	0.580	208.64 (606.68) n = 66	457.55 (836.73) n = 99	0.005
Mississippi	165.23 (1103.57) n = 98	393.71 (1153.74) n = 147	0.826	1.80 (554.39) n = 66	152.24 (779.45) n = 99	0.214
Total	298.07 (1225.87) N = 182	782.74 (4498.27) N = 273	0.522	251.49 (920.59) N = 182	424.47 (1043.75) N = 273	0.338

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of Jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.

Appendix AY

Average Annual County Change in Construction Employment by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	63.00 (246.00) n = 22	94.36 (313.12) n = 33	0.622	124.74 (232.19) n = 50	41.51 (174.72) n = 75	0.494
Louisiana**	31.25 (386.60) n = 59	254.75 (520.63) n = 89	0.000	20.17 (125.17) n = 58	63.08 (237.85) n = 85	0.128
Mississippi**	-9.51 (229.92) n = 84	93.30 (264.58) n = 132	0.235	21.35 (118.57) n = 63	25.13 (84.39) n = 90	0.269
Total	14.73 (296.77) N = 165	150.01 (385.84) N = 254	0.000	51.18 (167.84) N = 171	42.95 (175.94) N = 250	0.209

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of Jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix AZ

Average Annual County Change in Manufacturing Employment by State Comparing GO Zone to GO Zone Counties and Non-GO Zone to Non-GO Zone Counties for Pre- and Post-Katrina

	GO Zone			Non-GO Zone		
	Pre-Katrina	Post-Katrina	P-Value*	Pre-Katrina	Post-Katrina	P-Value*
Alabama	-128.73 (470.79) n = 22	42.67 (341.54) n = 33	0.234	-126.36 (399.14) n = 50	-82.59 (290.06) n = 75	0.751
Louisiana**	-93.11 (251.53) n = 61	69.35 (300.13) n = 93	0.156	-39.07 (130.61) n = 56	-32.21 (225.29) n = 82	0.945
Mississippi**	-8.52 (481.58) n = 88	-30.33 (214.68) n = 133	0.737	-106.32 (240.65) n = 63	-143.97 (257.20) n = 95	0.401
Total	-54.16 (413.21) N = 171	14.76 (269.05) N = 259	0.284	-89.96 (273.46) N = 169	-89.33 (261.09) N = 252	0.684

*P-value noted is for Katrina (Pre-K vs. Post-K) variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Unit: Number of Jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Pre-Katrina is comprised of years 2003, and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.
All dependent variables represent average annual change by county for each variable.
**Data were missing for a few counties in Mississippi and Louisiana.

Appendix BA

Average County Annual Total Industry Earnings by State

	Alabama			Louisiana		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	1550.29 (2664.78) n = 11	2226.28 (5070.95) n = 25	0.681	2470.05 (3984.20) n = 31	748.68 (1307.61) n = 33	0.022
2003	1571.86 (2664.97) n = 11	2265.40 (5078.96) n = 25	0.673	2528.83 (4051.26) n = 31	788.78 (1367.18) n = 33	0.023
2004	1610.24 (2710.83) n = 11	2348.53 (5243.15) n = 25	0.663	2573.35 (4129.69) n = 31	810.23 (1408.80) n = 33	0.024
2005	1681.66 (2832.09) n = 11	2386.59 (5215.24) n = 25	0.677	2573.69 (4001.70) n = 31	826.29 (1429.26) n = 33	0.022
2006	1770.82 (3008.96) n = 11	2450.68 (5282.85) n = 25	0.706	2649.67 (3931.86) n = 31	850.02 (1490.00) n = 33	0.017
2007	1784.35 (3031.00) n = 11	2430.65 (5242.26) n = 25	0.706	2734.44 (4034.35) n = 31	853.53 (1475.49) n = 33	0.015
2008	1799.58 (3079.03) n = 11	2422.76 (5207.34) n = 25	0.715	2848.12 (4168.58) n = 31	871.92 (1500.92) n = 33	0.013
	Mississippi			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	803.06 (1418.68) n = 49	469.21 (540.23) n = 33	0.201	1461.26 (2782.28) n = 91	1053.26 (2847.85) n = 91	0.330
2003	828.17 (1441.13) n = 49	492.54 (553.55) n = 33	0.206	1497.41 (2824.65) n = 91	1087.02 (2863.63) n = 91	0.332
2004	855.47 (1463.60) n = 49	503.16 (568.69) n = 33	0.192	1531.92 (2875.27) n = 91	1121.48 (2957.27) n = 91	0.344
2005	863.16 (1461.03) n = 49	506.92 (577.27) n = 33	0.187	1544.81 (2826.20) n = 91	1139.13 (2951.70) n = 91	0.345
2006	871.26 (1489.14) n = 49	499.78 (580.38) n = 33	0.177	1585.83 (2830.92) n = 91	1154.51 (2997.98) n = 91	0.320
2007	879.83 (1495.60) n = 49	502.45 (584.58) n = 33	0.172	1620.96 (2892.83) n = 91	1159.48 (2977.48) n = 91	0.290
2008	897.11 (1513.49) n = 49	495.23 (576.97) n = 33	0.150	1670.83 (2978.72) n = 91	1161.37 (2964.08) n = 91	0.249

Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.

Appendix BB

Average County Annual Manufacturing Industry Earnings by State

	Alabama			Louisiana*		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	261.844 (369.22) n = 11	308.536 (416.72) n = 25	0.752	278.656 (317.68) n = 31	97.848 (157.53) n = 29	0.008
2003	261.839 (368.49) n = 11	310.799 (414.79) n = 25	0.740	278.519 (321.03) n = 31	103.968 (189.07) n = 28	0.015
2004	257.172 (359.13) n = 11	310.237 (431.82) n = 25	0.724	277.227 (309.98) n = 30	96.219 (177.11) n = 30	0.007
2005	260.441 (368.23) n = 11	317.354 (439.73) n = 25	0.710	266.456 (294.40) n = 31	102.454 (170.89) n = 27	0.014
2006	268.630 (388.38) n = 11	324.079 (458.84) n = 25	0.729	278.359 (294.48) n = 31	101.161 (173.82) n = 28	0.007
2007	268.941 (397.68) n = 11	322.639 (456.13) n = 25	0.738	289.334 (299.12) n = 31	99.251 (166.62) n = 28	0.004
2008	271.304 (406.28) n = 11	318.529 (454.95) n = 25	0.769	298.611 (306.51) n = 31	81.744 (135.14) n = 33	0.000
	Mississippi*			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	111.418 (162.24) n = 45	123.426 (151.68) n = 30	0.748	190.028 (266.92) n = 87	168.014 (271.23) n = 83	0.595
2003	120.218 (181.86) n = 44	115.070 (144.89) n = 31	0.896	195.394 (274.04) n = 86	167.921 (275.93) n = 83	0.517
2004	113.023 (183.33) n = 47	116.041 (147.86) n = 30	0.940	187.020 (266.48) n = 88	166.161 (283.69) n = 85	0.619
2005	118.574 (191.24) n = 45	111.892 (138.74) n = 31	0.868	189.205 (264.80) n = 87	170.708 (286.87) n = 83	0.663
2006	117.633 (184.88) n = 46	107.493 (127.41) n = 31	0.791	193.127 (266.91) n = 88	169.843 (294.59) n = 84	0.587
2007	120.357 (197.03) n = 45	101.709 (120.40) n = 31	0.640	199.354 (276.16) n = 87	166.642 (291.32) n = 84	0.452
2008	118.711 (207.30) n = 46	93.274 (112.23) n = 31	0.535	201.159 (294.95) n = 88	152.273 (279.87) n = 89	0.251

Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
*Data were missing for a few counties in Mississippi and Louisiana.

Appendix BC

Average County Annual Construction Industry Earnings by State

	Alabama			Louisiana*		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	122.590 (218.22) n = 11	165.797 (412.44) n = 25	0.746	204.642 (320.15) n = 30	45.075 (71.93) n = 30	0.010
2003	120.398 (209.59) n = 11	167.952 (415.75) n = 25	0.723	207.532 (327.68) n = 30	46.292 (71.87) n = 29	0.012
2004	121.312 (212.79) n = 11	178.790 (434.71) n = 25	0.681	214.449 (320.50) n = 29	46.511 (74.22) n = 31	0.006
2005	143.516 (257.65) n = 11	178.106 (427.78) n = 25	0.806	212.818 (327.62) n = 30	51.161 (76.86) n = 29	0.012
2006	153.463 (277.29) n = 11	182.789 (431.26) n = 25	0.838	257.467 (383.01) n = 29	57.652 (91.66) n = 29	0.008
2007	155.824 (279.56) n = 11	180.601 (418.53) n = 25	0.859	247.622 (386.48) n = 31	59.212 (92.81) n = 29	0.013
2008	147.131 (275.14) n = 11	162.648 (379.44) n = 25	0.904	251.695 (407.99) n = 31	57.750 (93.00) n = 30	0.014
	Mississippi*			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	57.259 (74.51) n = 44	29.860 (67.03) n = 32	0.103	117.731 (220.26) n = 85	74.169 (233.03) n = 87	0.210
2003	55.292 (72.63) n = 43	31.345 (73.77) n = 32	0.165	118.189 (224.53) n = 84	76.096 (236.71) n = 86	0.236
2004	52.539 (71.61) n = 44	33.158 (80.09) n = 31	0.275	117.442 (219.74) n = 84	79.764 (246.83) n = 87	0.294
2005	56.887 (77.16) n = 45	36.408 (88.41) n = 30	0.292	122.362 (229.62) n = 86	83.673 (247.99) n = 84	0.293
2006	64.905 (89.62) n = 44	35.578 (83.45) n = 31	0.155	142.981 (265.97) n = 84	86.406 (249.86) n = 85	0.156
2007	63.724 (90.34) n = 45	33.536 (77.97) n = 30	0.139	140.895 (269.48) n = 87	86.170 (244.18) n = 84	0.166
2008	68.055 (89.57) n = 44	29.872 (60.30) n = 31	0.043	144.365 (280.95) n = 86	78.194 (219.05) n = 86	0.087

Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
*Data were missing for a few counties in Mississippi and Louisiana.

