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Education Finance as a Social Determinant of Health in the United States

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The purpose of this thesis is to investigate the role of K-12 education finance in the determination of health outcomes in the United States. To accomplish this, first, the differing theoretical perspectives surrounding health outcomes are explored. Second, theoretical literature surrounding public finance of education and cash vs in-kind benefits are explored to establish the grounds for connecting education finance and health. Third, a framework is presented to trace the pathways of how education finance determines health outcomes. Finally, the manuscript brings together a review of the literature on similar benefits and an evaluation of a voucher program in Cleveland, Ohio in order to compare voucher and traditional funding mechanisms in relation to the health pathway framework. Ultimately, this thesis concludes that education finance is a social determinant of health and voucher programs have not been shown to positively impact health outcomes when compared to traditionally funded public education.

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Introduction

Education, a human right, has long been considered as one of the social determinants of health. Education is critically important for human and economic development, as well as for well-functioning societies (WHO, 2011). While the role of education as a social determinant of health has been investigated rigorously, there is a lack of emphasis in the literature specifically looking at *education finance* as a social determinant of health. Financing and funding are critical components of producing quality education and, in return, positive health outcomes, thus considering specifically financing of education deepens our understandings of how education and health are intertwined.

The present study is also relevant for the ongoing current debate within the United States political system between advocates of 'school choice' and those who support the traditionally funded public education system. Advocates of school choice push for the privatization of education through programs like charter schools and voucher systems. Voucher systems, in most cases, use public funding to pay for students to attend private schools that otherwise could not, or provide tax breaks to those paying for their students' private education (Strauss, 2022). If education finance is an important determinant of health, then the impact on health outcomes needs to be considered in the debate of privatizing education in the United States.

To explore the relationship between education finance and health, one should identify specific pathways to health outcomes. Chapters one and two provide the foundations of identifying these pathways by presenting relevant theories of health, education, and public finance, as well as empirical evidence to see how those theories work in reality. Chapter three then identifies and presents specific pathways adapted from the World Health Organization's work on education as a social determinant of health. After identifying these pathways, a discussion of how voucher programs may change these pathways given the roles of class, race, and gender follows. Finally, the current study displays differences in health outcomes between the two types of education financing based on a review of the research on the topic with empirical evidence regarding benefit type and efficiency in addition to a review of the case of Cleveland Scholarship Program, a metropolitan voucher program in the United States.

This analysis allows the following research questions to be answered. How is education finance a social determinant of health? What are the pathways that allow education finance to impact health? Do voucher programs impact these pathways to health outcomes, and in what ways? What does the intersection of education finance and health say about the debate around spreading voucher programs in the United States?

Chapter One: Perspectives on Health Outcomes and Determinants of Health

Perspectives on determination of health: Neoclassical Theory

The definition of health, and definitions of concepts in general, are dependent on the context in which they are being discussed. Context specific definitions allow for different perspectives and conclusions when discussing most, if not all, concepts, and health, and what determines health, are no exception. Health is generally defined as, "a state of physical, mental, and social well-being and the absence of disease or other abnormal conditions" (Santerre & Neun, 2010). However, when looked at through different theoretical lenses this definition tends to change. The definition of health in Neoclassical economic theory is rooted in the work of Michael Grossman, an American health economist. Grossman's 1972 publication, "On the Concept of Health Capital and Health Demand," laid the foundation for health, or rather 'good health' to be considered a commodity that is demanded, rather than a state of being, as it is generally defined.

Grossmans model of the demand for the commodity of good health, relies on how neoclassical economics defines the individual and the world the individual exists in. Within neoclassical theory, human beings are defined as rational individuals who are governed by seeking pleasures and avoiding pains[1].

[1] This concept stems from Jeremy Bentham's book, "An Introduction to the Principles of Morals and Legislation," that introduces the principle of 'utility'. Utility is defined by Bentham as, "that principle which approves or disproves of every action whatsoever, according to the tendency it appears to have to augment or diminish the happiness of the party whose interest is in question." (Bentham, 1789) In other words, utility (pleasure) and disutility (pain) are what control the actions and decisions of human beings as they are ration individuals seeking to maximize their pleasure and minimize their pain.

Grossman's model also relies upon another theoretical concept that is emphasized by neoclassical theory. Human capital is often generally defined as the skills and abilities of individuals or groups of individuals. Skills include things like how well one can produce some good, or how efficiently one can communicate what needs to be accomplished. Abilities may include whether someone is able-bodied or otherwise capable of performing the task at hand. Gary Becker (1962) contributed greatly to human capital theory and highlights that, investments can be made to increase one's individual human capital, or even human capital of groups. Such investments take the shape of any activity that serves to influence the future monetary or psychic earnings of the individual or group. The activities do this by increasing the resources available or within individuals or groups (Becker, 1962). A common example of investment in human capital is receiving education. Education can be considered a production process where time, materials (textbooks, notebooks, pens, etc.), classrooms and so on are considered inputs that shape students to produce graduates who go on to the workforce ready to sell their labor which includes the skill sets they have picked up from their education. Here it would be expected that someone who has had no education, or in other words, not invested in their human capital through education, would receive less income than someone who had invested this way.

Given this understanding of human-beings and human capital, Grossman, and thus neoclassical economics, define good health as a form of capital. As human beings are rational utility seeking individuals, it follows that they will make choices that positively impact their health capital, such as receiving medical care, eating healthy food, exercising, and living in a safe environment. Thus, Grossman's model implies that health

is a function of rational choices and behaviors made by individuals. This is not the whole story, however, as Grossman argues that individuals inherit an initial amount of health when they are born, that he calls the initial stock of health. This stock of health is assumed to depreciate with age and at an increasing rate and is not necessarily the same for every individual. Grossman states that death occurs when one's health stock falls below a certain level, thus someone born in a first world country may have a higher initial health stock, than someone born in a third world country, and thus, even if their stocks depreciate at the exact same rate and they make the exact same choices, the one born in the third world country has a shorter life expectancy as their initial stock will run out first.

Determining the degree that someone makes health choices or not relies on how much value one puts on their life in the present versus their life in the future. For example, those who engage in unhealthy activities, such as smoking, would be considered people who put less value on their life in the future than in the present. The key idea in neoclassical theory here is that all of these factors are individual *choices,* the worker chooses what tools to use, just as one chooses how to treat their body, therefore impacting their health stock.

What drives the choices of good health in this model is what is referred to as the demand for good health. Grossman suggests that health is demanded for two different reasons. First, health is demanded for consumption purposes to gain utility, in other words that when one is healthy it is a source of utility, as opposed to when one is sick it is a source of disutility. Thus, we want to be healthy because it is a source of pleasure, while we do not want to be sick as it is a source of pain. Second, health is demanded for

investment purposes, meaning that as the number of healthy days go up one can work more and earn more income. If you are sick and cannot work you will not make money, so the return on investing in one's health is the time one is able to work, and thus compensated monetarily (Grossman, 1972).

Based on Grossman's model, and the understanding that good health is demanded because it produces utility and potential income, neoclassical economics illustrates how individual health is determined through the health production function. This function represents the maximum amount of health one can generate based on different factors over a given time. More specifically, in the short run, health (H) is a function of profile, meaning an individual's mental, social, and physical make up, the state of medical technology, environmental factors, socioeconomic status, lifestyle choices, and amount of medical care consumed. These inputs are ordered by the degree of choice the individual has over that input, from least choice to most choice. The focus of what determines health in neoclassical economics often emphasizes the latter inputs by treating them individual "choices" and responsibilities. This is a critical component of how health and its determinants are conceptualized in neoclassical theory. Lifestyle choices and consumption of medical care are often pointed to for why an individual is in the state of health they are. For example, if someone is overweight, one explanation for why may be that overweight person does not eat healthy and exercise enough. James W Henderson summaries this perspective well in his book, *Health Economics and Policy* stating,

> "Regardless of level of income and education, health status depends to a large degree on personal behavior…insufficient evidence prevents the determination of whether we are actually witnessing a link between socioeconomic status and health, lifestyle behavior and health, or possibly socioeconomic status and lifestyle behavior, or all three" (Henderson 2015, page 175).

