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# THE ECONOMIC IMPACT OF CHARTER SCHOOLS
# AN EMPIRICAL STUDY

LINDSAY ANNE EISENHUT
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Reviewed and approved* by the following:

Sung Jae Jun
Strumpf Early Career Professor in Economics and Assistant Professor of Economics
Thesis Supervisor

Diane Henderson
Professor of Mathematics
Honors Adviser

Bee-Yan Roberts
Professor of Economics and Asian Studies
Faculty Reader

*Signatures are on file in the Schreyer Honors College

**Abstract**

This paper examines whether or not charter schools impact the economies of local communities across the nation. This question is answered by analyzing the relationship between charter schools and annual public charity expenses, which serve as a measure for economic development within a community. Charter schools, like traditional public schools, receive tax-dollars from the district and state according to the number of students attending. Data from 465 counties over a ten year period were analyzed using various fixed effects regression models. Empirical analysis suggests that, under certain conditions, the existence of charter schools influences annual public charity expenses in the local community. Therefore, one may conclude that in certain communities charter schools are viewed as assets and encourage local investment. This paper outlines the various relationships tested and reveals under which conditions charter schools are likely to impact the economies of local communities. The results of the analysis indicate that in counties with a mean Hispanic population, an increase in the number of charter schools leads to an increase in annual public charity expenses.

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## 1. Introduction

All citizens have some direct or indirect interest in having diverse and high-quality educational opportunities available in their communities.

> "[Education] is the best investment we can make – one that pays off in countless dividends, for us, for our children, and for our society . . . If we hope to maintain or improve the quality of life in our communities, attract new industries, and continue to prosper as a nation, top-notch schools are essential." (American Association of School Administrators (1999)

For years now, the state of primary education in the United States has been under intense scrutiny by educators, parents and public policy makers alike. Bennett (1999) revealed the following disheartening statistics: One in five teachers feels well-prepared to teach to high academic standards; since 1983 over six million Americans dropped out of high school altogether; and during that same time period over 10 million Americans have reached the $12^{th}$ grade without having learned to read at a basic level. These statistics reveal unacceptable public school performance standards and "For the better part of the last quarter century, vigorous efforts have been under way to reform American Public Education" (Murphy (2002)). With the education reform movement in full-swing many alternatives to traditional public schools, such as charter schools, are being considered.

In 1991 Minnesota passed the first state charter school legislation (Closing the Achievement Gap (2004)). It was this legislation that helped charter schools become established and ultimately one of the most sought out solutions to the demise of public primary education in the United States. "When charter schools first arrived on the American educational landscape, few people suspected that within two decades, thousands of these schools would be established across the United States, serving almost a million and a half children" (Lubienski and Weitzel (2010)). As of November 2010, charter school legislation has been passed in 40 states and the District of Columbia (Fast Facts).

Over the last decade, charter school research has focused largely on student achievement and charter school laws (Smith, Wohohlstetter, Farrell, Nayfack (2011)). While some qualitative and quantitative research has looked at charter school outcomes at the systems level – looking at charter schools as innovation centers, competition within district schools or other charter schools, charter school market share and segregation and achievement gaps in charter schools (Smith, Wohlstetter, Farrell, Nayfack (2011)) – the impact that charter schools have had on the economies of local communities has been left largely unexplored. For this reason, the aim of this paper is to focus on the impact that charter schools have outside of the classroom. More specifically, I look to answer the following question: what economic impact, if any, do charter schools have on local communities?

I have chosen to use annual public charity expenses as a measure of the economic impact of charter schools on local communities. This is an appropriate way of analyzing the derivative impact of charter schools on local communities, because it has become increasingly common for community-based organizations (CBO) to start charter schools or, at the very least, partner with charter schools "as a way to increase the impact of their programs and provide one-stop shopping" (Halsband (2003)). CBOs aim to improve local communities in various ways through diverse programs. Typically, CBOs can be classified by the sector they primarily serve. For example, CBOs may be grouped as follows: "community-service and action, health, (education), personal growth and improvement, social welfare and self-help for the disadvantaged" (Community Organization (2012)). In other words, the more active CBOs are in a community the better off that community is. For this paper, I chose to measure the level of CBO involvement in a community each year and analyze the relationship between the level of CBO involvement and the number of charter schools in that same community. In my analysis I use the annual

public charity expenses in a county as a measure of CBO involvement. Public charity expenses are an appropriate measure for two reasons. First, charter schools are funded by the state and district, therefore public charity expenses are not the primary source of charter school funding. Second, public charity expenses indicate the amount of money an organization is "investing" in the community.

This thesis will start by giving a brief history and background of charter schools. The remainder is organized as follows. Section 2 describes the methodology used to describe the impact that charter schools have on local communities. Section 3 presents a summary of the data collected and analyzed. Section 4 reveals the results of my regression analysis. Section 5 gives insight into some limitations and possible areas for further research, and finally section 6 concludes my analysis.

### *1.1 Charter Schools: A Definition*

In order to identify the economic impact that charter schools have on local communities it is important to first define what a charter school is. At the most basic level, charter schools are public schools free from direct government control (Finn (2000)). Unlike traditional public schools, charter schools operate separately from the district board of education and are subject to terms and conditions outlined in their charter. States play a role in determining the possibilities of charter schools through charter school legislation, which determines limitations and criteria of charters. Given that charter schools are subject to state and local legislation, they vary across states and even within states (Murphy (2002)). Generally, charter schools are publically funded educational institutions (details about charter school funding can be found in section 1.2) and are held accountable, through their charters, for meeting specified levels of student achievement.

Although charter schools vary dramatically across the nation, most charter schools differ from the traditional public school in the five following ways (Finn (2000)).

- They can be created by nearly anyone.
- They are essentially self-governing as they are free from abiding by most state and local regulations.
- Families choose to send their children to the school.
- There is more freedom in hiring teachers; only one third of states require all charter school teachers to be certified.
- Charter schools are held accountable for their results; if they do not attain the goals outlined in their charter they will be closed.

Charter schools represent freedom of choice in the primary education system. Since they are run by a "group of parents, a team of teachers, an existing community organization…even (in several states) a private firm" (Finn (2000)) charter schools are inevitably rooted in the community.

### *1.2 Charter Schools: Funding*

It is important to understand how charter schools are funded, because I am using a financial variable, annual public charity expenses, as the dependent variable in my analysis. Since many charter schools are founded by CBOs, it would pose significant problems if charter schools were primarily funded by their founding organizations. It would be undesirable if annual public charity expenses only represented the cost of funding and operating charter schools. I wanted to be sure that public charity expenses captured investments made in a broad range of sectors in the community, not just in education.

Charter schools, like public schools, receive funding through state and district tax payer dollars on a per-student basis. This per-student amount is used to finance charter school day-to-day expenses (Murphy (2002)). The details of charter school funding are negotiated in the school's charter and therefore, guidelines differ across states. However, it is widely debated whether or not charter schools receive per-student amounts equal to public schools in their districts. (Closing the Achievement Gap (2004)). Murphy (2002) helped clarify this controversy:

> "Charter schools have different relationships [than public schools] with revenue sources and different capacities for garnering resources. At the same time, the costs charters face are similar to school districts in some instances; in other cases, the costs are experienced in different degrees; and finally, some costs are unique to charters – particularly newly created entities. Some argue that the relatively higher financial burden charter schools face is somewhat offset by some exemptions from costly regulations such as hiring unionized staff, providing transportation, or adhering to public school building codes." (Murphy (2002))

Although studies suggest that charter schools are underfunded compared to traditional public schools (Annual Survey of America's Charter Schools (2010)) educational public charity expenses are not the real source of charter school funding. Charter schools rely on funding from the state and district. My regression results, in section 4, show that neither public charity expenses related to education nor public charity expenses unrelated to education are significantly correlated with the percentage of all public schools that are charter schools in a county. Therefore, I argue that the majority of annual public charity expenses will not only represent expenses directly related to charter schools. For more details in support of this argument refer to section 4 of this paper.