Appendix BD

Average County Average Wages per Job by State						
	Alabama			Louisiana		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	32202 (6497.26) n = 11	31865 (4848.95) n = 25	0.864	35463 (6506.98) n = 31	28680 (3524.92) n = 33	0.000
2003	32623 (6592.49) n = 11	32357 (4969.19) n = 25	0.895	35607 (6348.99) n = 31	29109 (3668.56) n = 33	0.000
2004	32778 (6575.47) n = 11	32586 (5005.74) n = 25	0.924	36077 (6343.83) n = 31	29507 (3663.78) n = 33	0.000
2005	33207 (6319.94) n = 11	32766 (5147.53) n = 25	0.827	36998 (6499.73) n = 31	29891 (3601.28) n = 33	0.000
2006	33554 (6238.13) n = 11	32836 (5349.55) n = 25	0.726	39433 (7388.55) n = 31	30507 (3811.59) n = 33	0.000
2007	33679 (6004.55) n = 11	33208 (5551.23) n = 25	0.821	40185 (7155.39) n = 31	30704 (3850.76) n = 33	0.000
2008	34134 (6338.78) n = 11	33526 (5644.96) n = 25	0.776	41902 (7397.86) n = 31	31844 (4013.86) n = 33	0.000
	Mississippi			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	29011 (4421.53) n = 49	27955 (2930.99) n = 33	0.232	31595 (6169.55) n = 91	29292 (4046.51) n = 91	0.003
2003	29516 (4586.77) n = 49	28410 (3031.18) n = 33	0.227	31967 (6113.40) n = 91	29748 (4163.48) n = 91	0.005
2004	29885 (4671.34) n = 49	28868 (2799.48) n = 33	0.266	32344 (6162.07) n = 91	30121 (4079.50) n = 91	0.005
2005	30384 (4943.13) n = 49	28872 (2690.21) n = 33	0.113	32978 (6386.61) n = 91	30311 (4092.58) n = 91	0.001
2006	30872 (5024.39) n = 49	28834 (2799.27) n = 33	0.037	34113 (7175.49) n = 91	30540 (4256.23) n = 91	0.000
2007	30929 (4769.13) n = 49	28920 (2741.91) n = 33	0.032	34415 (7165.99) n = 91	30745 (4366.96) n = 91	0.000
2008	31779 (4965.12) n = 49	29111 (2682.61) n = 33	0.006	35512 (7598.53) n = 91	31315 (4474.91) n = 91	0.000

Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.

Appendix BE

Average County Employment by State						
	Alabama			Louisiana		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	39711 (65576.06) n = 11	49471 (93671.96) n = 25	0.757	56748 (83687.88) n = 31	19535 (30192.67) n = 33	0.020
2003	39936 (65598.02) n = 11	49553 (93145.41) n = 25	0.759	57332 (84005.51) n = 31	19697 (30541.91) n = 33	0.019
2004	40843 (66717.53) n = 11	50746 (94591.95) n = 25	0.756	57574 (84062.22) n = 31	19952 (31096.83) n = 33	0.019
2005	42207 (69006.10) n = 11	51859 (94811.96) n = 25	0.764	56392 (79646.37) n = 31	20215 (31609.64) n = 33	0.019
2006	43743 (71423.77) n = 11	52865 (96246.52) n = 25	0.780	56216 (76035) n = 31	20893 (32736.44) n = 33	0.018
2007	45282 (73887.90) n = 11	53984 (97260.30) n = 25	0.793	58702 (78816.04) n = 31	21255 (33233.64) n = 33	0.015
2008	45789 (75080.03) n = 11	54079 (97360.02) n = 25	0.803	60148 (80364.17) n = 31	21587 (33740.97) n = 33	0.014
	Mississippi			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	20671 (31592.56) n = 49	13400 (13127.84) n = 33	0.215	35263 (60183.18) n = 91	25535 (54328.58) n = 91	0.254
2003	20736 (31497.61) n = 49	13244 (13107.31) n = 33	0.200	35524 (60372.21) n = 91	25559 (54171.06) n = 91	0.243
2004	21001 (31701.55) n = 49	13404 (13412.60) n = 33	0.198	35859 (60594.60) n = 91	26038 (55095.59) n = 91	0.254
2005	21149 (31358.62) n = 49	13607 (13862.83) n = 33	0.198	35700 (58617.42) n = 91	26512 (55450.91) n = 91	0.279
2006	21479 (31375.09) n = 49	13915 (14492.04) n = 33	0.200	36004 (57287.42) n = 91	27146 (56464.31) n = 91	0.295
2007	22010 (32240.03) n = 49	14086 (15113.99) n = 33	0.192	37323 (59367.10) n = 91	27647 (57197.59) n = 91	0.264
2008	22330 (32643.97) n = 49	14063 (15337.33) n = 33	0.179	38049 (60477.47) n = 91	27785 (57370.02) n = 91	0.242

Note: Figures in parentheses refer to the standard deviations.
Unit: Number of jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.

Appendix BF

Average County Manufacturing Employment by State

	Alabama			Louisiana*		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	4208 (5620.67) n = 11	5531 (6678.27) n = 25	0.571	3784 (4087.09) n = 31	1569 (2255.88) n = 30	0.012
2003	3975 (5137.67) n = 11	5282 (6327.55) n = 25	0.551	3703 (4099.53) n = 31	1568 (2380.44) n = 28	0.019
2004	3951 (5038.67) n = 11	5278 (6189.86) n = 25	0.537	3715 (4053.07) n = 30	1462 (2348.27) n = 30	0.011
2005	3994 (5214.54) n = 11	5421 (6319.52) n = 25	0.517	3553 (3792.03) n = 31	1626 (2494.92) n = 27	0.028
2006	4126 (5573.61) n = 11	5488 (6417.01) n = 25	0.546	3595 (3703.79) n = 31	1591 (2447.59) n = 28	0.019
2007	4169 (5810.04) n = 11	5382 (6453.28) n = 25	0.596	3788 (3834.32) n = 31	1596 (2439.43) n = 28	0.012
2008	4122 (5812.75) n = 11	5173 (6224.34) n = 25	0.637	3761 (3795.76) n = 31	1329 (2013.95) n = 33	0.002
	Mississippi*			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	2307 (2747.95) n = 45	2630 (3134.15) n = 32	0.633	3073 (3744.09) n = 87	3098 (4507.78) n = 87	0.969
2003	2286 (2730.06) n = 44	2370 (2942.98) n = 33	0.897	3013 (3657.10) n = 86	2956 (4327.18) n = 86	0.925
2004	2242 (2935.11) n = 46	2451 (2949.10) n = 31	0.761	2966 (3687.67) n = 87	2928 (4270.21) n = 86	0.950
2005	2320 (2965.37) n = 44	2479 (2862.27) n = 31	0.817	2978 (3633.34) n = 86	3087 (4377.53) n = 83	0.860
2006	2278 (2887.49) n = 45	2327 (2698.13) n = 32	0.940	2981 (3636.65) n = 87	3014 (4365.13) n = 85	0.956
2007	2250 (2883.75) n = 45	2180 (2524.65) n = 32	0.914	3040 (3741.64) n = 87	2930 (4331.23) n = 85	0.858
2008	2189 (2858.39) n = 46	1981 (2345.64) n = 32	0.736	2984 (3713.67) n = 88	2629 (4051.79) n = 90	0.543

Note: Figures in parentheses refer to the standard deviations.
Unit: Number of jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
*Data were missing for a few counties in Mississippi and Louisiana.

Appendix BG

Average County Construction Employment by State

	Alabama			Louisiana*		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	2976 (5188.34) n = 11	3159 (5925.08) n = 25	0.930	4273 (5900.03) n = 30	1199 (1687.50) n = 30	0.008
2003	2994 (5118.67) n = 11	3239 (6042.09) n = 25	0.908	4401 (6143.28) n = 30	1210 (1631.63) n = 30	0.008
2004	3102 (5305.53) n = 11	3409 (6198.96) n = 25	0.888	4479 (5959.73) n = 29	1195 (1664.05) n = 31	0.005
2005	3551 (6153.87) n = 11	3492 (6215.94) n = 25	0.979	4515 (6181.13) n = 30	1328 (1744.03) n = 29	0.010
2006	3732 (6446.03) n = 11	3585 (6181.53) n = 25	0.949	5246 (6721.28) n = 29	1478 (2019.17) n = 29	0.005
2007	3857 (6645.27) n = 11	3673 (6180.57) n = 25	0.936	5028 (6770.91) n = 31	1467 (1990.84) n = 29	0.009
2008	3834 (6764.52) n = 11	3617 (6088.02) n = 25	0.925	5122 (6876.64) n = 31	1461 (2014.40) n = 30	0.007
	Mississippi*			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	1417 (1709.32) n = 44	715 (811.85) n = 32	0.035	2627 (4297.44) n = 85	1584 (3471.15) n = 87	0.082
2003	1416 (1715.78) n = 43	726 (862.21) n = 32	0.041	2689 (4443.38) n = 84	1615 (3531.57) n = 87	0.082
2004	1400 (1729.01) n = 44	776 (1004.82) n = 31	0.076	2686 (4352.66) n = 84	1682 (3645.50) n = 87	0.103
2005	1515 (1898.79) n = 45	844 (1098.48) n = 30	0.084	2822 (4619.65) n = 86	1799 (3727.09) n = 84	0.114
2006	1697 (2156.99) n = 44	870 (1189.04) n = 31	0.057	3189 (5035.25) n = 84	1876 (3752.25) n = 85	0.056
2007	1721 (2230.36) n = 45	876 (1244.49) n = 30	0.063	3170 (5106.50) n = 87	1912 (3783.64) n = 84	0.070
2008	1831 (2254.74) n = 44	893 (1198.30) n = 31	0.038	3273 (5197.04) n = 86	1883 (3696.07) n = 86	0.045

Note: Figures in parentheses refer to the standard deviations.
Unit: Number of jobs.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
*Data were missing for a few counties in Mississippi and Louisiana.

Appendix BH

Average County Personal Income by State						
	Alabama			Louisiana		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	2200.817 (3377.50) n = 11	2876.693 (5211.91) n = 25	0.696	3206.989 (4495.40) n = 31	1122.096 (1635.65) n = 33	0.015
2003	2220.726 (3392.18) n = 11	2924.614 (5249.21) n = 25	0.686	3229.299 (4506.66) n = 31	1140.458 (1664.69) n = 33	0.016
2004	2290.134 (3477.38) n = 11	3050.865 (5511.62) n = 25	0.677	3303.553 (4621.49) n = 31	1175.52 (1720.41) n = 33	0.016
2005	2389.089 (3635.87) n = 11	3112.801 (5561.63) n = 25	0.696	3434.952 (4713.89) n = 31	1221.585 (1792.85) n = 33	0.015
2006	2521.263 (3861.17) n = 11	3201.513 (5738.44) n = 25	0.723	3514.043 (4671.34) n = 31	1258.642 (1885.17) n = 33	0.013
2007	2576.662 (3927.43) n = 11	3260.892 (5749.68) n = 25	0.722	3747.977 (4991.11) n = 31	1265.708 (1850.81) n = 33	0.010
2008	2626.507 (4018.62) n = 11	3282.684 (5730.97) n = 25	0.734	3790.599 (4931.89) n = 31	1307.586 (1897.96) n = 33	0.009
	Mississippi			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	1106.520 (1521.83) n = 49	717.911 (765.71) n = 33	0.180	1954.342 (3190.32) n = 91	1457.555 (3033.93) n = 91	0.283
2003	1121.671 (1544.49) n = 49	737.933 (781.31) n = 33	0.192	1972.507 (3204.14) n = 91	1484.640 (3061.70) n = 91	0.295
2004	1152.451 (1573.52) n = 49	755.152 (805.02) n = 33	0.185	2022.766 (3281.72) n = 91	1538.284 (3208.15) n = 91	0.315
2005	1198.051 (1634.02) n = 49	777.889 (849.54) n = 33	0.179	2104.044 (3371.46) n = 91	1580.245 (3253.24) n = 91	0.288
2006	1212.135 (1668.21) n = 49	783.275 (877.05) n = 33	0.179	2154.548 (3398.70) n = 91	1620.012 (3364.18) n = 91	0.288
2007	1259.075 (1731.02) n = 49	801.922 (911.31) n = 33	0.168	2266.212 (3596.66) n = 91	1645.649 (3371.59) n = 91	0.231
2008	1275.817 (1729.18) n = 49	812.612 (907.06) n = 33	0.162	2295.771 (3584.18) n = 91	1670.699 (3372.23) n = 91	0.227

Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.