Neoclassical theory fails to recognize or consider the importance of the social context that the individual exists within, which includes critical socioeconomic factors such as income, education, and environment.

Perspectives on the determination of health: Social Determinants of Health

In comparison with neoclassical theory, public health perspective provides different answers for the questions related to what health is and how the health of individuals is determined. Braveman and Woolf (2011) suggest that health is determined by biological, social, political, and economic conditions. The risk factors that are included in these different conditions are often categorized into two types of determinants referred to as 'upstream' and 'downstream' determinants. Upstream determinants consider the social conditions that individuals exist within and often have little to no control over. Examples of these upstream determinants are access to personal resources, such as how much income someone has or what type and quality of education they receive, as well as the social environment in which they live, work, study, and interact with others in. These upstream determinants are important for understanding what determines an individual's health as they create conditions or boundaries for a person's level of exposure to different risks and access to resources such as clean water, healthy foods, and medical care. Exposure to risk and access to and use of different resources are referred to as 'downstream' determinants due to the upstream factors often shaping what they look like. For example, if an individual makes a minimum wage their income may be relatively low and sets a budget constraint for what kind and how much food they can buy for themselves, thus their access to healthy foods is limited. Someone who makes over minimum wage will have less of a constraint and relatively greater access to healthy

foods even if they live in the exact same neighborhood as the first individual. As this example illustrates, when using a social determinants lens, the individual is considered in a social context, contrasting from the neoclassical view of an individual and what determines their health. Factors like gender, race and ethnicity, income, education level and access, and environmental conditions are considered as they impact the health of an individual. The connection between income and health can be considered as an example of one social determinant. Braveman and Woolf (2011, page 1853) found that "US adults living in poverty are more than five times as likely to report being in fair or poor health as adults with incomes at least four times the amount federal poverty level." This illustrates that health status improves with income and vice versa. While neoclassical theory would argue that both types of individuals, impoverished and not, will choose to consume the amount of health that is rational for each of them, a social determinants perspective argues that individuals do not have control over their health because they have structural constraints and limits place against them, in this case income level.

Armed with this understanding up and down stream determinants, we can zoom out and illustrate the broader context of a social determinants of health perspective. Ultimately, this perspective starts with the understanding that all individuals exist within the greater social context that encompasses different factors of the social system, including structure, culture and function. Within this context, individuals are organized into a sort of hierarchy based on socioeconomic factors. This is referred to as social stratification. Each individual has their place within the hierarchy, referred to as their social position. Social context, social stratification, and social position serve as the basis for the determination of health outcomes and disparities (Diderichsen et al. 2001).

Factors like level of education, occupation and income are indicative of one's social position, while community (rural vs urban), work environment and social and economic policies are factors of social context. The distinction of social position and social context is helpful when considering upstream and downstream determinants of health, as upstream determinants are essentially synonymous with one's social context and while downstream determinants and one's social position compare similarly. The interactions of factors between and within social position and social context produce different health outcomes for different individuals. The relationship between social position and social context can be thought of as, "[s]ocial positions are derived from, or generated by a particular social context," (Diderichsen et al, 2001) indicating that there is a lack of individual control, as social context appears on a societal level, over the factors that influence an individual's health.

In addition to this basis, individuals have different experiences with how the pathways to health outcomes affect them. Two concepts, differential exposure and differential vulnerability (Diderichsen et al., 2001) can be considered to explain these different experiences. Differential exposure refers to fact that people encounter different health risks as a result of their social position within the social stratification. One's social class, race/ethnicity, and/or gender, will cause one to be exposed to different risks. For example, someone living in a wealthy neighborhood will likely have less exposure to environmental risks, like pollution and crime, than someone living in a poor neighborhood. Differential vulnerability refers to the fact that if two people in different social positions on the social hierarchy ladder are exposed to the same health risk, their

vulnerability to the risk would still be different, likely that the person lower on the ladder would be impacted more.

Individuals also have different experiences when it comes to how ill health impacts their lives. This is referred to as differential consequences of ill health (Diderichsen et al. 2001). If one gets into an accident or develops a chronic disease, their social position within the social stratification and social context matters for how it is going to impact them. For example, if one person gets sick and uses all of their paid time off of work but still is too sick to go back to work, they go without pay. Someone with a high socioeconomic status will be less affected by this loss of pay than someone with a low socioeconomic status. As this illustrates, wealthier individuals will be better off when dealing with the consequences of negative health, while less wealthy and poor individuals will be worse off.

Education[2]

Education is a key component of social determinants of health and the WHO recognized its importance and identified pathways of how education impacts health and vice versa, in the publication, *Education: Shared Interests in Well-Being and Development (WHO, 2011).* While this thesis focuses on the United States in particular, the publication takes a global perspective. The publication provides key insight that can be adapted to a United States context, and therefore the discrepancy between global and national does not provide a conflict of interest.

[2] We will be primarily concerned with public education here and in the rest of the thesis.

It is critical to put education and health outcomes in conversation with each other because they have a mutually reinforcing relationship. Unhealthy learners are associated with low educational attainment, and low educational attainment with negative health outcomes. However, the pathways that create these associations are far more complex than this simple feedback loop. To understand these pathways, the question must be asked, "How does education affect health status?".

Depending on the framework this question is posed under, different conclusions can be drawn. Looking at the question under a social determinants of health perspective, where what matters is society and the hierarchy within society will produce very different answers than looking at the question under a neoclassical economic perspective where the individuals' preferences and the place of education within the health production function matter.

Starting with the social determinants of health perspective the connection between education and health ultimately relies upon a person's social position. For example, public education is governed by local, state, and federal level policies in the U.S.A. It is compulsory for children but up to what age varies by state, ranging from 14 to 18 years old. Although public education kindergarten through 12th grade is free, the major source of public education financing relies on local property taxes. As a result, the way public education is financed in the U.S.A. plays a potential role the relationship between health and education. For example, locations with less property tax revenues (e.g., rural settings and poor neighborhoods of metropolitan areas) would have less resources to finance public education. This, in turn, would exacerbate those children and their families' place

in the social hierarchy ladder by diminishing potential positive impact of education on health.

As a result, for example, individuals with the same years of public education may be exposed to different health risks and/or even if they are exposed to the same risks their vulnerability may differ. In other words, it is not only the length of years of public education but also its quality would matter in terms of its relationship with health. School resources determine the degree of teacher stress, levels of childhood nutrition and the availability of health intervention tools for students. The degree of teacher stress is a key factor in the quality of education provided which impacts one's years of education. When schools are able to provide healthy meals to students, their nutrition levels benefit. And when schools are given the resources to provide health interventions such as eye and hearing tests, students can be given the help they need, eliminating obstacles of them pursuing more education, as well as possibly preventing chronic disease (WHO, 2011).

A large body of empirical work documents the connection between health and education in a variety of ways. One example is empirical work that looks at the relationship between life expectancy and years of education. Lleras-Muney (2005) finds that there is a large positive correlation between education and health, specifically that education attainment has a casual impact on mortality rates. Here, a social determinants of health perspective would explain this by pointing to school quality factors that allow and support students to continue their education.