### *1.3 Motivation*

Education advocates have often asserted that high quality public schools have a positive impact on a community's economic development. Weis (2004) reviewed literature that examines the relationship between public schools and economic development. Weis came to the following conclusion: "Research shows that, holding all else constant, homes in high-performing school districts sell for higher prices than homes in low-performing school districts" (Weiss (2004)). This can be interpreted in the following way: High-performing schools benefit local economies and add to a community's value. CREDO (2009) found that over 60 percent of charter schools have shown to have performed at least as well as or better than local public schools. Given that charter schools are public schools and assuming that charter schools are

generally high-performing schools (based on the results of the CREDO (2009) study) I believe that the economic impact charter schools have on various communities should be examined. My analysis measures the economic impact charter schools have on various communities in a broader sense than the Weis' research.

Horowitz, Keil, and Spector (2008) analyze the affect that charter schools have on residential property values in the neighborhoods they are located in. Horowitz, Keil, and Spector based their study using literature that examined the relationship between traditional public school quality and property values. The literature previous to their study suggests that "(1) highly rated schools may cause property values to increase or (2) high property values may result in higher quality public schools" (Horowitz, Keil, Spector (2008)). However, Horowitz, Keil, and Spector (2008) found that, except in special cases, there was little evidence that the existence of a charter school affects property values. Because of these inconclusive results I have chosen to consider a different measure.

Instead of focusing on measuring the effect that charter schools have on property values in communities across the nation I have chosen to look at other ways that charter schools may impact local economies. As previously stated, charter schools are often started by CBOs and therefore, charter schools are one option CBOs have when choosing how to invest their money in community development. I will focus on how charter schools impact public charity spending and investment in the community.

The 2006 Civic Builders Policy Brief, Number 8 outlines various ways that charter schools have contributed to a community's well-being. The document examines how charter schools have helped improve both the social and physical capital of surrounding neighborhoods.

I will draw upon many of their conclusions and observations in this paper. Most notably, I will focus on, what the brief defines as, the "multiplier" effect.

The multiplier effect refers to the contributions to economic revitalization that occur as a consequence of launching a new school. When a charter school is launched often times the buildings require renovation or construction. This building process results in a burst of economic activity by purchasing local materials and hiring local workers (Civic Builders (2006)). This economic activity contributes funds into the local economy. New schools will inevitably need to hire teachers, administrators, custodians and other staff that are required in order to run a school. In the long run the school helps to create employment opportunities. As the school operates it contributes to the local economy by consuming local goods and services and the cycle then repeats itself. These multiplier effects are different from the externalities from the presence of charter schools, because charter schools often intentionally hire and source materials locally, because they are founded by CBOs. CBOs are rooted in the community and their goal is to improve the local community by investing in the local community. The diagram below from the Civic Builders Policy Brief, Number 8 depicts the cycle:

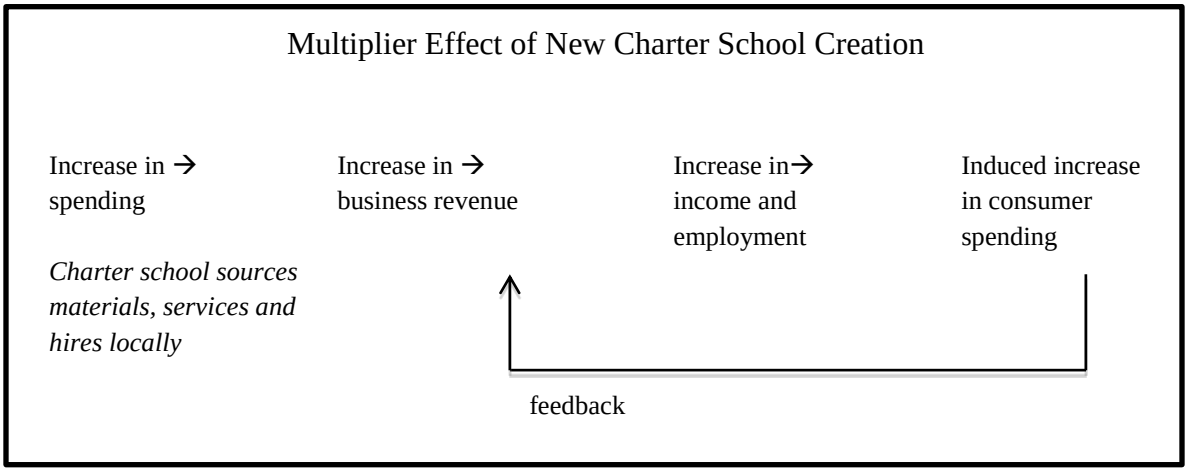


**Figure 1. Schematic of the multiplier effect on communities**
**Civic Builders Policy Brief, Number 8 (2006)**

Charter school advocates argue that charter schools contribute to urban economic development. This impact has been seen through the following ways: An increasing number of CBOs are starting charter schools; fewer families are "fleeing cities in search of quality education" (Halsband (2003)); charter schools are contributing to neighborhood revitalization through the purchasing or leasing of vacant properties.

The remainder of this paper focuses on my attempt to quantitatively measure and analyze the effects of charter schools on annual public charity expenses using a fixed effects model.

## 2. Methodology

For this study I obtained county level data for 34 of the 40 states and District of Columbia that have charter school legislation for the years 1998 through 2008. In total 465 counties were observed and on average about 7.5 counties were observed in each state. Many similar studies that I have come across tend to focus on specific regions, states or cities. However, I wanted to consider a much larger geographic area in hopes of being able to make a broader generalization about the impact of charter schools on local economies. Using data from different states introduces the issue of state/county-wide unobserved heterogeneity (or unobserved differences). Fortunately, I was able to collect panel data, which is described below, so I was able to account for time-invariant unobserved heterogeneity in my analysis.

Panel data are data that are collected for the same individuals, groups or firms over a period of time. "A panel is a cross-section or group of people who are surveyed periodically over a given time span" (Yaffee (2003)). Panel data analysis has become an increasingly popular analytical tool in the social and behavioral sciences. Since the effects that charter schools have on local communities may not be immediately apparent and there will inevitably be unobserved state/county-wide specific effects, it is favorable to use data that span a period of time, for

example data that are collected over five or ten years. Panel data have the benefit of providing regression analysis with both a spatial and time specific element.

I analyzed my panel data set using a linear fixed effects model. The general model that I used can be expressed as follows:

$$\log(e_{it}) = \beta_1 cs_{it} + \beta_2 h_{it} + \beta_3 cs_{it} * h_{it} + A_i + \varepsilon_{it}, \quad (2.1)$$

where $e_{it}$ represents the economic indicator under investigation, public charity expenses (per charity), for county *i* at time *t*, $cs_{it}$ represents the number of charter schools per capita for county *i* at time *t*, $h_{it}$ represents the proportion of the population of county *i* that is Hispanic at time *t*, $cs_{it}*h_{it}$ represents the interaction between charter schools and the Hispanic population for county *i* at time *t*, $A_i$ represents county specific information, such as rules and regulations, for county *i* (not dependent on time), and $\varepsilon_{it}$ is the error term. I included the variable $h_{it,}$ because minority populations are often targeted by CBOs and therefore I needed to account for the possibility that demographics would influence my results. Only the Hispanic population is considered in model (2.1), because accounting for other races, such as African Americans and Asians, and genders proved to be statistically insignificant in the models. More information concerning the demographic variables can be found in section 3.