Appendix BI

Average County Per Capita Income by State

	Alabama			Louisiana		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	25400 (3764.79) n = 11	27421 (5245.89) n = 25	0.258	28019 (4445.17) n = 31	24360 (3345.02) n = 33	0.000
2003	25878 (3473.31) n = 11	27969 (5018.64) n = 25	0.219	28211 (4365.35) n = 31	25093 (3022.07) n = 33	0.001
2004	26835 (3395.95) n = 11	28827 (5362.83) n = 25	0.266	28679 (4376.30) n = 31	25671 (3303.83) n = 33	0.003
2005	27640 (3708.70) n = 11	29294 (5525.73) n = 25	0.373	30076 (4556.03) n = 31	26592 (3510.18) n = 33	0.001
2006	28459 (3962.39) n = 11	29688 (5634.58) n = 25	0.518	34090 (10031.30) n = 31	26770 (3834.43) n = 33	0.000
2007	28886 (4004.80) n = 11	30156 (5757.04) n = 25	0.512	34320 (6449.85) n = 31	27267 (3800.09) n = 33	0.000
2008	29236 (3764.38) n = 11	30390 (5554.05) n = 25	0.535	34811 (5321.83) n = 31	28230 (4102.81) n = 33	0.000
	Mississippi			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	24480 (4570.34) n = 49	23663 (3569.36) n = 33	0.390	25797 (4686.85) n = 91	24948 (4275.20) n = 91	0.203
2003	24773 (4526.21) n = 49	24786 (2890.36) n = 33	0.989	26078 (4595.40) n = 91	25772 (3847.18) n = 91	0.627
2004	25557 (4561.06) n = 49	25256 (2804.64) n = 33	0.736	26775 (4562.52) n = 91	26387 (4081.52) n = 91	0.547
2005	26327 (4683.49) n = 49	25995 (2869.51) n = 33	0.718	27763 (4807.75) n = 91	27118 (4162.87) n = 91	0.335
2006	26303 (5215.86) n = 49	25625 (3018.92) n = 33	0.503	29216 (7916.36) n = 91	27157 (4430.49) n = 91	0.032
2007	26871 (5866.54) n = 49	26374 (2891.58) n = 33	0.654	29652 (6766.94) n = 91	27737 (4396.99) n = 91	0.025
2008	27433 (5254.65) n = 49	26768 (2715.97) n = 33	0.506	30165 (6111.03) n = 91	28293 (4348.50) n = 91	0.018

Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.

Appendix BJ

Average County Median Household Income by State						
	Alabama			Louisiana		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	33322 (7022.10) n = 11	37726 (9709.08) n = 25	0.185	40495 (6931.19) n = 31	31606 (5122.33) n = 33	0.000
2003	33563 (6967.78) n = 11	37938 (9349.46) n = 25	0.174	40878 (6737.36) n = 31	32164 (4856.64) n = 33	0.000
2004	33425 (6772.15) n = 11	38038 (9286.29) n = 25	0.148	40262 (6502.43) n = 31	32163 (5066.61) n = 33	0.000
2005	32830 (6671.43) n = 11	38007 (9301.58) n = 25	0.106	40658 (6660.61) n = 31	32108 (5034.87) n = 33	0.000
2006	33426 (6988.98) n = 11	38099 (9712.51) n = 25	0.160	41096 (7309.24) n = 31	32306 (5611.96) n = 33	0.000
2007	34590 (7329.91) n = 11	38741 (9392.15) n = 25	0.203	42453 (7345.73) n = 31	33192 (5297.46) n = 33	0.000
2008	34846 (8108.05) n = 11	39157 (10029.51) n = 25	0.219	44498 (7242.40) n = 31	34320 (5329.19) n = 33	0.000
	Mississippi			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	32957 (6853.74) n = 49	32532 (7046.98) n = 33	0.786	35569 (7696.43) n = 91	33623 (7663.40) n = 91	0.089
2003	33478 (7077.08) n = 49	33065 (6948.17) n = 33	0.795	36009 (7721.61) n = 91	34077 (7397.28) n = 91	0.086
2004	33450 (6896.33) n = 49	33143 (6807.71) n = 33	0.843	35768 (7423.46) n = 91	34132 (7390.39) n = 91	0.138
2005	33546 (6923.82) n = 49	32300 (6337.63) n = 33	0.411	35882 (7567.67) n = 91	33798 (7290.79) n = 91	0.060
2006	33610 (7495.57) n = 49	32337 (6458.72) n = 33	0.428	36138 (8126.89) n = 91	33909 (7609.93) n = 91	0.058
2007	34321 (7304.19) n = 49	33129 (6814.54) n = 33	0.459	37124 (8200.93) n = 91	34694 (7502.46) n = 91	0.038
2008	34826 (7698.66) n = 49	33138 (6578.65) n = 33	0.306	38123 (8810.77) n = 91	35220 (7648.57) n = 91	0.019

Note: Figures in parentheses refer to the standard deviations.
Unit: Dollars. All dollar amounts are converted to constant 2008 dollars using the Gross Domestic Product (GDP) price deflator.
Data Source: U.S. Census Bureau.

Appendix BK

Average County Housing Unit Estimates by State

	Alabama			Louisiana		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	35738 (52273.31) n = 11	39009 (57170.63) n = 25	0.872	41807 (54288.70) n = 31	17755 (21461.17) n = 33	0.022
2003	36185 (52888.21) n = 11	39328 (57621.87) n = 25	0.878	42209 (54512.32) n = 31	17883 (21604.05) n = 33	0.021
2004	36773 (53622.38) n = 11	39710 (58261.74) n = 25	0.887	42718 (54924.64) n = 31	18037 (21801.26) n = 33	0.020
2005	37459 (54634.02) n = 11	40104 (58975.89) n = 25	0.900	43241 (55306.77) n = 31	18181 (21995.17) n = 33	0.019
2006	38350 (55802.37) n = 11	40555 (59641.47) n = 25	0.918	38901 (46217.79) n = 31	18439 (22316.53) n = 33	0.026
2007	39271 (57134.78) n = 11	40940 (60393.73) n = 25	0.939	40148 (47433.87) n = 31	18631 (22519.82) n = 33	0.022
2008	39799 (57989.12) n = 11	41249 (60884.49) n = 25	0.947	40762 (48078.09) n = 31	18774 (22691.02) n = 33	0.021
	Mississippi			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	16665 (19371.77) n = 49	11502 (8859.10) n = 33	0.156	27536 (40359.47) n = 91	21326 (34499.03) n = 91	0.266
2003	16830 (19624.73) n = 49	11621 (9138.17) n = 33	0.159	27815 (40649.17) n = 91	21504 (34783.86) n = 91	0.262
2004	16998 (19914.74) n = 49	11760 (9455.80) n = 33	0.164	28150 (41066.67) n = 91	21715 (35174.04) n = 91	0.258
2005	17199 (20256.86) n = 49	11894 (9802.06) n = 33	0.167	28520 (41524.76) n = 91	21924 (35602.14) n = 91	0.252
2006	16955 (19343.31) n = 49	12088 (10196.53) n = 33	0.189	27017 (37108.40) n = 91	22212 (36039.76) n = 91	0.377
2007	17212 (19729.70) n = 49	12260 (10615.31) n = 33	0.191	27692 (38077.96) n = 91	22449 (36488.46) n = 91	0.344
2008	17520 (20214.19) n = 49	12387 (10857.05) n = 33	0.186	28130 (38664.70) n = 91	22632 (36792.75) n = 91	0.327

Note: Figures in parentheses refer to the standard deviations.
Unit: Number of houses.
Data Source: U.S. Census Bureau.

Appendix BL

Average County Building Permits by State

	Alabama			Louisiana		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	483 (835.12) n = 11	341 (677.31) n = 25	0.592	474 (637.55) n = 31	113 (206.33) n = 33	0.003
2003	627 (1232.53) n = 11	399 (881.16) n = 25	0.531	566 (772.04) n = 31	141 (296.33) n = 33	0.005
2004	768 (1525.53) n = 11	471 (975.77) n = 25	0.485	586 (792.69) n = 31	146 (262.23) n = 33	0.004
2005	971 (2054.39) n = 11	495 (929.60) n = 25	0.340	553 (732.34) n = 31	172 (336.09) n = 33	0.009
2006	1015 (1873.38) n = 11	464 (983.57) n = 25	0.252	751 (1024.50) n = 31	163 (275.84) n = 33	0.002
2007	620 (1032.12) n = 11	393 (701.86) n = 25	0.446	632 (903.05) n = 31	114 (213.83) n = 33	0.002
2008	544 (935.82) n = 11	223 (472.81) n = 25	0.178	428 (587.87) n = 31	92 (201.57) n = 33	0.003
	Mississippi			Total		
Year	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
2002	153 (349.92) n = 49	114 (394.42) n = 33	0.638	302 (551.81) n = 91	176 (450.77) n = 91	0.093
2003	159 (388.51) n = 49	128 (422.90) n = 33	0.732	354 (702.35) n = 91	207 (562.09) n = 91	0.120
2004	207 (467.83) n = 49	133 (452.09) n = 33	0.480	404 (795.94) n = 91	231 (610.84) n = 91	0.101
2005	176 (389.56) n = 49	145 (487.11) n = 33	0.752	400 (896.64) n = 91	251 (614.78) n = 91	0.192
2006	236 (537.06) n = 49	153 (522.79) n = 33	0.485	506 (992.81) n = 91	242 (633.29) n = 91	0.034
2007	277 (705.40) n = 49	99 (290.65) n = 33	0.175	439 (828.73) n = 91	186 (440.73) n = 91	0.011
2008	193 (476.21) n = 49	59 (134.24) n = 33	0.119	316 (593.54) n = 91	116 (291.66) n = 91	0.004

Note: Figures in parentheses refer to the standard deviations.
Unit: Number of building permits issued annually.
Data Source: U.S. Census Bureau.