In general, more years of education are associated with increased productive activity and therefore economic stability, which increases life expectancy, improves quality of life, and decreases stress. For women, improved access to education is

associated with a decrease in rates of infant mortality (WHO, 2011). key factor in this is the increase in productive activity. This means that people who have more years of education not only contribute more productively but often have the ability to choose jobs that are less dangerous, architect instead of construction worker for example, which decreases their risk of injury and chronic disease.

According to neoclassical perspective, the same question, "How does education affect health status?" is answered by considering the health production function. The health production function explains how much health a person can produce given a set of inputs over a given period. Through this, health is a function of medica care, technology, profile, lifestyle, socioeconomic status, and environment. Education fits under the socioeconomic status variable in this function (Santerre & Neun, 2010). Education therefore is connected to health through its ability to impact a person's socioeconomic status, for example, learning the skills required for high paying jobs in school would help someone increase their socioeconomic status. Under this neoclassical perspective, individuals have the ability to make different choices to change the inputs of the function. An example of this would be that if someone was going to a school where they were not learning the skills required for a high paying job, they could simply choose to go somewhere else. Ultimately, the individual is responsible for their health as they make the choice that impacts it, including choosing their education.

However, the K-12 education system in the United States is not a system of choice for most people, it is determined by the residence of an individual and resources available in that locality (e.g., property taxes). From the social determinants of health perspective, this would create the social context in which education takes place and play

a role in terms of health. Neoclassical theory takes these circumstances as given (e.g., existing endowments). As pointed out above, this residence-based education system relies on funding from property taxes. Thus, schools and their districts will reflect the socioeconomic status in which they reside. Children living in low-income areas will have the 'choice' to go to low-income schools as children in high-income areas will have the 'choice' to go to high income schools.

This consideration of how the K-12 education system in the United States is funded and its impact on the health of children raises the question of if a different way of financing education can change the health outcome predictions given by a social determinants of health perspective.

Chapter 2: Education Finance in the United States

A Brief History of Public Education Finance in the United States

Public education has served multiple roles throughout the history of the United States. Before what would be referred to as public schooling, education opportunities were limited for many children. Children were excluded from traditional education for a variety of factors including, but not limited to, race, income, gender, and where they lived geographically. The general demographic makeup of the children who did receive education were wealthy white children. For these children schooling did not look as uniform as it tends to be today. There was wide variability in where/how schooling occurred. There were church supported schools, schools organized by groups of parents or by the town, charity schools for poor children, boarding schools, private tutoring and home schooling, tuition-based schools organized by traveling schoolmasters, 'Dame schools' run by women out of their homes, and work apprenticeships that touched on subjects like reading, writing and arithmetic. To summarize, the formal organized schooling system that we see today did not exist, and access to elementary education varied greatly depending on a child's place in society.

The lack of a formal system for funding education led to great variation in how these schools were financed. Depending on the school, it may have been reliant on tuition payments from parents, charitable contributions, property taxes (similar to how the

current system is funded), fuel contributions, and possibly state support. Around the 1780s some towns in the Northeast organized systems that allowed local schools to be tuition free, funded by the town residents, however this was far from the norm at the time. The picture looked much different outside of the Northeast. Schooling in the South mainly consisted of tuition based and/or parent organized schools. Outside of cities in the rural South, if there was a school at all, it was often difficult to get to, lacked resources, and was overcrowded. No state in the South where education was compulsory or completely supported by taxes (Kober, 2020).

After the American Revolution, early leaders of the nation understood that American democracy was dependent on the competency of its citizens. To ensure an educated population, schooling needed to take a more systemic approach. Thomas Jefferson, John Adams, and other early leaders encouraged and proposed a uniform and formal system for publicly funded schooling. Northeastern communities had already adopted and established small scale versions of this by the late 1780s, however expansion of the concept of free public education lagged some 50 years after.

While the brunt of the responsibly of schooling fell on local and state governments, the federal government supported the efforts to create a formal and organized system by passing ordinances in 1785 and 1787 that gave federal land to new states entering the union with the agreement that states would set aside some of the land specifically for schools.

The concept of ‘common schools’ emerged in the 1830s when Horace Mann, at the time Massachusetts’s secretary of education, and others advocated that all children should be able to receive a state funded education, free of charge. This concept rested on

the external benefits to the nation; public investment in education would lead to more literal, moral and most of all productive citizens. Key to this proposition was the education of poor and middle-class children. Free public education would help them find good jobs, strengthening the economic position of the nation. Universal education was seen as a way to eliminate poverty (as the narrative of the American Dream expresses), as well as crime and other social problems. Advocates argued that the cost of educating children would be substantially less than the cost of dealing with criminals, highlighting the role that education serves in a capitalist society (Kober, 2020).

The spread of public schools looked different across the nation. Public schools were more likely to be found in cities than in rural areas and much more common in the Northeast than other parts of the country. Access to these schools took longer to obtain for students of color, girls, and children with disabilities or special needs than their counterparts – white boys. Between 1830 and 1870 enrollment in public elementary schools for children between the ages of 5 and 14 increased by 23%, where in 1870 about 78% of children were enrolled (Neem, 2018). By 1880, about 10 million pupils were enrolled in public elementary and secondary schools. During the hundred years that followed, enrollment grew to 41.5 million, most rapidly increasing from 1910 to 1930 (England, 1985).

It is important to note that the spread of high school attendance and completion lagged the spread of public elementary schooling. High school completion rates in the early 1900s hovered just under 15%. This rate grew slowly throughout the century, reaching 55% in 1970. Within the last decade (2010-2020) rates have increased to 90% (Kober, 2020).

With this rapid growth in enrollment came changes in how public schooling is financed. The federal government played essentially no role in funding public schools before WWII, making up about less than 2% of public elementary and secondary school funding. This figure increased to about 10% but the 1970s. State governments played a bigger role in funding public education, however over the course of the 20th century, funding amounts fluctuated, covering less than 20% of costs at the minimum and just above 45% at the maximum (England, 1985).

These funding changes illustrate a shift away from complete reliance on local property taxation and other forms of local funding, toward greater state and federal government support. State and federal funding relies on more centralized forms of taxation such as income and sales tax, rather than property tax.

Understanding the history of public education and public education finance provides the tools needed to explore microeconomic theory and public finance literature as it relates to education.

Education as a Public Good with Positive Externalities

To analyze the education system from an economic perspective one must first understand the concept of public good. For a good to be considered a public good two criteria need to be met. By definition, a pure public good is a good that is neither rival nor excludable. A good is considered rival when one's consumption or use of the good impacts other's opportunity to consume the good. For example, if I buy pizza for lunch and eat it, in no way can you consume that pizza. A good is considered excludable when one's consumption or use of the good can be denied. For this example, the pizza place could have simply denied selling me pizza since I do not have enough money to purchase

and thus pizza is excludable. Because pizza is rival and excludable it is a private good. An example of a pure public good is a streetlight. My consumption of the light provided by a streetlight does not impact your ability to consume the same thing, and I cannot be excluded from using the light provided by it. Because a streetlight is a pure public good, a nation's government has incentive to provide streetlights.

Education does not meet these criteria to be considered a pure public good. Education is a rival good when it can be privately purchased or not financed by public resources, meaning that my purchase of a seat at a private school, takes away your opportunity to purchase that same seat. If education is strictly not a pure public good, why is it treated like one? The justification for public involvement in K-12 education can be explained by the idea that there are positive externalities to both civic and economic sectors that public education provides that justify government involvement (Ulbrich, 2011).

Another way of looking at why education is treated as a public good is to look at an alternative definition of public goods. A different perspective of public goods is that they are goods usually produced by the public sector to meet identified societal needs by collective choice and shared costs (Sekera, 2019). Under this perspective, there is no need to justify government provision of education as it meets the criteria to be a public good. But being designated "to meet identified societal needs" and being "produced by collective choice and shared costs" would be sufficient to identify public goods. However, even under the previous definition, government intervention still has grounds to stand upon.