Considering model (2.1) I can see that, after analyzing my data, the value I estimate for $\beta_1$ is the effect that $cs_{it}$ has on $\log(e_{it})$. In other words, $\beta_1$measures the effect that charter schools have on the logarithm of annual public charity expenses. $\beta_1$ is not the only effect that charter schools have on public charity expenses, but this will be discussed in detail later in this paper.

I chose to use a log transformation of my economic indicator variable for two reasons. The first reason that I used the log transformation is that the resulting behavior of the data is

linear. The second reason that I used the logarithm of my dependent variable was for interpretation of my estimated coefficients. By setting the right hand side of my regression equation equal to $\log(e_{it})$ I am able to interpret the estimated effect of *cs* on annual public charity expenses as follows: A one unit increase in the fraction of public schools that are charter schools would lead to an approximate $[(\hat{\beta}_1 + (\hat{\beta}_3 * \bar{h})) * 100]$ percent increase in annual public charity expenses. $\hat{\beta}_1$ and $\hat{\beta}_3$ represent the values of $\beta_1$ and $\beta_3$ estimated by my regression analysis and $\bar{h}$ represents the mean of $h_{it}$.

A fixed effects model has "constant slopes, but intercepts that differ according to the county (Yaffee (2003)). In other words, the intercept is specific to the counties. The fixed effects model differs from the simple linear regression model in that it accounts for unobserved time-invariant variables and analyzes data over a ten year period of time. A fixed effects model is more appropriate than using simple linear regression for my analysis due to the fact that charter schools vary dramatically across states. Charter school legislation is state mandated; therefore charter schools laws, regulations and accountability standards will vary across counties in this study. These unobserved state/county specific variables are assumed to be time-invariant. The fixed effects model treats county-specific effects as parameters and there are no restrictions imposed on these parameters in the model.

Any unobserved county specific effects are allowed to be correlated with the charter school variable, which is the fraction of all public schools that are charter schools in each county. An example of the fixed effects model is the following simplified two-year example:

Say we want to estimate $\beta_1$ in the following equation:

$$(2.2) \qquad y_{it} = \beta_1 cs_{it} + A_i + \varepsilon_{it}.$$

However, we are worried that there are county specific effects (independent of time) that will influence our estimate that are not represented in the model. We let the variable $A_i$ represent county specific information, such as state laws and regulations. The fixed effects model then works in the following way:

At time t=1:
(2.3) $y_{i1} = \beta_1 cs_{i1} + A_i + \varepsilon_{i1}$.

At time t=2:
(2.4) $y_{i2} = \beta_2 cs_{i2} + A_i + \varepsilon_{i2}$.

By subtracting equation (2.3) from (2.4) we obtain:
(2.5) $(y_{i2} - y_{i1}) = \beta_1(cs_{i2} - cs_{i1}) + (\varepsilon_{i2} - \varepsilon_{i1})$.

Therefore, we can now see the impact that the variable *cs* has on the variable *y*, because the fixed effects model accounts for the county specific information. This is very convenient for my study, because there are many county specific variables that need to be accounted for when estimating the effect that charter schools have on annual public charity expenses.

While the fixed effects model accounts for county specific information it is still necessary to consider possible variables I would need to account for. As demonstrated in equation (2.1) my model controls for demographics, and more specifically for the Hispanic population. I chose to control for demographics, because many CBOs and charter schools target minority populations. Both CBOs and charter schools have not only a mission, but a vision. In order to carry out this vision many of these institutions focus on a specific group of people in a community. Therefore, if an area has a larger minority population this may influence the estimation of the impact charter schools have on public charity expenses. For this reason I included demographic control variables in my model.

The next section gives a detailed summary of all of the variables I included in my model and is followed by a summary of the results of my analysis.

## 3. Summary Statistics and Data Description

Community economic benefits i.e. the economic prosperity of the community, is defined, for the purposes of this paper, by local annual public charity expenses for each county. In other words, the higher the annual public charity expenses are the better off the local community is. Local expenses take into account all public charities located in a specific county.

Thirty-four of the 40 states and District of Columbia that currently have passed charter legislation were observed in this study. The number of counties observed varied depending on the state. On average approximately 7.5 counties were observed for each state. The maximum number of counties observed in any one state was 55 counties in North Carolina. Figure 4 depicts the number of counties that were observed in each state included in my analysis.

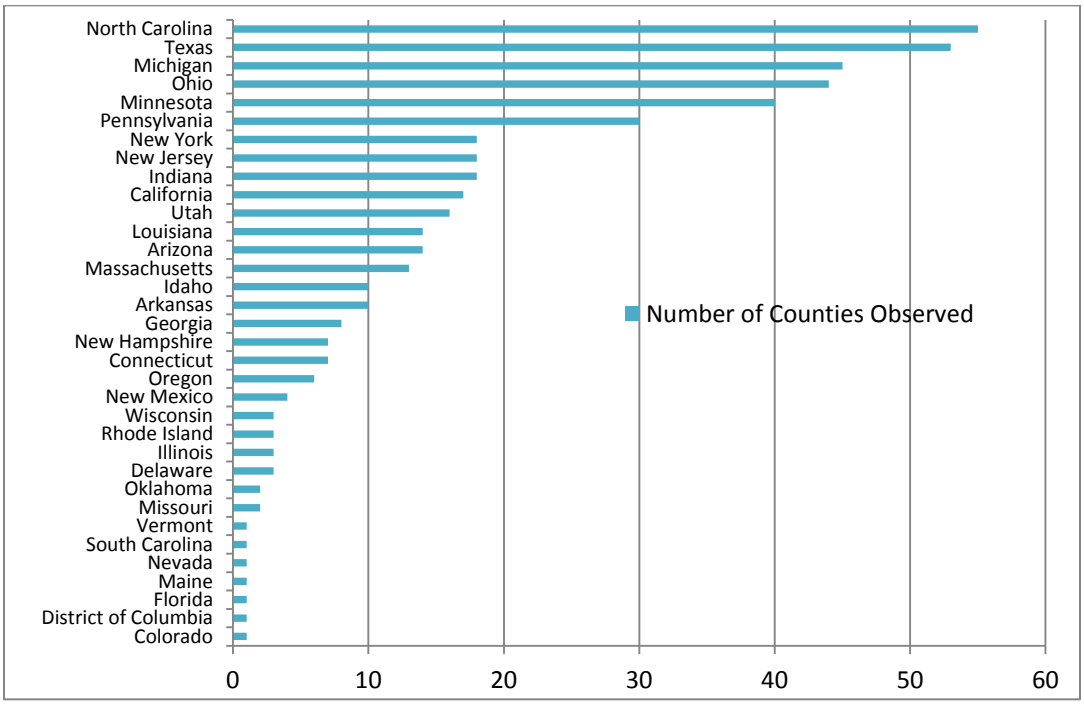


**Figure 2. Number of Counties Observed by State**

In this section I present and define all of the variables used in the fixed effects regression model. Summary statistics for the variables considered in my analysis can be found in Table 1. Table 1 shows the summary statistics for the year 2004, but is representative of all years.