Appendix BM

Average Annual County Change in Wages Per Job

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	953.72 (671.18) n = 11	1009.16 (340.27) n = 25	0.743	941.45 (373.30) n = 11	1000.24 (397.46) n = 25	0.680	1371.27 (702.44) n = 11	1136.68 (576.60) n = 25	0.300
Louisiana	773.29 (424.56) n = 31	895.67 (562.46) n = 33	0.332	1295.42 (591.74) n = 31	1071.73 (358.24) n = 33	0.070	1923.26 (1065.36) n = 31	1232.06 (867.78) n = 33	0.006
Mississippi	968.04 (1040.57) n = 49	905.45 (551.74) n = 33	0.753	1055.88 (852.09) n = 49	1108.33 (639.63) n = 33	0.764	1349.08 (762.96) n = 49	862.88 (447.81) n = 33	0.001
Total	899.97 (834.28) N = 91	930.40 (503.97) N = 91	0.766	1123.65 (732.22) N = 91	1065.36 (484.87) N = 91	0.527	1547.36 (904.14) N = 91	1071.98 (674.01) N = 91	0.000
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	1327.73.28 (746.88) n = 11	1050.20 (541.30) n = 25	0.216	1036.18 (693.37) n = 11	1259.52 (583.71) n = 25	0.325	1159.36 (723.88) n = 11	1012.36 (749.99) n = 25	0.588
Louisiana	3427.90 (2895.85) n = 31	1484.00 (1017.96) n = 33	0.001	1811.39 (1322.30) n = 31	1025.06 (1723.38) n = 33	0.046	2557.71 (1006.76) n = 31	1781.40 (724.27) n = 33	0.001
Mississippi	1377.33 (907.50) n = 49	830.45 (618.34) n = 33	0.003	897.35 (808.66) n = 49	870.55 (531.37) n = 33	0.867	1496.98 (1900.22) n = 49	795.27 (624.03) n = 33	0.044
Total	2069.88 (2064.03) N = 91	1127.82 (814.33) N = 91	0.000	1225.51 (1079.93) N = 91	1033.44 (1127.48) N = 91	0.242	1817.52 (1618.47) N = 91	1212.52 (817.68) N = 91	0.002

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Dollars.

Appendix BN

Average Annual County Change in Per Capita Income

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	879.27 (364.35) n = 11	976.96 (386.46) n = 25	0.482	1490.36 (517.18) n = 11	1453.64 (542.69) n = 25	0.851	1540.82 (882.19) n = 11	1288.36 (622.01) n = 25	0.332
Louisiana	678.26 (358.49) n = 31	1081.58 (1209.30) n = 33	0.079	1111.19 (440.51) n = 31	1132.36 (799.37) n = 33	0.897	2142.51 (1417.00) n = 31	1613.61 (812.76) n = 33	0.070
Mississippi	701.73 (753.40) n = 49	1406.12 (1500.25) n = 33	0.006	1308.78 (662.10) n = 49	1029.09 (469.15) n = 33	0.039	1470.55 (635.10) n = 49	1434.00 (727.23) n = 33	0.810
Total	715.20 (603.47) N = 91	1170.53 (1180.56) N = 91	0.001	1263.42 (586.18) N = 91	1183.18 (643.40) N = 91	0.380	1707.96 (1034.43) N = 91	1459.12 (737.00) N = 91	0.063
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	1609.55 (733.94) n = 11	1255.08 (436.66) n = 25	0.080	1194.09 (455.32) n = 11	1267.36 (479.34) n = 25	0.671	954.09 (251.41) n = 11	864.88 (328.74) n = 25	0.429
Louisiana	4723.10 (8896.99) n = 31	968.33 (821.62) n = 33	0.019	1154.36 (5617.36) n = 31	1215.82 (695.16) n = 33	0.950	1209.19 (2196.05) n = 31	1532.97 (929.19) n = 33	0.440
Mississippi	767.63 (1146.97) n = 49	428.30 (1035.92) n = 33	0.176	1273.27 (1721.21) n = 49	1431.48 (1286.85) n = 33	0.654	1124.35 (1295.67) n = 49	945.97 (977.68) n = 33	0.504
Total	2216.87 (5522.59) N = 91	851.27 (888.28) N = 91	0.021	1223.19 (3482.01) N = 91	1308.19 (911.62) N = 91	0.822	1132.67 (1586.15) N = 91	1136.56 (875.84) N = 91	0.984

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Dollars.

Appendix BO

Average Annual County Change in Personal Income

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	57.48 (76.66) n = 11	94.13 (130.24) n = 25	0.393	116.57 (174.06) n = 11	184.60 (367.19) n = 25	0.564	159.40 (252.60) n = 11	147.93 (233.47) n = 25	0.895
Louisiana	77.94 (102.07) n = 31	36.43 (605.55) n = 33	0.051	145.72 (217.33) n = 31	59.35 (95.03) n = 33	0.042	219.49 (289.88) n = 31	77.46 (120.23) n = 33	0.012
Mississippi	33.36 (54.73) n = 49	30.48 (33.05) n = 33	0.788	55.06 (75.23) n = 49	33.52 (42.52) n = 33	0.140	76.35 (112.87) n = 49	43.44 (69.78) n = 33	0.140
Total	51.46 (78.41) N = 91	50.12 (83.45) N = 91	0.911	93.38 (154.72) N = 91	84.39 (209.23) N = 91	0.742	135.15 (215.17) N = 91	84.48 (152.18) N = 91	0.068
Post-Katrina									
	2006			2007			2008		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	197.53 (327.02) n = 11	177.89 (338.66) n = 25	0.872	122.96 (181.30) n = 11	145.40 (191.69) n = 25	0.744	103.74 (174.30) n = 11	89.99 (105.97) n = 25	0.772
Louisiana	178.41 (561.66) n = 31	71.95 (144.26) n = 33	0.296	324.83 (488.01) n = 31	41.23 (46.84) n = 33	0.001	121.01 (184.29) n = 31	68.35 (89.23) n = 33	0.147
Mississippi	49.38 (121.13) n = 49	28.48 (54.73) n = 33	0.356	78.99 (175.83) n = 49	39.61 (59.51) n = 33	0.219	43.08 (68.66) n = 49	27.46 (23.01) n = 33	0.212
Total	111.24 (359.74) N = 91	85.29 (206.59) N = 91	0.551	168.06 (335.49) N = 91	69.26 (118.57) N = 91	0.009	76.96 (136.35) N = 91	59.47 (81.72) N = 91	0.295

Note: Figures in parentheses refer to the standard deviations.
Unit: Millions of dollars.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.

Appendix BP

Average Annual County Change in Median Household Income

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	817.64 (342.87) n = 11	872.92 (497.85) n = 25	0.741	702.73 (358.07) n = 11	1022.68 (524.01) n = 25	0.075	446.64 (1191.60) n = 11	1104.00 (1282.56) n = 25	0.157
Louisiana	1071.94 (466.36) n = 31	1061.12 (443.97) n = 33	0.925	456.48 (367.14) n = 31	791.55 (503.84) n = 33	0.004	1564.16 (1303.66) n = 31	906.45 (1014.04) n = 33	0.027
Mississippi	1053.51 (552.42) n = 49	1056.52 (391.50) n = 33	0.979	799.20 (555.91) n = 49	883.00 (454.87) n = 33	0.475	1084.18 (965.15) n = 49	210.33 (919.39) n = 33	0.000
Total	1031.27 (504.71) N = 91	1007.75 (444.57) N = 91	0.739	670.79 (498.92) N = 91	888.21 (495.49) N = 91	0.004	1170.63 (1158.69) N = 91	708.29 (1119.65) N = 91	0.007
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	1553.27 (946.59) n = 11	1229.40 (1612.68) n = 25	0.541	2050.45 (1294.49) n = 11	1667.00 (1862.25) n = 25	0.541	979.72 (1404.09) n = 11	1225.68 (2172.80) n = 25	0.733
Louisiana	1637.26 (1669.34) n = 31	1152.42 (1797.86) n = 33	0.269	2448.84 (2243.83) n = 31	1748.39 (1705.80) n = 33	0.163	2932.84 (2604.92) n = 31	1821.88 (1520.97) n = 33	0.040
Mississippi	1068.18 (1596.05) n = 49	1004.61 (1546.60) n = 33	0.858	1612.31 (1552.49) n = 49	1657.42 (1686.45) n = 33	0.901	1222.55 (1745.48) n = 49	701.85 (1685.82) n = 33	0.183
Total	1320.68 (1569.36) N = 91	1119.97 (1643.73) N = 91	0.401	1950.24 (1816.30) N = 91	1693.04 (1724.06) N = 91	0.329	1775.82 (2193.41) N = 91	1251.92 (1822.69) N = 91	0.081

Note: Figures in parentheses refer to the standard deviations.
Data Source: U.S. Census Bureau.
Unit: Dollars.

Appendix BQ

Average Annual County Change in Total Industry Earnings

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	47.03 (65.65) n = 11	74.61 (107.71) n = 25	0.439	72.92 (110.36) n = 11	129.91 (273.26) n = 25	0.511	113.79 (193.86) n = 11	105.01 (176.33) n = 25	0.895
Louisiana	96.11 (139.99) n = 31	48.47 (80.19) n = 33	0.097	101.95 (174.93) n = 31	38.54 (74.82) n = 33	0.061	76.94 (240.64) n = 31	38.94 (64.31) n = 33	0.385
Mississippi	36.46 (71.51) n = 49	28.82 (30.10) n = 33	0.564	44.74 (66.90) n = 49	21.59 (30.74) n = 33	0.067	32.56 (47.65) n = 49	18.45 (36.91) n = 33	0.155
Total	58.06 (102.50) N = 91	48.52 (77.68) N = 91	0.480	67.63 (120.97) N = 91	57.49 (155.88) N = 91	0.625	57.49 (159.83) N = 91	49.66 (107.22) N = 91	0.698
Post-Katrina									
	2006			2007			2008		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	135.35 (254.18) n = 11	104.10 (225.41) n = 25	0.715	61.52 (107.09) n = 11	75.74 (134.19) n = 25	0.759	52.54 (113.47) n = 11	42.95 (79.01) n = 25	0.771
Louisiana	149.59 (463.59) n = 31	47.38 (103.09) n = 33	0.221	155.22 (215.55) n = 31	26.61 (37.52) n = 33	0.001	170.87 (230.87) n = 31	36.24 (61.01) n = 33	0.002
Mississippi	33.62 (85.38) n = 49	8.42 (28.31) n = 33	0.106	32.14 (69.39) n = 49	16.24 (24.90) n = 33	0.211	35.68 (65.58) n = 49	3.29 (18.93) n = 33	0.007
Total	85.42 (293.07) N = 91	48.84 (138.06) N = 91	0.283	77.62 (150.20) N = 91	36.35 (78.34) N = 91	0.021	83.77 (159.63) N = 91	26.13 (58.51) N = 91	0.001

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Millions of Dollars.