There are numerous benefits of government involvement in the provisions of education that can be identified. One benefit of this is an educated public. A democratic society can only function if the population within it is educated on their civic duties, is able to locate, absorb and interpret information, understands how the political process works and knows how to participate in civic affairs. What comes out of this educated population is a benefit to everyone as the government is more responsive and held accountable on all levels (Ulbrich, 2011). Another benefit that comes out of an educated public are informed citizens, specifically through learning to be literate. Literacy is an important part of informed voting; thus, the public sector has a stake in educating its population for the sake of the democratic process. Education also may make citizens more informed about the voting process and thus more active voters. The societal benefit that stems from this is an improved quality of the democratic process as more people participate. Another benefit of an educated population is increase in productivity. When populations are more educated, their productive capacities increase as a result of high specialization of workers and knowledge spillovers from educated coworkers. Higher educated people often receive higher wages and thus pay more taxes, resulting in greater amounts of tax collection that governments and societies can benefit from in terms of increases to the standard of living (Gruber, 2016).

Increasing productivity is not only a benefit to society but also a benefit to the marketplace. There are several other benefits to the marketplace that come out of having an educated public. With technological advancement in the economy comes an increase in the basic skills needed for entry level jobs. Deeper levels of skills like reading, math, writing, and analysis become needed at every level of the job market, and thus public

education is critical in ensuring a job force that is equipped with the skills needed for jobs.

It is not only important to have educated workers, but also educated consumers. Informed consumers are the backbone of mainstream economic theory, as it is assumed that information is available and utilized. Consumers are thought to be rational in their actions and expectations and thus mold the marketplace to ensure good matches between consumers and their products, and workers and their employers. To achieve these processes, individuals must have access to the information that allows them to be rational consumers, thus needing some form of formal education (Ulbrich, 2011).

While government intervention in K-12 education is mostly justified through the outcome of an educated population, there are other benefits that arise outside of this theme. Redistribution as a result of education is an example of this. If education functioned like a normal good, for which demand rises with income, higher income families would have a higher demand for education and thus provide more education for their children than low-income families could. This would limit income mobility as the children of higher income families would likely to stay high income, and low-income children low income because higher education is often associated with higher incomes. High income mobility is generally a goal of most democratic societies thus governments have the incentive to provide public education to avoid limiting income mobility (Gruber, 2016). Another benefit outside of an educated public is exposure to diversity. Exposure to diversity is an important benefit that comes out of public education as it can lead to the recognition and acceptance of differences between people in terms of values, cultures, attitudes, and practices. Exposure to diversity within public school systems from a young

age can contribute significantly to understanding and accepting diversity consequently reducing social tensions and conflicts (Ulbrich, 2011).

All these benefits in discussion are what we consider positive externalities of education. A positive externality occurs when the production or consumption of a good or service benefits a party or parties outside of the market transaction. The benefits of K-12 education that have been identified fall into this category as the public benefits collectively from each member being educated.

While public goods with positive externalities produce benefits to society, markets fail in providing such goods with externalities according to neoclassical thought that considers only private goods with no externalities (positive or negative) for markets to work efficiently. According to this theory, if resources (including goods but not public goods, only private ones with no externality) are allocated efficiently among the members of the society, then it would be impossible to make one person better off without making another worse off. This is also known as the Pareto optimality condition which cannot work if public goods and/or externalities exist. When externalities and public goods are present, as they are in reality, a Pareto efficient allocation is not guaranteed (Varian, 2014). The presence of both results in market failure and inefficient results because the price and benefits are not individualized. Instead, they are paid and received by others in society. Public education as a public good with positive externalities in the United States, therefore, is an example of a market failure under this definition since private markets fail to provide such goods whose price and benefits cannot be individualized. In the case of market failures, involvement of social and legal institutions to replicate

market forces may be justified for the purpose of achieving Pareto efficiency (Varian, 2014).

It is important to note that t externalities are defined from an individualistic perspective according to neoclassical thought and this is criticized by non-mainstream approaches in economics. The following quotation reveals the fundamental logical flaw in defining externalities from an individualistic perspective without considering society at all in neoclassical theory: “Unless people in modern societies are completely homogenous self-serving robots responding only to price and cost, practically any deviant social behavior results in an externality” (D’Arge & Hunt, 1971, page 275). The interconnectedness of society through externalities, which may arise in all cases of production and consumption, is ignored by the narrow interpretation of externalities in neoclassical thought. Consideration of this interconnectedness may result in a very different conclusion about how market failures resulting from externalities should be dealt with.

The understanding of this problem of a market failure and the appropriate solution varies vastly between neoclassical thought and public finance literature. For example, regarding the financing of education, some in the neoclassical public finance literature recognize that there is a credit market failure when it comes to education in the United States and this failure also justifies why government is involved in provision and financing of (public) education (Gruber, 2016). While the United States government does play this role in the case of higher education, providing student loans to finance college, at the elementary and secondary levels the government only provides a fixed level of publicly funded education, leaving potential productivity gains on the table. Governments

are hesitant to provide loans for elementary and secondary education as parents may fail to choose the appropriate levels of education for their children. Even if private education were funded through government loans, some costs would still fall on parents, whether that be interest payments or covering the costs not covered by the loans. In this case parents may value their own consumption over their children's education, thus harming children by denying them the opportunity to receive the appropriate level and quality of education. Because of this possibility, the public provision of education is a better alternative (Gruber, 2016).

On the other hand, some neoclassical economists consider privatization as the solutio rather than government involvement, for market failure in case of (public) education. Followers of this thought believe that privatization of education may enhance efficiency for several reasons (Greene et al, 1999). The first is that privatization leads to competition among providers (schools) which may reduce costs and improve the quality of services. The second is that if consumers have the opportunity to choose from an array of options, their service may more closely match that of their preferences. Lastly, private producers may be able to take input from the consumer in the coproduction of services, thus increasing the quality and effectiveness of such a service. Based on these outcomes of privatization, neoclassical economists advocate for school choice, so that school systems function like a market and, therefore, become more efficient (Greene et al, 1999). This notion of school systems becoming more efficient rests on the idea that cash transfers (such as vouchers), are always superior to in-kind benefits (food stamps, Medicaid etc.) in terms of market outcomes (Thurow, 1974).

A voucher program with the goal to privatize education was first proposed by Friedman (1955) who argued that the gradual development of the education system allowed for the government to provide 'special treatment' to the industry of education. The special treatment referred to is that governmental bodies paid for and administered most education in the country. Friedman (1955, page 1) argued that this degree of government intervention was an "indiscriminate extension of governmental responsibility," or in other word that there was too much government involvement in education. This conclusion of Friedman's rests his idea that society's ultimate goal should be the freedom of individual and families realized by voluntary exchange between individuals. Freidman refers to this goal of the economic structure of society as a free private enterprise exchange economy, an economy where the government's role is to enforce the rules of the game using tools like contracts, prevent coercion, and to keep markets free. According to this thought, the only other times the government should intervene are in the cases of natural monopolies, extensive 'neighborhood effects,' and paternalistic concern for children and irresponsible individuals (Friedman, 1955). Natural monopolies make effective competition, what voluntary exchange relies upon, impossible and therefore the government has the responsibility to step in and protect the market. Neighborhood effects refer to the actions of an individual imposing costs or benefits on other individuals that the first individual cannot compensate, or vice versa. In the case of education, the neighborhood effects that Friedman describes mirror the positive externalities of literacy and public knowledge previously discussed. Thus, Friedman agrees that government intervention is justified in education, but only to establish a mandate for parents to provide a basic education for their kids that creates such effects.