**Table 1. Data obtained for the year 2004**

| Variable | Number of Observations | Mean | Standard Deviation | Min | Max |
|---|---|---|---|---|---|
| Counties | 465 | - | - | - | - |
| Public Charity Expenses (in dollars per charity) | 465 | 2,536,516 | 2,121,126 | 27,192 | 1.70e+07 |
| Non-Education Public Charity Expenses (in dollars per charity) | 465 | 2,148,261 | 1,848,346 | 20,891.5 | 1.69e+07 |
| Education Public Charity Expenses (in dollars per charity) | 453 | 398,571.1 | 776,759.9 | 463.64 | 1.08e+07 |
| Charter School Number (as a fraction of all public schools) | 299 | .063 | .060 | 0 | .5 |
| Fraction of population that is Black | 445 | .098 | .123 | .0006 | .670 |
| Fraction of population that is Asian | 445 | .021 | .032 | .0008 | .320 |
| Fraction of the population that is Hispanic | 445 | .101 | .154 | .005 | .944 |

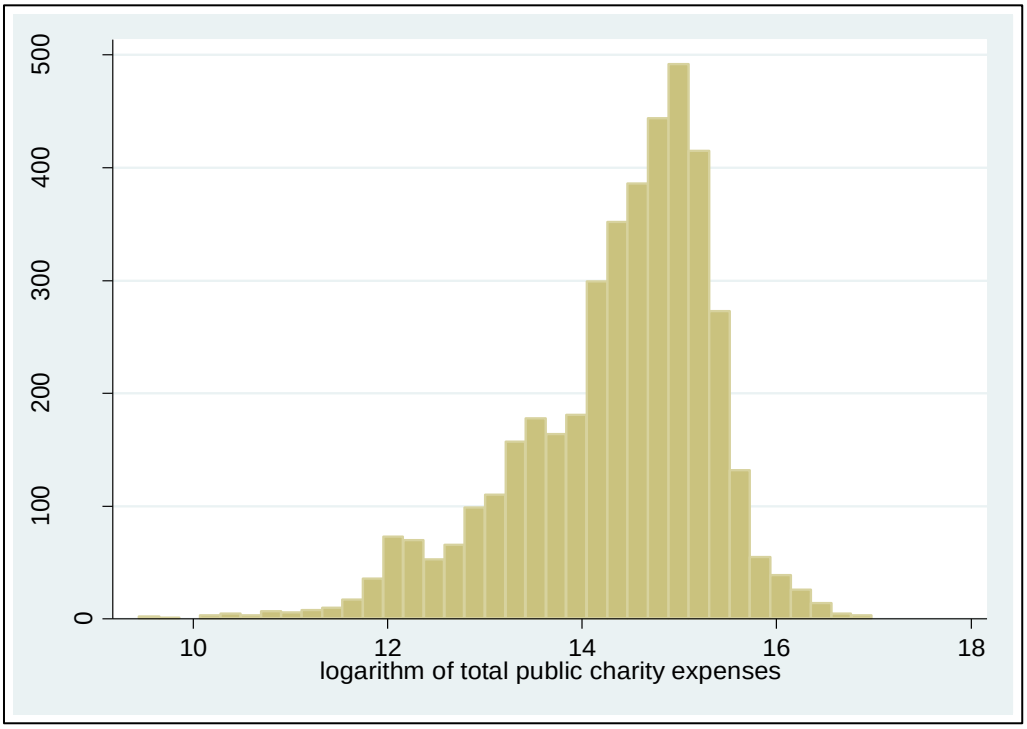


**Figure 3. Histogram of logarithm of total public charity expenses (vertical axis – frequency)**

All data for this paper were obtained at the county level. Given that this analysis is done for the entire nation it was most desirable to have each observation be the smallest possible geographic location. Each county is a single observation. For example, take Suffolk County, New York. Table 2 represents Suffolk County, identified by FIPS code 03016, observed in three different years. A FIPS code is a five-digit number where the first two digits identify the state and the last three specify the county. The first two digits 03 represent New York State and the last three, 016, identify Suffolk County. In Table 2, 03016 is one observation in each of the three years. In each year data regarding the education system and economy were collected and recorded.

**Table 2. Example data set for FIPS code 03016**

| FIPS | Year | Public Charity Expenses (Dollars per charity) | Enrollment in public charter schools | Number of charter schools | Hispanic Population (as a percentage of the total population) |
|---|---|---|---|---|---|
| 036103 | 2003 | 2,621,430.68 | 351 | 3 | 11.84 |
| 036103 | 2004 | 2,651,641.19 | 333 | 2 | 12.16 |
| 036103 | 2005 | 2,456,329.99 | 299 | 2 | 12.46 |

### *3.1 Economic Indicator: Annual Public Charity Expenses*

This paper analyzes the economic impact that public charter schools have on counties across the United States. Annual public charity expenses were determined to be the most appropriate economic indicator for the purposes of this paper.

Public charity expense data were obtained from the National Center for Charitable Statistics (NCCS), a program of the Center on Nonprofits and Philanthropy at the Urban Institute. The NCCS retrieves its data files primarily from "information that tax-exempt nonprofit

organizations file with the Internal Revenue Service" (IRS) (NCCS Data Guide (2006)). NCCS created their databases based on data from three types of exempt organization database files released regularly by the IRS (NCCS Data Guide (2006)).

Public charity expense data were retrieved from the NCCS Core files, which is a database derived from the IRS annual Return Transaction Files (RTF). The Core files contain data on all 501(c)(3) organizations that were required by the IRS to file a Form 990 or a Form 990-EZ. A 501(c)(3) organization is a tax-exempt nonprofit, corporation or association. Form 990 is "an annual reporting return that certain federally tax-exempt organizations must file with the IRS" (GuideStar (2012)). Form 990 provides information on general information about the organization as well as the organization's finances (GuideStar (2012)). It is important to consider that not all public charities are captured in this database. Two categories are exempt from registering with the IRS and are therefore excluded from the IRS, and subsequently the NCCS, databases:

- "Public charities or other exempt organizations with less than $5,000 in gross receipts." (NCCS Data Guide (2006))
- "Churches, their integrated auxiliaries, and conventions or associations of churches." (NCCS Data Guide (2006))

The IRS recognizes two categories of 501(c)(3) organizations: public charities and private foundations. For the purposes of this paper, I considered only public charities in my analysis. Public charities account for approximately 90 percent of all 501(c)(3) organizations and are the main focus of the NCCS databases (NCCS Data Guide (2006)). The NCCS obtained total expenses information on 501(c)(3) organizations from line 17 of the Form 990 (NCCS Data Guide (2006)). Total expenses are equal to the sum of "program, fundraising, management, and general expenses, as well as payments to affiliates" (NCCS Data Guide (2006)). A detailed

summary of the information that is found on line 17 of the Form 990 can be found in the Appendix.

All data were obtained from the NCCS Public Charities Table Wizard. I was able to use this wizard to find total public charity expenses as well as the expenses related purely to public charity education organizations. In my analysis I tested two different models, one which looked at the influence charter schools had on public charity expenses, excluding the expenses of education related organizations. I calculated the non-education public charity expenses variable by subtracting the education expense data from the total public charity expense data.

### *3.2 Public Charter School Variables*

Data on individual charter schools are gathered annually in the Common Core of Data (CCD) survey by the Department of Education. The CCD is the core database on public elementary and secondary education in the United States (National Center for Education Statistics). It is designed to provide basic information, descriptive statistics and an official listing of public elementary and secondary schools and school districts in the nation. Each year, statistical information from approximately 18,000 public school districts and 100,000 public elementary and secondary schools is collected and recorded in the CCD (National Center for Education Statistics). According to the National Center for Education Statistics (NCES) website, the CCD "contains data that are designed to be comparable across all states" (National Center for Education Statistics).

In their 1998-99 school year data collection the CCD expanded their survey to include questions on charter schools. Therefore, even though the first charter school in the U.S. was opened in St. Paul Minnesota in 1992 this paper analyzes data from 1998 through 2008.

Data from the CCD annual surveys were gathered via the NCES website. The NCES is located within the U.S. Department of Education and the Institute of Education Sciences and is responsible for collecting and analyzing national and international data related to education (National Center for Education Statistics). Through the NCES website, data from the CCD can be viewed and obtained. Data from 465 counties across the nation were obtained from the NCES CCD database.