Appendix BR

Average Annual County Change in Construction Industry Earnings

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	0.34 (9.33) n = 11	4.90 (12.83) n = 25	0.297	3.78 (14.43) n = 11	13.80 (28.90) n = 25	0.285	24.08 (48.42) n = 11	4.69 (9.08) n = 25	0.058
Louisiana*	6.25 (22.30) n = 30	1.71 (4.71) n = 29	0.289	5.19 (13.53) n = 29	3.26 (8.62) n = 29	0.519	11.48 (28.70) n = 29	3.00 (4.60) n = 29	0.122
Mississippi*	-1.71 (11.21) n = 42	1.83 (7.34) n = 32	0.126	-0.08 (13.41) n = 42	1.68 (6.65) n = 31	0.503	6.51 (12.36) n = 43	3.01 (9.14) n = 30	0.191
Total	1.44 (16.22) N = 83	2.68 (8.69) N = 86	0.533	2.30 (13.65) N = 82	5.79 (17.51) N = 85	0.155	10.57 (26.05) N = 83	3.51 (7.80) N = 84	0.018
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	13.78 (29.06) n = 11	9.80 (17.31) n = 25	0.612	6.49 (10.18) n = 11	2.84 (10.22) n = 25	0.329	-5.43 (18.03) n = 11	-14.18 (32.96) n = 25	0.416
Louisiana*	42.29 (61.79) n = 29	7.94 (21.92) n = 28	0.007	13.42 (43.66) n = 29	3.28 (7.08) n = 28	0.230	9.25 (48.70) n = 31	1.72 (9.58) n = 29	0.417
Mississippi*	8.46 (18.06) n = 44	1.30 (2.38) n = 30	0.035	1.88 (9.27) n = 44	-1.15 (4.66) n = 30	0.104	4.41 (22.74) n = 44	-3.16 (16.41) n = 30	0.122
Total	20.84 (42.51) N = 84	6.10 (16.18) N = 83	0.004	6.47 (26.99) N = 84	1.55 (7.68) N = 83	0.112	4.90 (34.03) N = 86	-4.75 (21.94) N = 84	0.030

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Millions of Dollars.
*Data were missing for a few counties in Mississippi and Louisiana.

Appendix BS

Average Annual County Change in Manufacturing Industry Earnings

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama*	4.78 (34.15) n = 11	7.78 (25.72) n = 23	0.777	2.28 (9.79) n = 11	18.07 (32.06) n = 24	0.122	10.67 (28.21) n = 11	15.80 (31.65) n = 25	0.647
Louisiana*	4.97 (27.78) n = 31	5.17 (33.87) n = 28	0.980	-2.14 (14.90) n = 30	1.56 (9.94) n = 28	0.274	6.27 (22.91) n = 30	-0.35 (10.97) n = 27	0.177
Mississippi*	7.63 (33.66) n = 44	-1.77 (7.19) n = 30	0.137	3.23 (23.57) n = 44	2.64 (9.16) n = 29	0.899	4.10 (15.69) n = 45	1.73 (6.31) n = 30	0.434
Total	6.31 (31.38) N = 86	3.34 (24.58) N = 81	0.500	1.21 (19.46) N = 85	6.84 (20.30) N = 81	0.070	5.70 (20.12) N = 86	5.33 (19.98) N = 82	0.905
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama*	15.61 (31.47) n = 11	15.93 (35.84) n = 25	0.980	7.63 (35.35) n = 11	7.42 (14.16) n = 25	0.980	7.99 (18.72) n = 11	2.64 (14.17) n = 25	0.351
Louisiana*	19.33 (22.82) n = 31	5.09 (12.01) n = 27	0.005	18.33 (32.59) n = 31	0.82 (6.89) n = 27	0.008	15.33 (22.30) n = 31	-4.90 (22.46) n = 28	0.001
Mississippi*	5.12 (9.43) n = 45	-1.04 (11.60) n = 30	0.014	3.39 (22.01) n = 45	-2.73 (8.14) n = 31	0.144	1.82 (23.85) n = 44	-6.31 (11.49) n = 31	0.083
Total	11.51 (19.69) N = 87	6.16 (22.89) N = 82	0.104	9.25 (28.49) N = 87	1.48 (10.75) N = 83	0.021	7.47 (23.32) N = 86	-3.18 (16.88) N = 84	0.001

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Millions of Dollars.
*Data were missing for a few counties in Alabama, Mississippi and Louisiana.

Appendix BT

Average Annual County Change in Total Employment

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	224.09 (894.92) n = 11	82.08 (818.47) n = 25	0.644	907.00 (1409.16) n = 11	1193.20 (1661.99) n = 25	0.622	1364.55 (2368.80) n = 11	1112.00 (2500.40) n = 25	0.779
Louisiana	584.35 (1664.97) n = 31	162.06 (550.48) n = 33	0.173	241.90 (1069.90) n = 31	255.21 (663.41) n = 33	0.952	-1182.03 (8102.33) n = 31	262.48 (707.41) n = 33	0.311
Mississippi	65.57 (1251.57) n = 49	-156.39 (485.47) n = 33	0.335	264.90 (935.08) n = 49	160.00 (580.51) n = 33	0.568	147.53 (997.97) n = 49	202.91 (750.18) n = 33	0.787
Total	261.45 (1380.38) N = 91	24.60 (624.53) N = 91	0.138	334.68 (1055.50) N = 91	478.37 (1100.12) N = 91	0.370	-158.29 (4871.61) N = 91	474.26 (1483.79) N = 91	0.238
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	1536.27 (2529.79) n = 11	1006.80 (1617.80) n = 25	0.454	1539.00 (2581.82) n = 11	1119.00 (1695.72) n = 25	0.565	506.18 (1254.86) n = 11	94.68 (484.82) n = 25	0.161
Louisiana	-175.90 (12279.32) n = 31	678.24 (1189.45) n = 33	0.692	2485.35 (3336.64) n = 31	362.36 (591.70) n = 33	0.001	1445.90 (2144.37) n = 31	332.03 (550.80) n = 33	0.005
Mississippi	329.90 (1423.99) n = 49	308.85 (913.23) n = 33	0.940	531.18 (1274.82) n = 49	170.73 (911.07) n = 33	0.165	320.04 (605.72) n = 49	-22.85 (373.22) n = 33	0.005
Total	303.42 (7233.15) N = 91	634.55 (1255.23) N = 91	0.668	1318.71 (2476.06) N = 91	500.74 (1157.38) N = 91	0.005	726.08 (1475.66) N = 91	138.13 (493.85) N = 91	0.000

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Number of Jobs.

Appendix BU

Average Annual County Change in Construction Employment

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	18.00 (201.89) n = 11	79.92 (235.24) n = 25	0.454	108.00 (286.13) n = 11	169.56 (224.83) n = 25	0.491	448.73 (880.83) n = 11	83.84 (168.60) n = 25	0.051
Louisiana*	127.97 (392.79) n = 30	13.34 (130.42) n = 29	0.141	-68.79 (359.74) n = 29	27.00 (121.62) n = 29	0.180	186.52 (511.83) n = 29	57.83 (68.82) n = 29	0.185
Mississippi*	-29.24 (217.75) n = 42	10.25 (73.14) n = 32	0.329	10.21 (242.49) n = 42	32.81 (152.52) n = 31	0.650	147.14 (246.52) n = 43	42.63 (101.69) n = 30	0.032
Total	33.84 (297.58) N = 83	31.55 (155.41) N = 86	0.950	-4.61 (296.51) N = 82	71.05 (178.27) N = 85	0.046	200.87 (474.37) N = 83	60.14 (117.10) N = 84	0.009
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	181.36 (399.72) n = 11	92.84 (147.36) n = 25	0.334	124.82 (232.91) n = 11	88.12 (178.53) n = 25	0.608	-23.09 (274.22) n = 11	-56.44 (159.81) n = 25	0.648
Louisiana*	580.72 (588.80) n = 29	156.54 (374.92) n = 28	0.002	101.24 (426.31) n = 29	-8.96 (87.03) n = 28	0.185	93.42 (386.65) n = 31	42.41 (111.81) n = 29	0.497
Mississippi*	151.95 (328.87) n = 44	51.03 (109.97) n = 30	0.110	52.64 (175.98) n = 44	11.13 (53.52) n = 30	0.215	75.30 (261.92) n = 44	13.23 (76.51) n = 30	0.212
Total	303.83 (482.95) N = 84	99.21 (242.70) N = 83	0.001	78.87 (291.05) N = 84	27.54 (120.45) N = 83	0.139	69.24 (312.49) N = 86	2.57 (123.66) N = 84	0.070

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Number of Jobs.
*Data were missing for a few counties in Mississippi and Louisiana.

Appendix BV

Average Annual County Change in Manufacturing Employment

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	-233.18 (580.65) n = 11	-248.24 (481.21) n = 25	0.936	-24.27 (322.96) n = 11	-4.48 (250.52) n = 25	0.843	43.82 (385.60) n = 11	142.84 (449.16) n = 25	0.530
Louisiana	-80.65 (307.86) n = 31	-70.79 (152.18) n = 28	0.879	-106.00 (180.31) n = 30	-7.36 (97.50) n = 28	0.013	-49.93 (467.68) n = 30	18.59 (86.41) n = 27	0.457
Mississippi	-69.09 (484.33) n = 44	-187.97 (247.38) n = 32	0.208	52.05 (476.61) n = 44	-22.03 (204.93) n = 31	0.419	-20.20 (210.32) n = 44	3.90 (170.91) n = 30	0.604
Total	-94.24 (441.22) N = 86	-167.09 (318.44) N = 85	0.218	-13.61 (381.11) N = 85	-11.92 (191.00) N = 84	0.971	-22.41 (341.62) N = 85	51.10 (276.42) N = 82	0.129
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	131.36 (401.03) n = 11	67.72 (292.71) n = 25	0.596	43.18 (407.82) n = 11	-106.68 (233.61) n = 25	0.170	-46.55 (169.52) n = 11	-208.80 (280.06) n = 25	0.085
Louisiana	41.81 (333.49) n = 31	17.00 (116.77) n = 27	0.715	192.94 (323.90) n = 31	3.33 (143.68) n = 27	0.007	-26.68 (184.44) n = 31	-113.93 (329.62) n = 28	0.209
Mississippi	9.02 (200.00) n = 44	-84.52 (243.03) n = 31	0.072	-28.56 (187.28) n = 45	-146.41 (257.77) n = 32	0.023	-71.50 (249.55) n = 44	-199.13 (265.15) n = 32	0.035
Total	36.49 (282.80) N = 86	-5.64 (234.88) N = 83	0.295	59.44 (290.50) N = 87	-86.45 (226.26) N = 84	0.000	-52.15 (217.54) N = 86	-173.91 (291.69) N = 85	0.002

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Number of Jobs.
*Data were missing for a few counties in Mississippi and Louisiana.