Further government involvement in the provision of education only hurts the efficiency of the education market. The paternalistic concern is taking care of through referring to family units, rather than individual, however Freidman points out that no satisfactory answer can be given in this case as the line is blurry between action motivated by paternalistic concern and action that conflicts with freedom.

The grounds for government involvement in general education rest on a widespread acceptance of common values and minimum levels of literacy and knowledge. Because these factors result from education, and the benefits of educating a child are not limited to the child and parents themselves but rather to all other member of society, as educated citizens increase welfare overall by contributing to a stable democratic society, there are extensive 'neighborhood effects' associated, thus warranting government intervention. Education that trains kids for citizenship and leadership justify government subsidy, while education that is purely vocational does not. 'Neighborhood effects' do not justify government administration of education, only government enforcement of minimum education requirements and the financing of such. Here Freidman introduces the voucher, sums of money subsidized by the government, given to parent's to be spent on approved educational expenses. This effectively limits the role of the government to keeping schools in check with regards to minimum standards. Friedman refers to this as the 'denationalization' of education.

The denationalization of education would provide parents with a wider range of choice of where to educate their children, provide parents with a sort of bargaining power in that if they are unimpressed with a school, they can withdrawal their child and send them somewhere else, potentially reduce residence and class-based stratification, and

promote a healthy variety of schools working to increase competition. The result of these measures would not only decrease the direct activities of the government but widen the educational opportunities available to children. This would allow education to function within the private enterprise exchange economy which would speed up progress in the field as, Friedman says, it has done with so many other industries (Friedman, 1955).

Friedman's proposition of a voucher system rest entirely on a neoclassical view of efficiency and externalities. However, "If…the market and its many attendant economic, social and political institutions influence the entire fabric of our society, then the traditional handling of externalities in economics is completely inadequate" (D'Arge & Hunt, 1971, page 273). This quote illustrates the lack of consideration of context in neoclassical thought, as seen with the determination of health in the previous chapter. This failure of consideration opens the debate for if the privatization of education through a voucher system (cash transfers of benefits) or any neoclassical solution to market failures would actually provide the most efficient outcomes, even without a consideration of equity.

Cash vs In-Kind Benefits

Reinhardt (2001) provides the inspiration for why a discussion of benefit types is relevant for a thesis on education finance. Reinhardt's work, motivated by the work of Arrow (1963), which illustrates that the medical-care industry operates and the way it serves the needs of society are different than that of the typical way industries function. Thus, the welfare theorem that is the only solution to the efficiency-equity dilemma in neoclassical economics does not explain how provision and financing of medical care in the United States should work. The first theorem of optimality states that if there is a

competitive equilibrium and if all commodities, that matter to the utilities and dis-utilities of participates, are priced in the market, then the equilibrium is necessarily optimal or, in other words, that there is no other allocation of resources and services that will make everyone better off. The second theorem of optimality states that if there are no increasing returns to production and if 'certain other minor conditions are satisfied' then every optimal state is a competitive equilibrium that results from some initial distribution of purchasing power (Arrow 1963).

The works of Reinhardt and Arrow point to a division of opinion within the neoclassical school of those who rely strictly on the welfare theorem and thus push the use of cash benefits and those who understand the limitations of the welfare theorem and see a role for benefits in-kind. Like healthcare, education operates in a way different from the typical industry and thus is subject to Reinhardt's concerns about the use of welfare theorem in informing policy decisions about whether to provide benefits in cash as strict welfare followers would prefer or in-kind as those who understand the limitations would favor. Both parties believe that movement of society from an initial efficient point to an also efficient, publicly desired, new point is possible. However strict followers, like Friedman, believe that it is only possible through using cash transfers as they cannot distort economic behavior since they are not related to any behavioral factor , while there is disagreement from the other party that says the movement can occur through in-kind transfers of benefits. Friedman's argument for the use of vouchers in education rests on this idea that benefits can only be transfer in cash to reach the publicly desired optimal states.

Those who disagree point to the limitations of the welfare theorem. Thurow (1974) highlights the fact that theorem relies on the fact that individual utility functions are separate from each other. However, Thurow (974) argues that the only way both parties can be left better off is if the taxpayers utility function relies to some degree on the welfare recipients' utility function. For example, if taxes are collected from the wealthy that pay for the education of the poor, then crime rates may decrease in that area as a result of the poor having the education to pursue careers outside of crime. The welfare recipient's utility is maximized through an unrestricted cash transfer as they now have the cash, and they want to pursue what they need as a rational consumer. The taxpayer's utility is only maximized if the utility of the welfare recipient appears in their utility function – i.e., as the welfare recipient's utility is maximized, they turn away from a life of crime, crime rates drop, and the taxpayer's utility is maximized. The taxpayer's action to maximize their own utility is dependent on the elasticity of price and the elasticity of income. Transferring cash functions as an income effect, increasing the welfare recipient's income, and hoping that the welfare recipient's income elasticity of demand for education functions in a way that has them spend their cash on education. The use of a restricted grant functions as both an income and substitution effect, only allowing the welfare recipient to purchase education with the funds, meaning that the budget line changes slope, changing relative prices and price elasticity of demand. Because operating under price elasticity of demand is always cheaper than operating under income elasticity of demand, restricted transfers (grants) will always dominate unrestricted transfers in the case where utility is coming from a particular good (or service in the example case of education). Here Thurow points out the issue with the

Pareto Optimal approach where the rational taxpayer should only be concerned with the utility of the welfare recipient and specifying what the welfare recipient should use their transfer on is inherently irrational. Thus, the argument for restricted transfers for specific goods does not explain the actual behavior of rational consumers. To explain actual behaviors, Thurow discusses his take on the social welfare function. From an individualistic stance, the social welfare function will always lead to cash transfers as it deals with individual utilities. Thurow then points out that the individualistic social welfare function leaves out anything about individuals having different levels of preferences, and that there is a distinction between individual preferences forming a social welfare function and making social welfare a function of individual utilities. Thurow suggests that individual preferences can be categorized in two ways: individual-societal preferences, which encapsule the rules of the economic game and distribution of prizes; and private-personal preferences, which take into account the maximization of personal utility given the current economic game. Thurow explains this by stating that, "[t]here is nothing self-contradictory…in seeking to become extremely wealthy and powerful in our current economic game yet believing that a better economic game would be one where there were no 'extremely wealthy' prizes to be had" (Thurow, 1974, page 192). Under the individual- societal preferences fall things like the rights of man for which Thurow gives examples like the right to life and the right to vote. If man has the right to life, then the distribution of medical care should fall into the individual-societal preference category, something that economists thinking strictly about private personal utility would deny. From this, one would conclude that the right to education could follow the same lines. Some level of education is included in the rights of man, not

because it maximizes private personal utility but because it maximizes both the utility of the taxpayer and welfare recipient, as previously described. This implies that there are some types of goods and services that fall under the rights of man that need to be provided in the form of restricted transfers as to maximize everyone's utility.

The implications of the debate around benefits type reveal that a Pareto Optimal approach contradicts itself in saying that cash transfers (vouchers) are always the right (more efficient) approach to maximizing the utility of all parties. Examining the social welfare functions for certain goods, health and education, justifies restricted transfer to ensure that the utilities of all parties are maximized. Therefore, the voucher argument to provide choice in education contradicts itself.

Empirical Considerations: Education Inequality in the United States

There is an extensive body of literature dedicated to studying inequalities within and as a result of the education system in the United States. This section is meant to sample some of those works and demonstrate the inequalities that arise in terms of class, race, and gender.