The CCD gathers information on public charter schools. The NCES defines a public charter school as follows:

> A *public charter school* is a school that provides free public elementary and/or secondary education to eligible students under a specific charter granted by the state legislature or other appropriate authority. Charter schools can be administered by regular school districts, state education agencies (SEAs), or chartering organizations. (Fast Facts)

In less than a ten year period enrollment in charter schools more than tripled (Fast Facts). In the 1999-2000 school year 340,000 students were enrolled in public charter schools compared to the 1.4 million students enrolled in public charter schools in the 2008-09 school year (Fast Facts). During that time period, the percentage of all public schools that were charter schools increased from 2 to 5 percent. While enrollment rates rose during this ten-year period the percentage of charter schools that were high-poverty schools increased from 13 percent in 1999-2000 to 30 percent in 2008-2009. Only 19 percent of traditional public schools were considered high poverty in 2008-09 (Fast Facts). Note that the number of charter schools reported by the NCES for each county is below the actual value, because the NCES only has information on schools that complete the CCD annual surveys. This bound will affect our analysis, but not enough to invalidate our results.

### *3.3 Race and Demographic Variables*

Race and demographic variables were included in the regression, because these variables have been shown to have a large influence on the growth of housing in the longer run (Miller (1988)). Demographics and race have also been shown to influence school choice. Therefore, it was important to include them as independent variables in the fixed effects model.

Race and demographic data were obtained from the Census Bureau. Each year the Census Bureau produces estimates of the resident population by age, sex, race, and Hispanic origin for each county in the United States and District of Columbia. The Census Bureau develops annual estimates by updating the Census 2000 data. The resident population includes all residents, civilian and Armed forces (U.S. Census Bureau). The Census Bureau calculates population changes using the following equation:

$P1 = P0 + B – D + NDM + NIM,$

where,
P1 = population at the end of the year
P0 = population at the beginning of the year
B = births during the year
D = deaths during the year
NDM = net domestic migration during the year
NIM = net international migration during the year.

Births and deaths are recorded relatively accurately and the data are readily available (U.S. Census Bureau).

The data set includes population estimates on the following race groups: White Alone Population, Black or African American Alone Population and Asian Alone Population. The ethnic group, Hispanic Alone Population, was also considered. The Census Bureau provides this information for each gender separately. For this paper male and female populations were combined to generate groups that reflected only race and didn't differentiate by gender. It is important to note that in looking at our race data the sum of all race groups will not equal the

total population. The reason is that the Census provides information on individuals who identify as a combination of races. This information is less important for the purposes of this study so only data of the four demographic groups listed above were collected. We note that the Census Bureau does not consider Hispanic to be a race (U.S. Census Bureau), so a Hispanic person may be of any race.

It is important to include information on demographics for the counties observed in this analysis, because charter schools largely serve minority populations. According to the results of the Center for Education Reform's 2009 annual survey "charters educate students who are largely underserved in the public school environment" (Annual Survey of America's Charter Schools (2010)). They found that 52% of charter students are minority students, 50% are at-risk students and 54% are from low-income families (Annual Survey of America's Charter Schools (2010)). These numbers are not very surprising given that a large number of charter schools are located in urban areas and are started by organizations that target minority populations. Figure 6 shows that more than 40% of charter schools that responded to the CER annual survey enroll student populations that are more than 60% minority, at-risk or low-income (Annual Survey of America's Charter Schools (2010)).

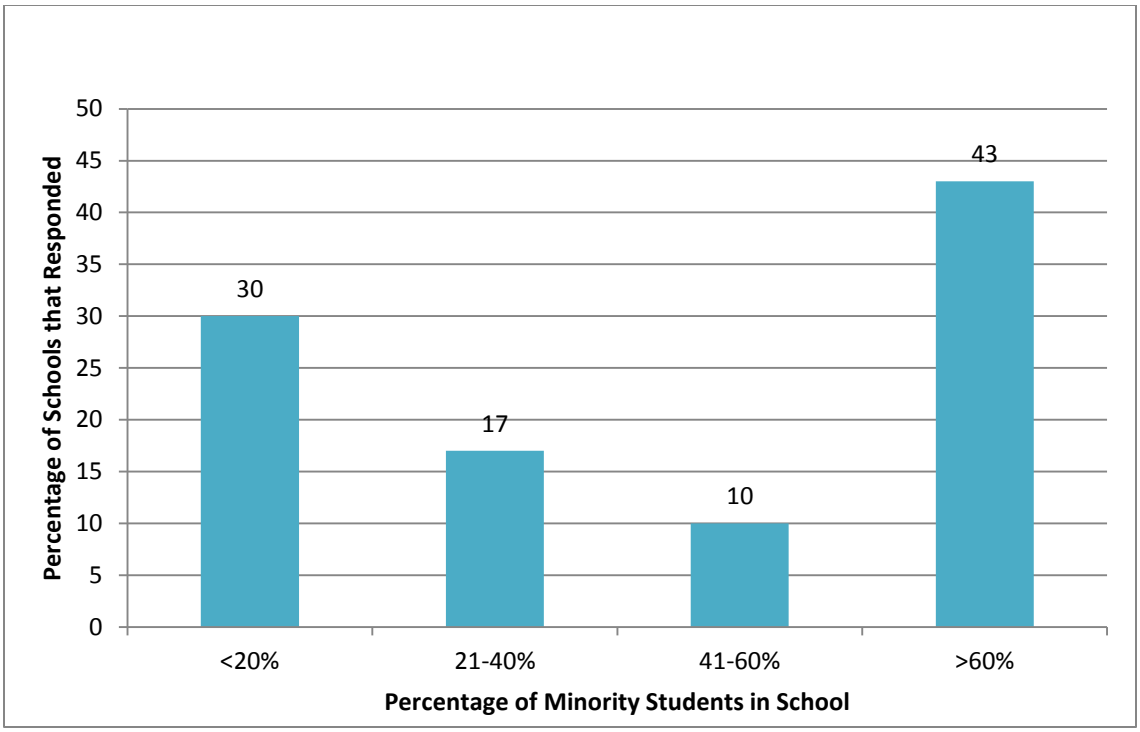


**Figure 4. The percentage of minority students in charter schools**
**Source: Center for Education Reform, *Annual Survey of America's Charter Schools*, 2010**

## 4. Results

In this section I present the results of the fixed effects model, which uses public charity expenses, charter school and demographic data from 465 different counties across the nation. Once again, I am using the fixed effects model to analyze my panel data instead of a simple linear regression model, in order to account for any county specific data that may influence the results. The fixed effects model allows the unobserved county specific effects to be correlated with the charter school variable, the fraction of all public schools that are charter schools.

Table 3 summarizes the results of the first model I tested. In equation (4.2) *e* represents public charity expenses, *cs* represents the proportion of all public schools that are charter schools and *A* represents any county specific information that will be captured in the fixed effects model.

This model looks to see what effect, if any, *cs* has on the logarithm of annual public charity expenses, log($e_{it}$), without controlling for any other variables.

$$(4.2) \quad \log(e_{it}) = \beta_1 cs_{it} + A_i + \varepsilon_{it}.$$

**Table 3. The fixed effects regression results for model (4.2)**

| | Coefficient | Standard Error | P-value | [95% Confidence Interval] |
|---|---|---|---|---|
| **cs** | 0.055 | 0.103 | 0.589 | -.146 .256 |

Clearly, we can see that in model (4.2) the variable *cs* is statistically insignificant. In this paper a P-value larger than .05 indicates that the variable is statistically insignificant in our model. This simplified model, where I do not control for any other variables and only observe the effect of charter schools on public charity expenses, is insufficient to capture the impact that the fraction of all public schools that are charter schools has on the logarithm of annual public charity expenses.

In my second model I chose to control for demographics. As stated in the previous section many different CBOs and charter schools target specific populations. I tested for the significance of Black, Asian and Hispanic minority groups. After running various regressions my results showed that out of all these minority groups only the Hispanic population seemed to be significant. This may be true for a few reasons.