Appendix BW

Annual County Change in Building Permits Issued

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	143.55 (522.50) n = 11	57.56 (231.09) n = 25	0.494	141.27 (310.65) n = 11	72.04 (125.17) n = 25	0.342	203.27 (599.16) n = 11	24.72 (127.94) n = 25	0.158
Louisiana	92.61 (186.43) n = 31	28.00 (108.28) n = 33	0.093	19.74 (193.05) n = 31	4.75 (98.43) n = 33	0.694	-33.42 (259.21) n = 31	26.00 (103.59) n = 33	0.228
Mississippi	5.73 (83.59) n = 49	13.73 (63.83) n = 33	0.643	47.90 (147.31) n = 49	5.30 (74.75) n = 33	0.130	-31.16 (155.90) n = 49	11.85 (48.59) n = 33	0.129
Total	51.99 (220.01) N = 91	30.95 (142.01) N = 91	0.444	49.59 (189.88) N = 91	23.44 (102.54) N = 91	0.249	-3.59 (284.95) N = 91	20.52 (95.20) N = 91	0.445
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	44.00 (464.78) n = 11	-31.88 (217.66) n = 25	0.505	-395.09 (1022.06) n = 11	-70.16 (360.77) n = 25	0.164	-76.55 (201.41) n = 11	-170.08 (323.86) n = 25	0.384
Louisiana	198.74 (369.12) n = 31	-9.12 (138.54) n = 33	0.004	-119.00 (596.94) n = 31	-48.58 (88.99) n = 33	0.505	-204.26 (378.21) n = 31	-22.48 (91.47) n = 33	0.009
Mississippi	60.65 (235.90) n = 49	7.58 (45.23) n = 33	0.206	40.33 (291.09) n = 49	-53.39 (239.21) n = 33	0.129	-83.27 (275.01) n = 49	-40.12 (170.48) n = 33	0.425
Total	105.68 (321.95) N = 91	-9.32 (142.94) N = 91	0.002	-66.58 (548.08) N = 91	-56.25 (240.72) N = 91	0.869	-123.67 (309.71) N = 91	-69.43 (212.64) N = 91	0.170

Note: Figures in parentheses refer to the standard deviations.
Data Source: U.S. Census Bureau.
Unit: Number of Permits.

Appendix BX

Average Annual County Change in Housing Unit Estimates

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	447.27 (749.86) n = 11	319.36 (569.63) n = 25	0.577	587.45 (1138.45) n = 11	382.12 (738.96) n = 25	0.521	686.73 (1430.39) n = 11	393.80 (854.67) n = 25	0.449
Louisiana	401.48 (629.82) n = 31	128.06 (177.17) n = 33	0.020	509.48 (715.99) n = 31	154.48 (263.23) n = 33	0.010	522.74 (741.00) n = 31	143.48 (229.95) n = 33	0.007
Mississippi	164.51 (314.78) n = 49	119.79 (377.23) n = 33	0.562	168.51 (346.11) n = 49	138.76 (404.54) n = 33	0.722	200.53 (426.41) n = 49	134.30 (432.43) n = 33	0.495
Total	279.42 (513.14) N = 91	177.62 (394.96) N = 91	0.135	335.31 (641.98) N = 91	211.32 (489.55) N = 91	0.145	369.07 (737.07) N = 91	208.92 (541.46) N = 91	0.097
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	890.73 (1963.01) n = 11	450.80 (822.58) n = 25	0.345	920.55 (1757.72) n = 11	384.92 (846.94) n = 25	0.222	528.00 (907.25) n = 11	309.04 (583.95) n = 25	0.390
Louisiana	-4340.32 (21145.27) n = 31	258.09 (346.97) n = 33	0.216	1246.87 (2604.64) n = 31	192.39 (260.12) n = 33	0.024	613.87 (819.16) n = 31	143.33 (200.82) n = 33	0.002
Mississippi	-243.84 (2329.32) n = 49	193.79 (472.61) n = 33	0.291	256.49 (506.74) n = 49	171.67 (501.75) n = 33	0.458	307.94 (679.67) n = 49	127.06 (277.91) n = 33	0.152
Total	-1502.20 (12517.95) N = 91	287.71 (560.00) N = 91	0.175	674.14 (1719.59) N = 91	237.77 (559.67) N = 91	0.022	438.76 (763.12) N = 91	182.96 (372.65) N = 91	0.005

Note: Figures in parentheses refer to the standard deviations.
Data Source: U.S. Census Bureau.
Unit: Number of Housing Units.

Appendix BY

Annual County Percentage Change in Average Wages Per Job

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	3.52% (.0191) n = 11	3.71% (.0108) n = 25	0.704	3.36% (.0122) n = 11	3.57% (.0134) n = 25	0.655	4.85% (.0229) n = 11	3.89% (.0173) n = 25	0.175
Louisiana	2.67% (.0154) n = 31	3.67% (.0228) n = 33	0.047	4.28% (.0196) n = 31	4.27% (.0141) n = 33	0.983	6.03% (.0328) n = 31	4.78% (.0357) n = 33	0.150
Mississippi	3.97% (.0414) n = 49	3.82% (.0232) n = 33	0.848	4.18% (.0320) n = 49	4.65% (.0286) n = 33	0.504	5.00% (.0238) n = 49	3.40% (.0176) n = 33	0.001
Total	3.47% (.0327) N = 91	3.73% (.0202) N = 91	0.521	4.12% (.0264) N = 91	4.22% (.0207) N = 91	0.780	5.33% (.0273) N = 91	4.04% (.0260) N = 91	0.001
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	4.43% (.0258) n = 11	3.40% (.0159) n = 25	0.154	3.39% (.0197) n = 11	3.99% (.0167) n = 25	0.351	3.43% (.0152) n = 11	3.13% (.0208) n = 25	0.670
Louisiana	10.04% (.0858) n = 31	5.39% (.0363) n = 33	0.006	5.04% (.0341) n = 31	3.68% (.0535) n = 33	0.232	6.57% (.0236) n = 31	5.94% (.0225) n = 33	0.278
Mississippi	4.96% (.0293) n = 49	3.10% (.0233) n = 33	0.003	3.21% (.0260) n = 49	3.21% (.0201) n = 33	0.992	5.07% (.0671) n = 49	2.86% (.0224) n = 33	0.072
Total	6.63% (.0599) N = 91	4.02% (.0289) N = 91	0.000	3.86% (.0294) N = 91	3.60% (.0353) N = 91	0.592	5.38% (.0521) N = 91	4.05% (.0261) N = 91	0.031

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Annual Percentage Change.

Appendix BZ

Annual County Percentage Change in Personal Income

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	3.78% (.0166) n = 11	4.39% (.0161) n = 25	0.312	6.28% (.0261) n = 11	6.03% (.0237) n = 25	0.780	6.10% (.0430) n = 11	5.32% (.0261) n = 25	0.507
Louisiana	3.16% (.0161) n = 31	5.15% (.0620) n = 33	0.088	5.01% (.0203) n = 31	4.77% (.0409) n = 33	0.776	8.80% (.0587) n = 31	6.65% (.0332) n = 33	0.073
Mississippi	3.56% (.0402) n = 49	7.50% (.0917) n = 33	0.009	6.37% (.0312) n = 49	4.55% (.0281) n = 33	0.009	6.64% (.0304) n = 49	6.11% (.0291) n = 33	0.435
Total	3.45% (.0314) N = 91	5.79% (.0679) N = 91	0.003	5.90% (.0278) N = 91	5.04% (.0326) N = 91	0.058	7.31% (.0443) N = 91	6.09% (.0301) N = 91	0.031
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	6.31% (.0316) n = 11	5.16% (.0203) n = 25	0.200	4.28% (.0182) n = 11	5.18% (.0218) n = 25	0.238	3.47% (.0123) n = 11	3.54% (.0117) n = 25	0.856
Louisiana	7.20% (.0947) n = 31	4.45% (.0290) n = 33	0.116	10.06% (.0727) n = 31	4.52% (.0277) n = 33	0.000	5.48% (.0305) n = 31	5.50% (.0263) n = 33	0.980
Mississippi	3.23% (.0458) n = 49	2.01% (.0519) n = 33	0.264	5.43% (.0606) n = 49	5.83% (.0470) n = 33	0.754	5.25% (.0356) n = 49	3.74% (.0334) n = 33	0.057
Total	4.95% (.0676) N = 91	3.76% (.0394) N = 91	0.147	6.87% (.0656) N = 91	5.17% (.0349) N = 91	0.031	5.11% (.0323) N = 91	4.32% (.0275) N = 91	0.078

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Annual Percentage Change.

Appendix CA

Annual County Percentage Change in Median Household Income

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	2.98% (.0126) n = 11	2.91% (.0149) n = 25	0.896	2.50% (.0119) n = 11	3.13% (.0151) n = 25	0.229	1.51% (.0350) n = 11	3.16% (.0341) n = 25	0.194
Louisiana	3.23% (.0149) n = 31	4.18% (.0223) n = 33	0.051	1.34% (.0111) n = 31	2.74% (.0166) n = 33	0.000	4.37% (.0377) n = 31	3.25% (.0373) n = 33	0.238
Mississippi	3.75% (.0164) n = 49	4.02% (.0200) n = 33	0.511	2.87% (.0209) n = 49	3.18% (.0174) n = 33	0.483	3.67% (.0327) n = 49	.91% (.0334) n = 33	0.000
Total	3.48% (.0156) N = 91	3.77% (.0202) N = 91	0.277	2.31% (.0184) N = 91	3.01% (.0165) N = 91	0.007	3.65% (.0354) N = 91	2.38% (.0364) N = 91	0.018
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	5.10% (.0277) n = 11	3.45% (.0396) n = 25	0.219	6.43% (.0360) n = 11	4.95% (.0478) n = 25	0.363	2.60% (.0366) n = 11	3.17% (.0563) n = 25	0.757
Louisiana	4.22% (.0422) n = 31	3.78% (.0540) n = 33	0.720	6.53% (.0592) n = 31	6.00% (.0541) n = 33	0.707	7.36% (.0651) n = 31	5.79% (.0500) n = 33	0.284
Mississippi	3.24% (.0482) n = 49	3.42% (.0539) n = 33	0.879	5.39% (.0482) n = 49	5.50% (.0536) n = 33	0.924	3.64% (.0482) n = 49	2.43% (.0536) n = 33	0.293
Total	3.80% (.0443) N = 91	3.56% (.0500) N = 91	0.730	5.91% (.0508) N = 91	5.53% (.0519) N = 91	0.621	4.78% (.0562) N = 91	3.85% (.0546) N = 91	0.263

Note: Figures in parentheses refer to the standard deviations.
Data Source: U.S. Census Bureau.
Unit: Annual Percentage Change.