O'Flaherty (2015, page 169) states that

"[e]ducation is valuable…holding income constant, people with more education are healthier, live longer, and may live better...educated people invent more, commit less crime, participate in civic affairs more and bring more to those affairs, and help educate children around them"

If education provides these societal benefits and is considered the great equalizer, then we should see a system that values equal opportunity to education for all people. O'Flaherty quickly displays that this is not the case within the United States education system by highlighting disparities in educational attainment and educational achievement

by race. Taken from O'Flaherty's chapter, *Figure 1* presents level of education by race in the United States. While 39.2 percent of White Americans completed a bachelor's degree or more, only 19.6 percent of Black Americans and 12.8 percent of Hispanic Americans did. *Figure 1* also displays that only 5.6 percent of White American's did not complete high school, while the rate for Black Americans is more than twice that of whites and the rate for Hispanics Americans is about 5 times that of whites. This disparity in educational achievement by race shows that the education system favors white people.

O'Flaherty's work is supported by an extensive body of literature. Significant differences in academic achievement exist between races, with white students performing better than their non-white peers. There is no single cause for these disparities, but no concrete evidence has been presented that characteristic associated with one's race impact cognitive abilities. Instead, environmental factors within schools, academic structures, and home lives, can explain some of the racial disparities that exist nationwide across the education system. The literature also shows similar disparities across genders that can be explained by the same factors noted earlier. (Bainbridge & Lasley II, 2002)

A 2010 article published in *Economics of Education Review*, entitled, "Education and the reproduction of economic inequality in the United States: an empirical investigation," investigates the relationship between family background and college completion and adult earnings, using data from the National Education Longitudinal Study. While this study focuses on college completion, it informs this discussion on inequality in K-12 education by illustrating what groups are more likely to attend college, thus what groups likely performed relativity better in K-12 schooling. Using econometric modeling, this study confirmed what virtually all other studies examining social class

Table 7.1. Educational attainment of 25–29-year-olds, March 2011, civilian noninstitutionalized population (percent).

	Less than high school diploma	Bachelor's degree or more
Non-Hispanic white	5.6	39.2
Male	6.6	35.5
Female	4.5	43.0
Black	12.3	19.6
Male	12.5	16.1
Female	12.3	22.9
Asian	4.7	56.1
Male	6.6	51.3
Female	3.3	60.7
Hispanic	28.5	12.8
Male	30.8	9.6
Female	25.7	16.8

Source: U.S. Census Bureau (2012a).

Figure 1:O'Flahrety (2015)

background and adult outcomes show; that social class background predicts adult outcomes. (Rumberger, 2010) With the assumption that this outcome explains who performs better in K-12, the conclusion can be drawn that the education system in the United States fosters an environment that is not one of equal opportunity, as Verstegen illustrated, but rather an environment that allows children from relativity wealthy families to prosper while children from relatively poor families are left behind. If the education system did foster an equal opportunity environment the results should show less disparity in college completion. It is important to note here that the cost of college may play a significant role in these disparities even if K-12 environments are equal, however based on the 1988 start date if the longitudinal study this factor likely does not explain a significant amount of the connection between family social class and adult outcomes as college costs were relatively low compared to current times.

To provide evidence of inequalities across gender in the United States, Long & Conger conducted an analysis of the degree of gender sorting across public and private school systems. The study relied on data from the Common Core of Data Public Elementary/ Secondary School Universe Survey, the Private School Universe Survey, and the Parent and Family Involvement in Education section of the National Household Education Survey. All data from these studies were from 2007-2008. Data included enrollment counts by grade and gender and parents' preferences when choosing schools. The goal of the study was to identify the amount of gender sorting that can be explained by non-random forces. To do this, Long & Conger found the standard deviation in male share of enrollment if students were randomly assigned to their schools by randomly allocated students to schools over 100 Monte Carlo simulations. Using the mean standard

deviation as a comparison tool, Long & Conger then computed 'residual sorting' but taking the difference between the true standard deviation and the mean standard deviation. This was conducted for each county in the United States, producing the actual level of gender sorting, the amount of gender sorting that would happen if the students were randomly assigned and the difference between the two. Results of this analysis demonstrated that the standard deviations for the actual distribution was greater than the standard deviation for the random distribution across all 100 trials and that nonrandom gender sorting is statistically significant for all grades at all conventional levels of significance (p=0%). In other words, the results showed that gender sorting across schools can be explained by non-random factors. When examining the role of school type results found that irregular public schools, schools dedicated to special education vocational, or other/alternative schools, tend to enroll the highest percentage of males, where private schools tend to enroll the lowest. Furthermore, the results of the study also showed that there are higher levels of gender sorting across counties that have more extensive school-choice options, especially in counties that have more private schools and irregular public schools. While this study and results do not address inequalities across academic achievement and outcomes, the results still provide critical information for the discussion of inequalities within and across schools. Long & Conger displays that there may be systemic explanations for gender inequalities in schools in the United States, as gender sorting cannot simply be explained by random chance. (Long and Conger, 2013)

With these example of education inequalities in mind, the next chapter will develop the connection between K-12 education in the United States, specifically

differences in funding between traditional public schools and voucher programs and health outcomes later in life.

Chapter 3: How Does Financing Education Get Under the Skin?

Up to this point we have explored the big picture framework within which health outcomes and education connect. Given this complex and board connection between health outcomes and education, I would like to understand better the role of financing education, specifically the role of cash vs in-kind benefits within the voucher debate. The remainder of this manuscript focuses specifically on this small piece of the big picture.

To understand the extent of which education financing impacts health outcomes, specific pathways that explain the connection between the two need to be identified. While the World Health Organization has identified pathways on how education impacts health outcomes broadly, explicit discussion about financing is lacking (WHO, 2011). This chapter works to provide specific discussion about the intersection of education financing and health outcomes by providing specific pathways, adapted from the work of the World Health Organization, that trace the impact of education funding on health outcomes in the United States.

Important Health Outcomes

For the purposes of understanding the intersection of education financing and specific health outcomes need to be identified that matter in the context. The health outcomes identified have been adapted from the 2011 World Health Organization report, entitled "*Education: shared interests in well-being and development*." The relevant health

outcomes in the context of education financing are life expectancy, child mortality, abuse, stress, injury, chronic disease, and quality of life. Broadly, these outcomes can be classified in three categories: (1) physical health outcomes, (2) mental health outcomes and (3) both physical and mental health outcomes. It is important to note that the connection between physical health and mental health is extensive and difficult to disentangle. These categories are meant to simplify the pathway analysis rather than distinguish between what is strictly physical and what is strictly mental. Recognizing these outcomes provides a basis to trace the pathways through which education financing impacts each.