Demographics have been found to play a role in developing state charter legislation and student population. Stoddard and Corcoran (2007) stated that, "Controlling for student performance, states with greater Hispanic populations tended to pass laws supporting charter schools earlier and were likely to pass more permissive legislation" (Stoddard and Corcoran (2007)). Interestingly, the fraction of a state population that is black was statistically insignificant with "the passage, timing or strength of charter laws" (Stoddard and Corcoran (2007)). However, the fraction of the state population that is black played a significant role in

student participation in charter schools. Given that my analysis focuses on the fraction of public schools that are charter schools and not student enrollment rates it makes sense that the Hispanic population would need to be controlled for, whereas the black population would turn out to be statistically insignificant. Therefore, I have controlled for the ratio of the county population that is Hispanic in my model and the results of that model are show in Table 4.

$$(4.3) \quad \log(e_{it}) = \beta_1 cs_{it} + \beta_2 h_{it} + \beta_3 cs * h_{it} + A_i + \varepsilon_{it}.$$

**Table 4. The fixed effects regression results for model (4.3)**

| log(e) | Coefficient | Standard Error | P-value | [95% Confidence Interval] |
|---|---|---|---|---|
| **cs** | .473 | .197 | 0.017 | .085 .860 |
| **h** | 5.674 | .694 | 0 | 4.314 7.035 |
| **cs*h** | -1.826 | .636 | 0.005 | -3.050 -.555 |
| **P-value** $(\boldsymbol{H_0}: \boldsymbol{\beta_1 = \beta_3 = 0})$ | .018 | | | |

Model (4.3) suggests that charter schools have a net positive impact on public charity expenses. Before discussing a deeper analysis of model (4.3), including under what conditions *cs* is statistically significant, I want to comment on two variations of model (4.3).

After running the above regression I was concerned that the statistical significance of $\beta_1$ and $\beta_3$ may be due to the fact that public charity expenses are a source of charter school funding. I addressed this concern by considering models (4.4) and (4.5) below. I was able to extract all expenses that were associated with education related CBOs and run the regression separately for non-education expenses and education expenses. Equation (4.4) represents my model that looks at only expenses that are unrelated to education and equation (4.5) looks at expenses that are only related to education. Tables 5 and 6 present the results of the regression

for models (4.4) and (4.5) respectively. The corresponding coefficients become statistically insignificant in these models.

$$(4.4) \quad \log(\text{non-edu}) = \beta_1 cs_{it} + \beta_2 h_{it} + \beta_3 cs * h_{it} + A_i + \varepsilon_{it}.$$

**Table 5. The fixed effects regression results for model (4.4)**

| log(non-edu*) | Coefficient | Standard Error | P-value | [95% Confidence Interval] |
|---|---|---|---|---|
| **cs** | .342 | .222 | .123 | -.093 .777 |
| **h** | 5.447 | .781 | 0 | 3.915 6.978 |
| **cs*h** | -1.483 | .715 | .038 | -2.885 -.080 |
| **P-value** $(\boldsymbol{H_0}: \boldsymbol{\beta_1 = \beta_3 = 0})$ | .105 | | | |

**non-edu refers to public charity expenses unrelated to education*

$$(4.5) \quad \log(\text{edu}) = \beta_0 + \beta_1 cs_{it} + \beta_2 h_{it} + \beta_3 cs * h_{it} + A_i + \varepsilon_{it}.$$

**Table 6. The fixed effects regression results for model (4.5)**

| log(edu*) | Coefficient | Standard Error | P-value | [95% Confidence Interval] |
|---|---|---|---|---|
| **cs** | -.384 | .231 | .096 | -.837 .068 |
| **h** | 8.474 | .812 | 0 | 6.881 10.067 |
| **cs*h** | .871 | .744 | .242 | -.589 2.331 |
| **P-value** $(\boldsymbol{H_0}: \boldsymbol{\beta_1 = \beta_3 = 0})$ | .221 | | | |

**edu refers to public charity expenses related to education*

We can see that in both models the variable *cs* by itself is once again insignificant. One would expect this from equation (4.4), because this model excludes the expenses directly associated with education. The variable non-edu excludes expenses of public charities in the education sector, but captures annual public charity expenses in the sectors including, but not limited to: Environment, Healthcare, Science and Technology and Human Services. Any expenses related to renovations of school buildings, jobs for teachers and administrators, etc. may not be included.

Public charities in the education sector are more likely to invest in schools, including charter schools. Therefore, I argue that many of the expenses directly related to the operation of a charter school may not be captured in the variable non-edu. It is important to note that we can also see that the interaction term, *cs*h*, is statistically significant in model (4.4). This indicates that the effect of *cs* on log(*non-edu*) is different at different values of *h*. In model (4.4) as the ratio of Hispanics in a county increases the effect of *cs* on log(*non-edu*) decreases.

Table 6 shows that both the variable *cs* and the interaction variable *cs*h* are statistically insignificant in this model. Initially, it appears that the only impact that charter schools have on public charity expenses is the direct impact that charter schools have related to education. It is to be expected that when a new charter school is founded by a CBO, public charity expenses will automatically increase in that county, because new charter schools require start-up and operational funding. Initially, equation (4.4) suggests that charter schools may not have an influence outside of the education sector. However, after seeing the results of model (4.5) we can see that this is, in fact, not the case.

Equation (4.5) looks at the impact that charter schools have on the logarithm of public charity expenses purely related to education. Once again, the variable *cs* is statistically insignificant. Therefore, it appears that charter school impact is not only directly associated with the education sector. Given that model (4.4) yielded that *cs* was statistically insignificant it was expected that its impact would be significant in the public charity education sector. However, we can conclude from the regression results that charter school impact extends beyond the role it plays in education. This is because, charter schools were found to be statistically significant in the first model where education and non-education expenses were combined. Clearly, charter schools have an impact on annual public charity expenses, but the impact is not restricted to the

education sector or non-education sector. The results of equations (4.3), (4.4) and (4.5) suggest that it is the combination of non-education and education annual public charity expenses shows that the relationship between charter schools and annual public charity expenses is significant. Equations (4.4) and (4.5) did not contain enough information individually to show the significance of *cs*. Fortunately, equation (4.3) captured some of this missing information and showed us that we can conclude that *cs* has a significant impact on the logarithm of annual public charity expenses.

I will now return back to regression results from equation (4.3). The results of this regression, shown in Table 4, reveal that the fraction of all public schools that are charter schools does influence the logarithm of annual public charity expenses (per charity). It follows from these results that the fraction of all public schools that are charter schools has a net positive impact on annual public charity expenses. We can immediately see that our regression yields a positive coefficient $\hat{\beta}_1$, and a negative coefficient $\hat{\beta}_3$. Using these estimates I calculated the partial effect of *cs* on log(*e*) because, $\hat{\beta}_1$ alone does not represent the effect of *cs* on log(*e*). This is due to the fact that there is an interaction term, *cs*h* in model (4.3).

I calculated the partial effect of *cs* on log(*e*) in the following way:

Let $\delta =$ partial effect of *cs* on $\log(e)$

(4.6) $\delta = \beta_1 + \beta_3 \mathbb{E}(h).$

Using our estimates for $\beta_1$ and $\beta_3$ we can estimate $\delta$ using the following equation:

(4.7) $\hat{\delta} = \hat{\beta}_1 + \hat{\beta}_3 \bar{h}.$

$\hat{\delta} = .473 - 1.827(0.1) = .454$

We can then interpret the results of model (4.3) in the following way: increasing *cs* by one unit leads to an approximate increase of *e* by $[(\hat{\beta}_1 + (\hat{\beta}_3 * h)) * 100]$ percent, or 45.4 percent. In other words, as the number of charter schools increases in a community with a mean Hispanic population annual public charity expenses increase, but as the Hispanic population ratio

increases the effect of charter schools on annual public charity expenses decreases. Note that this is only true when holding all else constant and considering counties with a mean Hispanic population. The effect of *cs* on log(*e*) changes slightly depending on the Hispanic demographic of the county you are observing. We can see that the value we estimated $\beta_3$ to be ($\hat{\beta}_3$) is negative in model (4.3). This means that if we increase $h_{it}$ by one unit the effect of the percentage of all public schools that are charter schools, *cs*, has on the logarithm of total annual public charity expenses decreases by a factor of 1.8. $\hat{\beta}_3$ indicates how different the slopes of the regression lines are between the logarithm of total annual public charity expenses and the percentage of all schools that are charter schools.