Appendix CB

Annual County Percentage Change in Per Capita Income

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	4.27% (.0201) n = 11	4.41% (.0207) n = 25	0.857	6.76% (.0251) n = 11	5.91% (.0157) n = 25	0.223	6.38% (.0367) n = 11	4.99% (.0226) n = 25	0.169
Louisiana	2.93% (.0167) n = 31	5.65% (.0698) n = 33	0.038	4.60% (.0190) n = 31	5.16% (.0361) n = 33	0.446	8.53% (.0553) n = 31	7.06% (.0351) n = 33	0.209
Mississippi	3.55% (.0418) n = 49	7.82% (.0973) n = 33	0.008	6.22% (.0309) n = 49	4.86% (.0224) n = 33	0.033	6.49% (.0266) n = 49	6.42% (.0339) n = 33	0.914
Total	3.43% (.0330) N = 91	6.10% (.0735) N = 91	0.002	5.73% (.0277) N = 91	5.26% (.0269) N = 91	0.241	7.17% (.0405) N = 91	6.26% (.0325) N = 91	0.096
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	6.29% (.0261) n = 11	4.66% (.0134) n = 25	0.017	4.43% (.0171) n = 11	4.46% (.0134) n = 25	0.948	3.50% (.0127) n = 11	3.05% (.0135) n = 25	0.356
Louisiana	17.98% (.3770) n = 31	3.86% (.0316) n = 33	0.036	5.80% (.1043) n = 31	4.85% (.0277) n = 33	0.617	4.25% (.0546) n = 31	5.74% (.0306) n = 33	0.180
Mississippi	2.93% (.0420) n = 49	1.80% (.0416) n = 33	0.234	4.88% (.0542) n = 49	6.10% (.0601) n = 33	0.344	4.77% (.0395) n = 49	3.81% (.0379) n = 33	0.273
Total	8.46% (.2307) N = 91	3.33% (.0341) N = 91	0.037	5.14% (.0725) N = 91	5.20% (.0407) N = 91	0.949	4.44% (.0431) N = 91	4.30% (.0319) N = 91	0.802

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Annual Percentage Change.

Appendix CC

Annual County Percentage Change in Total Industry Earnings

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	4.92% (.0356) n = 11	5.57% (.0314) n = 25	0.589	6.68% (.0448) n = 11	5.99% (.0317) n = 25	0.602	6.88% (.0473) n = 11	5.96% (.0405) n = 25	0.555
Louisiana	5.42% (.0401) n = 31	1.25% (.1348) n = 33	0.007	4.21% (.0335) n = 31	3.57% (.0714) n = 33	0.656	4.77% (.0695) n = 31	5.20% (.0527) n = 33	0.780
Mississippi	6.20% (.1026) n = 49	13.74% (.2136) n = 33	0.036	8.54% (.0600) n = 49	4.55% (.0470) n = 33	0.002	4.21% (.0331) n = 49	5.02% (.0512) n = 33	0.384
Total	5.78% (.0795) N = 91	11.03% (.1553) N = 91	0.005	6.84% (.0540) N = 91	4.59% (.0544) N = 91	0.006	4.72% (.0502) N = 91	5.35% (.0487) N = 91	0.397
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	5.08% (.0449) n = 11	3.92% (.0280) n = 25	0.351	1.24% (.0431) n = 11	2.74% (.0376) n = 25	0.299	1.29% (.0198) n = 11	1.55% (.0287) n = 25	0.790
Louisiana	9.11% (.0782) n = 31	4.74% (.0531) n = 33	0.011	6.99% (.0362) n = 31	4.11% (.0689) n = 33	0.042	8.18% (.0422) n = 31	3.32% (.0500) n = 33	0.000
Mississippi	1.60% (.0722) n = 49	-1.49% (.0815) n = 33	0.075	3.41% (.0302) n = 49	5.03% (.0930) n = 33	0.258	4.32% (.0826) n = 49	-.45% (.0626) n = 33	0.006
Total	4.58% (.0790) N = 91	2.26% (.0663) N = 91	0.033	4.37% (.0392) N = 91	4.07% (.0723) N = 91	0.731	5.27% (.0693) N = 91	1.47% (.0521) N = 91	0.000

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Annual Percentage Change.

Appendix CD

Annual County Percentage Change in Construction Industry Earnings

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	12.01% (.1792) n = 11	5.74% (.1100) n = 25	0.204	4.72% (.1459) n = 11	9.91% (.1074) n = 25	0.240	20.34% (.3517) n = 11	6.93% (.1478) n = 25	0.113
Louisiana*	.26% (.1628) n = 30	10.45% (.1649) n = 29	0.020	5.43% (.1113) n = 29	5.29% (.1435) n = 29	0.968	7.26% (.1247) n = 29	10.81% (.1567) n = 29	0.344
Mississippi*	2.36% (.3571) n = 42	4.47% (.1443) n = 32	0.753	2.39% (.2142) n = 42	2.20% (.0916) n = 31	0.962	13.68% (.1639) n = 43	6.96% (.0838) n = 30	0.043
Total	2.88% (.2801) N = 83	6.85% (.1437) N = 86	0.245	3.78% (.1742) N = 82	5.52% (.1189) N = 85	0.450	12.32% (.1898) N = 83	8.28% (.1319) N = 84	0.112
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	7.82% (.1464) n = 11	10.07% (.0822) n = 25	0.560	14.99% (.2513) n = 11	3.28% (.0851) n = 25	0.043	-10.55% (.1431) n = 11	-9.22% (.0826) n = 25	0.726
Louisiana*	23.35% (.2636) n = 29	11.32% (.3513) n = 28	0.148	9.42% (.1428) n = 29	2.85% (.1753) n = 28	0.126	10.48% (.4241) n = 31	2.94% (.1942) n = 29	0.385
Mississippi*	11.74% (.3068) n = 44	7.51% (.1024) n = 30	0.470	1.32% (.1432) n = 44	1.07% (.1646) n = 30	0.945	14.53% (.6309) n = 44	-4.91% (.2251) n = 30	0.111
Total	15.24% (.2801) N = 84	9.57% (.2158) N = 83	0.145	5.90% (.1665) N = 84	2.33% (.1480) N = 83	0.145	9.86% (.5232) N = 86	-3.48% (.1868) N = 84	0.029

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Annual Percentage Change.
*Data were missing for a few counties in Mississippi and Louisiana.

Appendix CE

Annual County Percentage Change in Manufacturing Industry Earnings

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama*	.83% (.0895) n = 11	2.22% (.0834) n = 23	0.659	2.53% (.0686) n = 11	5.33% (.0743) n = 24	0.297	4.63% (.0542) n = 11	5.85% (.0641) n = 25	0.585
Louisiana*	1.45% (.0811) n = 31	-4.86% (.1600) n = 28	0.058	-.70% (.0874) n = 30	4.28% (.1252) n = 28	0.083	5.85% (.1346) n = 30	2.11% (.1105) n = 27	0.260
Mississippi*	3.48% (.2620) n = 44	-3.15% (.1386) n = 30	0.209	2.60% (.1654) n = 44	5.55% (.1719) n = 29	0.465	4.15% (.1095) n = 44	4.09% (.0979) n = 30	0.979
Total	2.41% (.1952) N = 86	-2.22% (.1355) N = 81	0.079	1.43% (.1321) N = 85	5.04% (.1313) N = 81	0.079	4.81% (.1132) N = 85	3.97% (.0938) N = 82	0.604
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	5.39% (.0862) n = 11	3.85% (.0700) n = 25	0.575	-1.65% (.0714) n = 11	1.96% (.0473) n = 25	0.081	4.00% (.1279) n = 11	-1.20% (.0660) n = 25	0.115
Louisiana*	11.23% (.1111) n = 31	7.75% (.1477) n = 27	0.312	8.81% (.1250) n = 31	2.95% (.0901) n = 27	0.048	4.47% (.1827) n = 31	-.22% (.2513) n = 28	0.412
Mississippi*	9.80% (.1606) n = 44	-.76% (.1067) n = 30	0.002	-.40% (.1309) n = 45	-3.20% (.1201) n = 31	0.347	.24% (.1284) n = 44	-5.58% (.1137) n = 31	0.047
Total	9.75% (.1364) N = 86	3.45% (.1175) N = 82	0.002	2.72% (.1300) N = 87	.36% (.0963) N = 83	0.181	2.25% (.1499) N = 86	-2.49% (.1645) N = 84	0.051

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Annual Percentage Change.
*Data were missing for a few counties in Alabama, Mississippi and Louisiana

Appendix CF

Annual County Percentage Change in Total Employment

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	-.12% (.0197) n = 11	.41% (.0238) n = 25	0.522	2.28% (.0308) n = 11	2.14% (.0219) n = 25	0.875	1.72% (.0205) n = 11	2.36% (.0371) n = 25	0.594
Louisiana	1.07% (.0242) n = 31	.05% (.0261) n = 33	0.112	.22% (.0226) n = 31	.30% (.0245) n = 33	0.896	-.36% (.0533) n = 31	.84% (.0260) n = 33	0.254
Mississippi	-.65% (.0419) n = 49	-1.58% (.0261) n = 33	0.258	.79% (.0298) n = 49	1.11% (.0315) n = 33	0.642	1.25% (.0241) n = 49	.93% (.0293) n = 33	0.599
Total	.002% (.0352) N = 91	-.44% (.0267) N = 91	0.340	.78% (.0280) N = 91	1.10% (.0273) N = 91	0.434	.76% (.0370) N = 91	1.29% (.0309) N = 91	0.293
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	1.90% (.0206) n = 11	1.85% (.0220) n = 25	0.945	2.37% (.0208) n = 11	1.98% (.0247) n = 25	0.649	-.24% (.0182) n = 11	-.18% (.0155) n = 25	0.922
Louisiana	2.44% (.0946) n = 31	2.80% (.0267) n = 33	0.833	4.71% (.0237) n = 31	1.86% (.0250) n = 33	0.000	3.06% (.0197) n = 31	1.64% (.0119) n = 33	0.001
Mississippi	2.18% (.0336) n = 49	1.23% (.0279) n = 33	0.183	2.03% (.0238) n = 49	.40% (.0260) n = 33	0.004	1.43% (.0263) n = 49	-.51% (.0232) n = 33	0.001
Total	2.24% (.0603) N = 91	1.97% (.0266) N = 91	0.701	2.98% (.0263) N = 91	1.36% (.0260) N = 91	0.000	1.78% (.0254) N = 91	.36% (.0200) N = 91	0.000

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Annual Percentage Change in number of jobs.