Pathways

The broad framework for identifying the pathways between education financing and health outcomes rests on the question: "How does education determine health outcomes?". Ultimately, two main pathways work to determine the health outcomes previously identified, school facility and location and school resources. School facility and location take into account factors like building safety and age, commuting distance of students, and physical environment factors – probability of severe storm, fire, etc. School resources account for factors like quality of food, health intervention tools, access to the proper education materials, class size, and before and after school care/programing. Both of these pathways have a crucial factor in common, they are reliant on school funding. Better funded schools may be able to update their building, eliminate transportation barriers, have resources, and plans for severe weather, provide healthy meals, health screenings, up to date materials, hire and retain more teachers, and have extracurricular

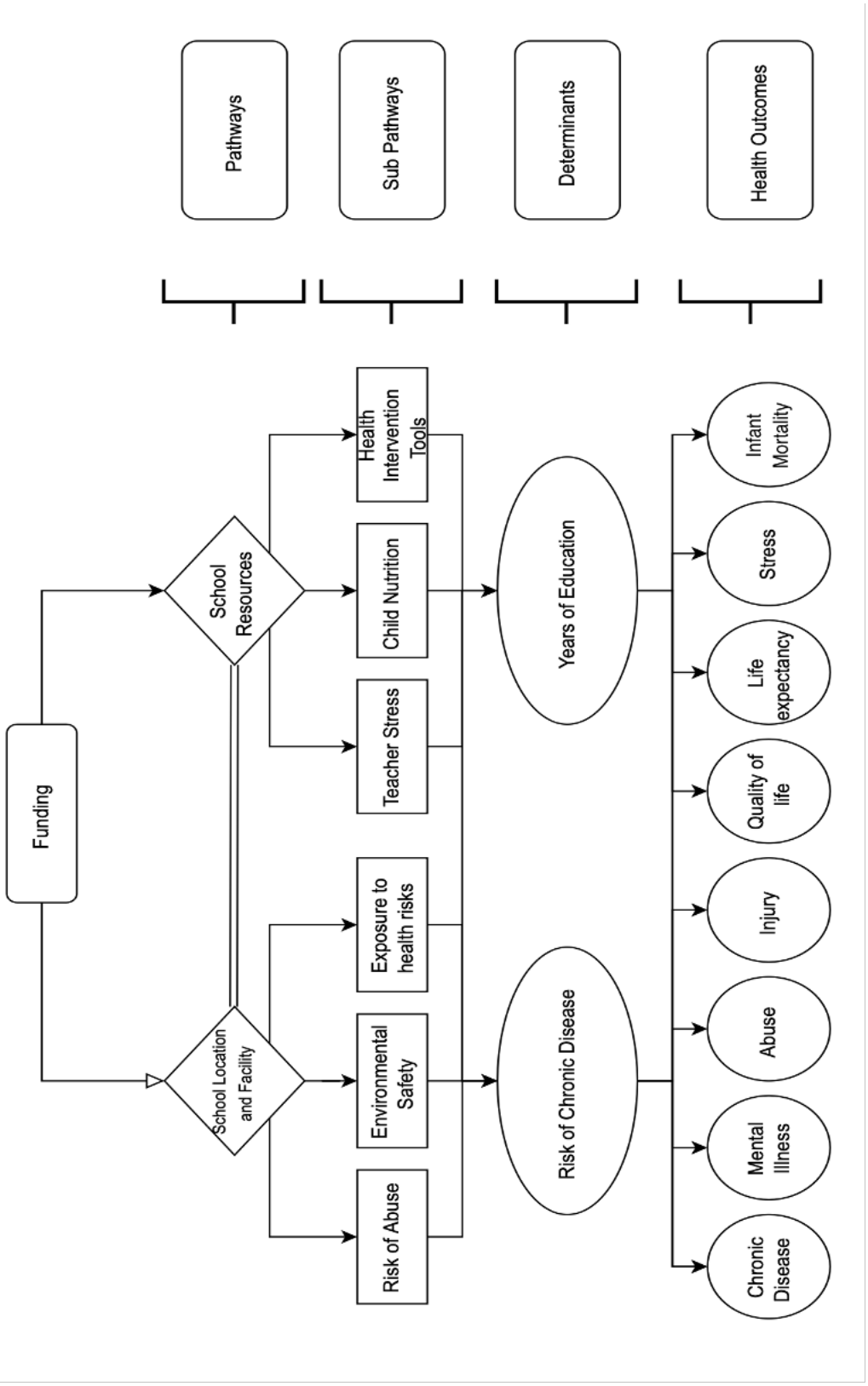

Figure 2; Education Finance Health Pathways

programing. Relatively low funded schools may not be able to provide these services. Here it is important to discuss that because of the nature of how funding impacts these pathways, and then the pathways impact health outcomes, the connection between education financing and health outcomes is an indirect one. Understanding that this connection is indirect emphasizes the need to specifically trace through the impact of financing for each outcome.

Starting with the pathway school facility and location, the key factors that have the potential to impact health are risk of abuse, environmental safety, and exposure to health risks. A school facility's safety measures and protocols, as well as its location, determine the risk of abuse of its students. These safety measures and location are determined by funding, as better funded schools should have more resources to invest in safety and it can be assumed that better funded schools are located in safer neighborhoods due to how public education in the United States is financed. Therefore, funding indirectly determines the risk of abuse for students. For example, if a school is located in a safe and secure location, students' risk of abuse may be lower, and thus parental fear may be lower. Parents that fear for their child's safety are less likely to keep sending their children, especially girls, to school (WHO, 2011). Therefore, if the risk of abuse and parental fear is lower, then the overall education of students, in terms of years of schooling, is likely to increase. More years of education are associated with more productive activity in the workplace which, in theory, should translate to greater incomes, creating economic stability that is associated with higher life expectancy, increased quality of life and decreased levels of stress (WHO, 2011). Higher levels of education are also associated with less dangerous occupations, and thus decreased risk of injury and

generally decrease risk of chronic disease[3]. The risk of abuse also impacts the risk of chronic disease and other health outcomes. If a student is abused, their chance of developing mental illness may be higher, they may have long term injuries from the abuse and that may lead to a decreased quality of life.

Also, within school facility and location is the safety of the environment. Older and poorly built buildings tend to have more safety issues than their counterparts. Initial funding when constructing new schools will therefore determine some degree of environmental safety. Factors like availability of resources, such as clean water and consistent electricity, play into the safety of the school environment. When these factors are met there is likely a decreased exposure to health risks and students may have an increased personal confidence and security which may decrease risk of abuse and risk of mental illness. This decreased exposure to health risk also impacts one's potential amount of education in terms of years. This can be explained through the mutually reinforcing nature of health and education. If students are healthy, they tend to be able to concentrate and learn more, and also miss less school. Unhealthy students have higher levels of absenteeism, when they are at school have more difficulty concentrating and learning and may eventually drop out of the education system because of this (WHO, 2011). Therefore, exposure to health risks may impact the years of education someone receives, thus following the same pathway described above leading to varying degrees of economic stability which may impact life expectancy, quality of life, stress, risk of injury, and risk of chronic disease.

[3] Just because a job is less physically dangerous does not necessarily mean its risk of chronic disease is lower. High stress office occupations that would not typically be deemed dangerous may lead to heart disease, thus education level and risk of chronic disease is not exclusively a negative relationship

Looking at the school resources pathways, similar outcomes arise. School resources determine factors like teacher stress levels, child nutrition levels, and access to early health intervention tools such as free ear and eye exams. These factors are all directly or indirectly determined to some degree by school funding. Teachers who are already in demanding occupations may lack the proper resources and school environments if funding is low, adding to the already stressful profession of teaching. For example, if a school does not have the proper funding to hire enough teachers, class sizes will increase to compensate. Increased class sizes may lead to more instances of behavioral issues, higher amounts of preparation, increased grading loads for teachers and increase instances of minor illnesses spreading in classes. These factors may eventually lead to higher rates of staff burnout and turnover, negatively impacting teacher health and stress but also impacting the quality of education students receive. Lower quality and lower levels of education follow the same pathway described previously, ultimately leading to potentially worse health outcomes.

School funding also impacts child nutrition through the quality of school provided lunches and the ability to hire enough staff to ensure quality of food. If students are not receiving the proper nutrition their ability to concentrate and learn may be impacted, as well as their overall health, falling into the pathway impacting years of education yet again.

The final factor that is impacted by schools' resources is their ability to provide access to tools for early health screenings. School funding may determine whether or not schools are able to contract with health providers to implement early health screenings. If students do not have access to these their need for tools like glasses and hearing aids may

not be recognized. If this need is not recognized students' abilities to concentrate and learn may be harmed and thus their quality and amount of education also may decrease – following the same path to worse health outcomes down the road.