Table 7 shows how the partial effect of the fraction of all public schools that are charter schools on log(*e*) changes when you look at counties with different Hispanic populations. The estimates $\hat{\beta}_1$and $\hat{\beta}_3$ from model (4.3) found in Table 4 were used to calculate the value of $\hat{\delta}$ at the different percentiles in Table 7.

**Table 7. The partial effect of the fraction of all public schools that are charter schools on log(*e*) for different Hispanic populations**

| Percentile | $\boldsymbol{h}$ | $\widehat{\boldsymbol{\delta}} = \widehat{\boldsymbol{\beta}}_{\boldsymbol{1}} + \widehat{\boldsymbol{\beta}}_{\boldsymbol{3}} * \boldsymbol{h}$ |
|---|---|---|
| **25** | 0.018 | 0.440 |
| **50** | 0.041 | 0.399 |
| **75** | 0.112 | 0.270 |

If we are considering counties that have Hispanic populations within the 25 to 75 percentile range increasing the ratio of public schools that are charter schools by one unit is equivalent to an increase in log(*e*) by 0.44 to 0.27 respectively.

My results show that charter schools do have an impact on the economies of local communities with a mean Hispanic population. Their impact extends beyond just the education

sector, but the extent to which they impact the community depends on the demographic make-up of the county.

## 5. Limitations

Having presented the results of my fixed effects model it is important to note that there are limitations to my analysis. Limitations and suggestions for possible areas of further study will be discussed briefly in this section.

It is most important to recognize that the data obtained on the number of charter schools in a county is not necessarily a complete data set. There are a few notes about the charter school data that should be considered when interpreting my analysis. First, not every state with charter schools was observed in this study. This was primarily due to data availability. However, 34 of the 40 states and District of Columbia were observed, which indicates I obtained data for a majority of states with charter school legislation. A second point to consider is that a different number of counties were observed in each state. The maximum number of counties observed was 55 in North Carolina and there were seven states where only one county was observed over the ten year time period. Specific values for each state can be found in Figure 4. Differences in the number of counties observed in each state were also due to data availability, as well as the fact that since charter legislation is state mandated not all states have had charter schools for the same period of time. For example, Minnesota was the first state to pass charter school legislation in 1991 (Closing the Achievement Gap (2004)). North Carolina did not pass charter school legislation until 1996 (Legislation). Therefore, there is a five year time period where there is no data for counties in North Carolina, because charter schools were not legally allowed to exist.

Given that charter schools are relatively new and gaining momentum within the last twenty years, there are limited data available. The number of charter schools in each county annually was obtained from the National Center for Educational Statistics (NCES) Common

Core of Data (CCD) database. As stated in section 3, the CCD is made up of statistical information that is collected annually from a set of five surveys sent to state education departments. Therefore, it is implied that not all schools will be accounted for in this database. It would have been more desirable to obtain this information from the Center for Education Reform (CER), because they have an extensive database devoted solely to charter schools. Unfortunately, the CER has a policy that prevents them from giving anyone their "national charter database in any format" (A. Grabowski, personal communication, September 8, 2011). Therefore, while the CCD may not be a complete database it has sufficient information to show trends in charter school growth over the years.

Also, using public charity expenses is not the only variable that could have been used to see the impact that charter schools have on local communities. It would be interesting to consider the impact of charter schools on other economic indicators, such as real-estate and property values on the national level as well as income and unemployment. Looking at these variables as well as conducting this analysis for different geographic sizes may yield interesting results. Considering data at the zip-code, state or regional level may be an interesting area for further research.

As stated in the introduction of this paper, I conducted my analysis under the assumption that charter schools are of the same quality as public schools. However, this does not account for the fact that quality might influence the results of this analysis. How would accounting for charter school quality affect my conclusions? It would be an interesting area for further research to consider a control variable that would capture charter school quality and include that variable in the model.

Much of what has been measured in this paper is the short-run direct economic impact of charter schools on local communities. While it would be interesting to analyze the long-run impact that charter schools have on the economic development of communities, this is left for further research.

My estimate of the impact that charter schools have on local communities should also be viewed as a minimum lower bound. The total influence could be much larger. Social impact is very difficult to measure and CBO activity is only one measure of community quality. Charter schools may influence the economic development of a community in other ways that are not captured by my economic indicator.

## 6. Conclusion

Charter schools first appeared as an alternative to traditional public schools in the United States in 1991 and over the past 20 years this newly established institution has been both praised and criticized for its unconventional approach to traditional public education. Research has shown that high-performing public schools are attractive to community members and have an impact on the community's local well-being. Given that charter schools are public schools this paper aimed to analyze the impact that charter schools have on local economies by analyzing the relationship between charter schools and annual public charity spending and investment in the community. The impact that charter schools have on a local economies may be important to consider when choosing which education reform methods are and are not successful and/or desirable.

The methodology of this research consisted of first aggregating a set of panel data spanning the years 1998 to 2008, cleaning up and preparing the data set, developing the models I would use to analyze the data, and then finally analyzing and interpreting the results of my regression. Data from 465 counties across 34 states was collected and analyzed using a linear

fixed effects model. Variations of model (4.3) were considered in my analysis and my results and interpretations were based off of comparisons of the different models.

The results of model 4.3 indicate that in counties with a mean Hispanic population, a one unit increase in *cs* leads to an approximate increase of annual public charity expenses by 45.4 percent. In other words, as the number of charter schools increases in a community the more public charities invest in that community. The impact that charter schools have on local communities extends beyond the education sector, although the magnitude of their impact depends on the demographic make-up of the county.

These results do not imply that charter schools are indicative of economic development, but the results suggest that charter schools influence local economies. This paper has largely focused on the short-run direct economic impact of charter schools on local communities. More research on the long-run economic impact, analysis using alternative economic indicators and controlling for other variables appears to be necessary.

As public policy makers and educators make decisions about the education system in the United States it is important that they consider how academic institutions impact all areas of our society. When choosing the best way to educate our nation's youth it is not enough to look at which institutions produce the highest test scores. As Weis (2004) recalled, education is an extremely important sector of society that ultimately influences the quality of life in our communities. Therefore, it is just as important to analyze the role of the educational institutions in the community.

## Appendix

| Variables included in the value obtained from line 17 of IRS Form 990 | |
|---|---|
| Grants paid from donor advised funds | Equipment Rental and Maintenance |
| Other grants and allocations | Printing and publications |
| Specific assistance to individuals | Travel |
| Benefits paid to or for members | Conferences, conventions, and meetings |
| Compensation of current officers, directors, key employees, etc. | Interest |
| Compensation of former officers, directors, key employees, etc. | Depreciation, depletion, etc. |
| Other compensation | Payments to affiliates |
| Payroll taxes | Telephone |
| Professional fundraising fees | Postage and shipping |
| Accounting fees | Occupancy |
| Legal fees | Supplies |

Bibliography


Amundson, K. & Davis, R. (1999). *How Our Investment in Education Pays Off.* American Association of School Administrators.

*Annual Survey of America's Charter Schools*. Publication. Washington, DC: Center for Education Reform, 2010. Print.