Appendix CG

Annual County Percentage Change in Manufacturing Employment

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	-3.88% (.0741) n = 11	-4.40% (.0630) n = 25	0.830	.34% (.0556) n = 11	-.15% (.0603) n = 25	0.822	-.35% (.0653) n = 11	2.24% (.0622) n = 25	0.264
Louisiana*	-2.52% (.0816) n = 31	-10.59% (.1438) n = 28	0.010	-3.00% (.0654) n = 30	-1.18% (.1359) n = 28	0.514	-.81% (.1188) n = 30	.12% (.0722) n = 27	0.724
Mississippi*	-4.45% (.1847) n = 44	-8.94% (.1007) n = 32	0.216	.07% (.1361) n = 44	2.57% (.1734) n = 31	0.487	-.28% (.0946) n = 44	3.14% (.1187) n = 30	0.173
Total	-3.68% (.1426) N = 86	-8.15% (.1103) N = 85	0.023	-.98% (.1075) N = 85	.51% (.1349) N = 84	0.428	-.48% (.0998) N = 85	1.87% (.0896) N = 82	0.111
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	-.60% (.0843) n = 11	2.17% (.0681) n = 25	0.304	-2.69% (.0482) n = 11	-3.05% (.0586) n = 25	0.861	1.40% (.1694) n = 11	-4.46% (.0416) n = 25	0.108
Louisiana*	2.67% (.0920) n = 31	3.74% (.1514) n = 27	0.745	6.96% (.1295) n = 31	2.39% (.1055) n = 27	0.150	-1.63% (.1327) n = 31	-3.56% (.1849) n = 28	0.644
Mississippi*	3.59% (.1186) n = 44	-3.77% (.1180) n = 31	0.010	-2.52% (.1099) n = 45	-6.14% (.1028) n = 32	0.148	-3.56% (.0955) n = 44	-8.60% (.1151) n = 32	0.041
Total	2.73% (.1054) N = 86	.46% (.1218) N = 83	0.198	.84% (.1200) N = 87	-2.48% (.0986) N = 84	0.050	-2.23% (.1203) N = 86	-5.72% (.1299) N = 85	0.070

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Annual Percentage Change in number of jobs.
*Data were missing for a few counties in Mississippi and Louisiana

Appendix CH

Annual County Percentage Change in Construction Employment

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	6.01% (.0980) n = 11	5.40% (.0714) n = 25	0.833	4.75% (.1174) n = 11	5.33% (.1080) n = 25	0.885	10.14% (.1945) n = 11	5.55% (.1126) n = 25	0.376
Louisiana*	.71% (.1331) n = 30	6.36% (.1121) n = 29	0.084	1.21% (.0976) n = 29	1.01% (.1261) n = 29	0.948	4.88% (.0950) n = 29	5.62% (.0891) n = 29	0.763
Mississippi*	-1.00% (.1736) n = 42	-.01% (.0929) n = 32	0.773	1.70% (.1523) n = 42	.76% (.0752) n = 31	0.752	10.58% (.0960) n = 43	4.64% (.0742) n = 30	0.006
Total	.55% (.1518) N = 83	3.71% (.0978) N = 86	0.109	1.94% (.1299) N = 82	2.19% (.1052) N = 85	0.889	8.53% (.1146) N = 83	5.25% (.0911) N = 84	0.042
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	5.58% (.1118) n = 11	4.74% (.0524) n = 25	0.760	6.38% (.1135) n = 11	3.92% (.0528) n = 25	0.376	-4.44% (.0815) n = 11	-1.59% (.0440) n = 25	0.180
Louisiana*	16.40% (.1721) n = 29	7.02% (.1501) n = 28	0.033	1.81% (.0729) n = 29	-1.78% (.0652) n = 28	0.055	6.25% (.2049) n = 31	4.05% (.0878) n = 29	0.595
Mississippi*	6.99% (.1477) n = 44	4.85% (.0629) n = 30	0.459	3.01% (.0963) n = 44	2.17% (.0677) n = 30	0.682	7.00% (.1724) n = 44	2.68% (.0900) n = 30	0.212
Total	10.05% (.1580) N = 84	5.55% (.0987) N = 83	0.029	3.03% (.0914) N = 84	1.36% (.0663) N = 83	0.178	5.27% (.1790) N = 86	1.88% (.0809) N = 84	0.115

Note: Figures in parentheses refer to the standard deviations.
Data Source: Regional Economic Information System, Bureau of Economic Analysis.
Unit: Annual Percentage Change in number of jobs.
*Data were missing for a few counties in Mississippi and Louisiana

Appendix CI

Average Annual County Population Change by State

	2003			2004			2005		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	175.00 (1142.44) n = 11	331.68 (1237.42) n = 25	0.723	389.36 (1522.06) n = 11	311.72 (1327.05) n = 25	0.878	707.27 (1931.13) n = 11	456.28 (1316.39) n = 25	0.652
Louisiana	291.55 (1493.04) n = 31	-21.06 (304.03) n = 33	0.243	414.06 (1726.60) n = 31	43.51 (430.04) n = 33	0.237	229.94 (1865.38) n = 31	20.27 (370.39) n = 33	0.529
Mississippi	110.08 (559.68) n = 49	100.12 (1066.55) n = 33	0.956	275.04 (848.24) n = 49	133.58 (1147.53) n = 33	0.523	198.14 (669.92) n = 49	118.30 (1084.08) n = 33	0.681
Total	179.75 (1030.58) N = 91	119.79 (930.34) N = 91	0.681	336.21 (1280.36) N = 91	149.86 (1007.52) N = 91	0.277	270.52 (1356.59) N = 91	175.60 (980.14) N = 91	0.589
Post-Katrina									
	2006			**2007**			**2008**		
	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value	GO Zone	Non-GO Zone	P-Value
Alabama	1223.28 (2336.17) n = 11	811.52 (1611.39) n = 25	0.543	660.91 (1338.77) n = 11	623.24 (1185.25) n = 25	0.933	595.09 (1154.69) n = 11	494.80 (1097.07) n = 25	0.805
Louisiana	-8640.94 (45243.09) n = 31	481.09 (1137.55) n = 33	0.251	4202.19 (14358.79) n = 31	-17.94 (350.30) n = 33	0.096	1160.94 (4461.26) n = 31	45.36 (479.27) n = 33	0.158
Mississippi	-233.08 (3731.96) n = 49	300.76 (1382.24) n = 33	0.435	358.45 (882.50) n = 49	204.64 (997.90) n = 33	0.465	214.29 (669.34) n = 49	214.79 (1012.54) n = 33	0.998
Total	-2921.25 (26601.67) N = 91	506.47 (1368.73) N = 91	0.221	1704.42 (8521.02) N = 91	238.92 (915.40) N = 91	0.105	582.80 (2685.22) N = 91	230.27 (893.99) N = 91	0.236

Note: Figures in parentheses refer to the standard deviations.
Data Source: U.S. Census Bureau.

Appendix CJ

Average Annual County Pre-Katrina and Post-Katrina Population Change by State

	Pre-Katrina			Post-Katrina		
	GO Zone	Non-GO Zone	P-Value*	GO Zone	Non-GO Zone	P-Value*
Alabama	282.18 (1317.85) n = 22	321.70 (1269.90) n = 50	0.905	826.42 (1662.60) n = 33	643.19 (1305.85) n = 75	0.538
Louisiana	352.81 (1601.96) n = 62	11.23 (370.96) n = 66	0.095	-1092.60 (27776.9) n = 93	169.51 (766.37) n = 99	0.651
Mississippi	192.56 (719.67) n = 98	116.85 (1099.36) n = 66	0.595	113.22 (2246.36) n = 147	240.06 (1133.88) n = 99	0.605
Total	257.98 (1161.64) N = 182	134.82 (967.13) N = 182	0.273	-211.34 (16262.1) N = 273	325.22 (1085.40) N = 273	0.586

*P-value noted is for GO Zone variable, not the complete model.
Note: Figures in parentheses refer to the standard deviations.
Data Source: U.S. Census Bureau.
Pre-Katrina is comprised of years 2003 and 2004; Post-Katrina is comprised of years 2006, 2007, and 2008.

Appendix CK

Subset Sample for Sensitivity Analysis	
GO Zone Counties	**non-GO Zone Counties**
Attala, MS	Bolivar, MS
Choctaw, MS	Calhoun, MS
Clarke, MS	Carroll, MS
Hinds, MS	Chickasaw, MS
Holmes, MS	Clay, MS
Humphreys, MS	Grenada, MS
Kemper, MS	Issaquena, MS
Lauderdale, MS	Itawamba, MS
Leake, MS	Lafayette, MS
Lowndes, MS	Lee, MS
Madison, MS	Leflore, MS
Neshoba, MS	Monroe, MS
Newton, MS	Montgomery, MS
Noxubee, MS	Pontotoc, MS
Oktibbeha, MS	Sharkey, MS
Rankin, MS	Sunflower, MS
Scott, MS	Tallahatchie, MS
Warren, MS	Washington, MS
Winston, MS	Webster, MS
Yazoo, MS	Yalobusha, MS

VITA

Randall B. Bunker was born in Little Rock, Arkansas, on December 20, 1970, to parents Dallas and Nancy Bunker. He has one older brother, Russell Bunker, and one older sister, Jaime Hensley. He attended elementary school and high school in Cabot, Arkansas, and graduated from Cabot High School in 1989. He attained a Bachelor of Science Degree with a major in accounting in 1993 from Arkansas State University. In 1998, he received a Master of Business Administration Degree from the University of Central Arkansas. He is a Certified Public Accountant, licensed in the State of Arkansas.

Mr. Bunker began his career working for an accounting firm as an external auditor in 1993. He then worked as a plant manager for a large manufacturing company. In 1997, he went back to school and worked at the University of Central Arkansas while attending classes. Upon graduation, he accepted a position as a financial analyst with Alltel Communications. During his professional career, Mr. Bunker has held numerous accounting and management positions.

Mr. Bunker began working on his Doctor of Philosophy Degree at the University of Mississippi in August 2007. He taught accounting classes while completing his coursework requirements. During his time as a graduate assistant, he taught sections in Cost Accounting, Managerial Accounting, and Financial Accounting. He received the Patterson School of Accountancy Outstanding Doctoral Teacher Award in 2009 and 2010. In 2009, he also received the Graduate Achievement Award for Ph.D. Degree in Accountancy from the University of Mississippi.

Mr. Bunker is a member of the American Accounting Association and the American Institute of Certified Public Accountants. His research interests include areas of tax accounting, managerial accounting, and auditing. He plans on continuing his career in academia teaching accounting.