Bennett, William J.. "20 Troubling Facts About American Education." *Heartlander*. N.p., 1999. Web. 2 Apr 2012. <http://news.heartland.org/newspaper-article/1999/10/01/20-troubling-facts-about-american-education>.

Christiana Stoddard, Sean P. Corcoran, The political economy of school choice: Support for charter schools across states and school districts, Journal of Urban Economics, Volume 62, Issue 1, July 2007, Pages 27-54, ISSN 0094-1190, 10.1016/j.jue.2006.08.006. <http://www.sciencedirect.com/science/article/pii/S0094119006000842>

"Charter Schools and Community Development: The Economic Impact of New Charter Schools." *CivicBuilders.org*. Civic Builders, n.d. Web. 22 Feb 2012.

"Charter School FAQ." Closing the Achievement Gap . PBS, 2004. Web. <www.pbs.org/closingtheachievementgap/faq.html>.

"Charter School Performance In 16 States." *credo.stanford.edu*. Center for Research on Education Outcomes at, 2009. Web. 14 Mar 2012. <http://credo.stanford.edu/reports/MULTIPLE_CHOICE_CREDO.pdf>.

"Common Core of Data (CCD)." *National Center for Education Statistics*. Institute of Education Sciences, n.d. Web. 23 Feb 2012. <http://nces.ed.gov/ccd/aboutCCD.asp>.

"Fast Facts." *National Center for Education Statistics (NCES) Home Page, a Part of the U.S. Department of Education*. Web. 23 Feb. 2012. <http://nces.ed.gov/fastfacts/display.asp?id=30>.

"FAQs: 990." *GuideStar*. GuideStar USA, Inc., 2012. Web. 23 Feb 2012. <www2.guidstar.org/rxg/help/faqs/form-990/index.aspx

Finn, Chester E., Jr. *Charter school in action: renewing public education*. Princeton: Princeton University Press, 2000. Print.

Frankenbert, Erica, Genevieve Siegel-Hawley, and Jia Wang. "Choice without equity: Charter school segregation." *Education Policy Analysis Archives*. 19.1 (2011): n. page. Print. <http://epaa.asu.edu/ojs/article/view/779>.

Halsband, Robin. "Charter Schools Benefit Community Economic Development." *Journal of Housing and Community Development*. (2003): 34-38. Print.

Holme, Jennifer Jellison. "Buying Homes, Buying Schools: School Choice and the Social COnstruction of School Quality." *Harvard Eductaional Review*. 72.2 (2002): 177-205. Web. 23 Feb. 2012.

Horowitz, John, Stanley Keil, and Lee Spector. "Do Charter Schools Affect Propert Values?." *Ball State University Education Redefined*. Ball State University, 20 Aug 2008. Web.

"Legislation." *Public Schools of North Carolina Office of Charter Schools*. State Board of Education. Web. <http://www.ncpublicschools.org/charterschools/policy/legislation/>.

Lubienski, C. A., and P. C. Weitzel. *The charter school experiment, expectations, evidence, and implications*. Cambridge, MA: Harvard Education Pr, 2010. Print.

Miller, Jr., Clenn H. Federal Reserve Bank of Kansas. Federal Reserve. *Demographic Influences on Household Growth and Housing Activity*. 1988. Web.

Murphy, Joseph. *Understanding and assessing the charter school movement*. New York: Teachers College Press, 2002. Print.

"NCCS Data Guide." *NCCS National Center for Charitable Statistics*. National Center for Charitable Statistics, 2006. Web. 22 Feb 2012. <http://nccs.urban.org/database/index.cfm>.

"Population Estimates Methodology." *U.S. Census Bureau*. U.S. Census Bureau, 21 Dec 2011. Web. <www.census.gov/popest/methodology/index.html>.

"Research." *Center for Education Reform*. Center for Education Reform, 2010. Web. 21 Feb 2012. <http://www.sde.idaho.gov/site/charter_schools/research/Research/CER Charter Survey 2010.pdf>.

"Return of Organization Exempt From Income Tax." IRS, 2006. Web.<www.unclefed.com/IRS-FOrms/2006/f990.pdf>.

Saporito, Salvatore, and Annette Lareau. "School Selection as a Process: The Multiple Dimensions of Race in Framing Educational Choice." *Social Problems*. 46.3 (1999): 418. Print.

Smith, Joanna, Priscilla Wohlstetter, Caitlin C. Farrell, and Michelle B. Nayfack. "Beyond Ideological Warfare: The Maturation of Research on Charter Schools." *Journal of School Choice*. 5. (2011): 444-507. Web.

Weiss, Johnathan D. "Public Schools and Economic Development What the Research Shows." *Knowledge Works Foundation*. (2004): n. page. Print.

Wikipedia contributors. "Community organization." *Wikipedia, The Free Encyclopedia*. Wikipedia, The Free Encyclopedia, 21 Feb. 2012. Web. 13 Mar. 2012.

Yaffee, Robbert. *A Primer for Panel Data Analysis*. Publication. 2003 ed. New York: New York University Information Technology Services, 2003. Print.

# ACADEMIC VITA LINDSAY A. EISENHUT

**Current address:**
520 E. Calder Way Apt. 409
State College, PA 16801
C: (607) 351-6238

**Permanent address:**
15 Dandyview Heights
Lansing, NY 14882
LAE161@gmail.com

## EDUCATION

Expected May 2012 — **Pennsylvania State University, Schreyer Honors College**, University Park, PA
*Bachelor of Science in Mathematics: Systems Analysis Option in Economics*
*Awards/Honors*: Evan Johnson Memorial Scholarship in Mathematics, Presidential Leadership Academy and Schreyer Honors College Summer Grants, Freshman President's Award, Women in Science and Engineering Research (WISER) Scholarship, Nancy Colfelt Scholarship

## EXPERIENCE

June – August 2011 — **American Enterprise Institute for Public Policy Research**, Washington, DC
*Research Intern, Monetary Policy and Social Security, Office of Vincent Reinhart*

- Helped prepare for conferences, seminars and hearings, including a Congressional hearing on Social Security's finance for the Ways and Means Subcommittee on Social Security
- Aggregated data sets for various research projects, including working papers and articles about social security, financial repression and public sector compensation
- Coauthored op-eds for The Enterprise Blog: *Bernanke's Monetary Policy Report, A Tale of Two Debt Ratings*, *Are States' Budget Surpluses Sustainable?*

January – June 2011 — **iSPACES**, Tumaini University, Makumira, Tanzania
*Humanitarian Engineering and Social Entrepreneurship (HESE) student*

- Interviewed and documented members of indigenous communities about traditional medicine, food security, innovation, and their perspectives on leadership
- Engaged Tumaini University students in Milking the Rhino, an international film competition
- Developed a four part indigenous knowledge video series

September 2009 — **Presidential Leadership Academy**, Pennsylvania State University

- Selected as one of thirty students for the inaugural class of the Presidential Leadership Academy where students developed critical thinking skills through organizational visits and activities, which included trips to the Bank of New York Mellon, CIA and FBI headquarters
- Researched, wrote, and presented a policy proposal to address high-risk college student drinking at Penn State and within the borough of State College

May – August 2009 — **Prendismo**, Ithaca, NY
*Digital Media Intern*

- Independently managed the creation and production of mini-videos for digital media company whose library contains over 13,000 video clips on business, leadership and entrepreneurship
- Researched viewership data of websites and products such as Forbes.com, FoxBusiness.com

December 2008 – December 2009 — **Tremin Project**, Pennsylvania State University
*Student Research Assistant*

- Contributed, as one of seven researchers, to the final stages of the Tremin Research Program on women's reproductive health, which began in 1934
- Entered and organized statistical data from annual surveys sent to the program's participants

## SKILLS

Language: Proficient in French
Technical: C++, STATA and basic video editing