Traditional vs Voucher Funding

These pathways have been adapted based on a traditionally funded education system, where federal, state, and local contributions fund schools and students attend those schools based on their location of residence. If students are given the choice to attend schools outside of their residence, and those schools have different amounts of funding, different pathways to health outcomes may be highlighted for those students. School vouchers are an example of how students and families may be given these options. Vouchers function as a tool that provides cash transfers or reimbursements to families to provide the opportunity for families to send their children to private schools. For example, a family may be reimbursed the tuition of the private school across town, so they have the choice to send their child to the neighborhood publicly funded school, or the private tuition charging school. If the family chooses to send their child to private school, how are the pathways to health outcomes affected?

Vouchers may provide students with access to safer and better funded schools, thus possibly lowering their risk of abuse, increasing environmental safety, decreasing exposure to health risks, providing better child nutrition and health interventions, and increasing the quality of teacher attention, school materials and resources. All of these factors may increase the child’s potential years of education and may reduce their chance of chronic disease, increasing their likelihood of having more positive health outcomes.

While this may be the case, it is important to note that vouchers often only cover the cost of tuition or even only partial costs of tuition, therefore families may face safety and time costs associated with accessing the school depending on its location. These costs may counter some of the positive effects associated with attending private school, possibly negatively impacting their health outcomes later in life. For example, families may sacrifice some of their income to get their child to school, whether that be buying train or bus tickets or trading off between taking their child to school and working more hours. Because of this sacrifice nutrition in the home may suffer due to a decrease in income, setting the child up for increased risk of chronic disease. If the school is close enough to commute via walking or bike for example, the child still risks exposure to environmental and abuse risks depending on the length and physical environment of the commute.

It is also likely that vouchers may lead to a concentration of high achieving students in better funded schools. This can be explained because there may be a bias of who seek vouchers. Usually there is an application process associated with receiving vouchers, thus families that have the time and resources to navigate the process are more likely to seek out vouchers and end up in private schools. As a result of this, lower funded public schools may suffer as enrollments shift toward private schools, decreasing their already low funding if funding is connected so some degree on enrollment, and further highlighting the pathways to negative health outcomes for students still residing in these schools.

Along these lines, vouchers may lead to excessive school specialization as schools tailor themselves to meet individual tastes. For example, schools focused on sports and

art may sacrifice the central elements of education that justify government involvement. While regulations could be put in place to prevent this, they may turn out to be costly and undermine the purpose of a voucher system, that being choice and efficiency (Gruber, 2016). Following these examples certain pathways may be highlighted for students choosing to attend specialized schools. Schools specializing in athletics will likely push more funding into athletics which can be thought of as a school resource. While more funding may mean better equipment, training, and access to things like physical therapy, generally the risk of injury is higher for students attending an athletics focused school than a traditional academic school, strictly based on the fact that students are likely to play sports. While injury is a health outcome itself, treatment for some injuries may lead to negative effects on other outcomes, given contexts like the opioid crisis. Injured students may become dependent on these sorts of drugs, making them more susceptible to mental illness, drug abuse, and addiction, likely decreasing their quality of life (Ekhtiari et al., 2020). Because more years of education for mothers is associated with lower rates of infant mortality, schools like these may lead to increased levels of infant mortality down the line. Decreased years of education may also decrease life expectancy and quality of life, while increasing the risk of injury and chronic disease associated with dangerous occupations due to the association between both productive activity and economic stability and years of education.

Similarly, vouchers may increase school segregation in terms of race, income, and ability. This may be the result of the different actions of motivated and unmotivated or disinterested parents. Parents who are motivated or have the resources to use vouchers will likely enroll their children in high-quality private schools, while parents who are

disinterested or not able to utilize vouchers for reasons other than eligibility would likely stick with the default education for their children, many times low quality public schools.

If the racial, income or ability make-up of children of motivated and able and unmotivated and unable differ, then segregation along those lines has the potential to worsen. While the argument can be made that vouchers may reduce segregation by providing access to private schools for minority students that may not otherwise been able to attend, vouchers still may divide the education system between high achieving and motivated students and lower motivation or lower ability students, illustrating that the case of vouchers and segregation is a complex relationship that may produce benefits and/or worsen costs (Gruber 2016). In context of our pathways, on an individual level vouchers may help students follow pathways to positive health outcomes, however if there are racial, economic, or ability differences between groups likely to use vouchers and those who are not, then voucher systems may steer certain groups toward the negative pathways that lead to bad health outcomes.

The Roles of Race, Gender, and Class

Understanding the roles that class, race and gender play within these pathways is extremely important. As discussed in the previous chapter, the education system in the United States favors some students over others. As a result of this differing impact, specific pathways are highlighted for different groups of students. This section discusses the pathways identified previously, paying special attention to why class, race, and gender matter within the context.

As presented in the previous chapter, class matters when it comes to education in the United States. Students whose families are wealthy may be more likely to graduate

from college and translate their education into positive labor market outcomes. Given this, wealthy students are likely to go through more years of education than students of lower-class status. As we have established, more years of education are associated with greater degrees of productivity and therefore higher incomes; thus, the education system acts to maintain the class status of students that come from wealthy families. In addition to maintaining their class status, wealthy students then are less likely to be in jobs that are dangerous, in terms of injury or exposure to environmental hazard, therefore are less likely to develop chronic diseases later in life. On the other hand, poor students are less likely to receive a greater number of years of education, so the opposite may be true for them – lower incomes, higher risk of injury and chronic disease.

Vouchers in theory should minimize this gap between wealthy and poor students, providing poor students with the opportunity to attend private schools which should translate into attending and graduating college. One way that vouchers would actually close the gap between the two groups is if the student academic achievement increases significantly upon voucher recipients attending the private schools. Academic achievement gains may be associated with a higher likelihood of attending college, thus a possible increase in years of education. The question of if vouchers actually produce academic achievement gains is explored in a case study looking at the Cleveland Scholarship Program in the next chapter.

It is also important to consider how low-income families may still be priced out of attending private schools even in case of vouchers. This is because in practice vouchers usually only cover the cost of tuition, and often only a portion of the tuition. Families are left with the burden of whatever is left over, for example remaining tuition costs, costs of

materials, and often costs of transportation (Greene, Howell & Peterson, 1997). In these cases, vouchers do not change the pathways for low-income students as they are unable to attend voucher accepting schools because of the financial burden associated even after receiving a voucher.

As demonstrated by Verstegen (2013) and O' Flaherty (2015), racial minority groups tend to get left behind in the United States education system. If the case from Nevada, where Verstegen displayed inequalities in terms of funding large and small school districts and the racial implications of such inequalities, mirrors the rest of the United States it is reasonable to say that students from racial minority groups are more likely to reside in urban areas and attend low-income schools. Following this, all pathways and outcomes identified would be negatively emphasized. In other words, based on the framework established and evidence of racial inequality within the United States public education system, racial minorities would be expected to have worse health outcomes, as a result of their education, than the white racial majority. Similar to the class discussion, voucher programs have the potential to eliminate or mitigate some of the pathways to negative outcomes, by providing racial minority groups with access to schools that are funded generously and therefore can provide better resources. However, there is no guarantee that the programs will have a strictly positive impact on the pathways to health outcomes. As discussed in the previous section, vouchers may increase school segregation or over specialize, impacting the education system in a way that may increase the negative impact of some pathways on racial minority groups, even if an individual from a minority group may benefit from the program. To this point, these pathways have been discussed from the lens of looking at their impact on individuals, this

consideration of race emphasizes the importance of considering the impacts on groups, as well as individuals when considering the differences between traditionally funded education and voucher options.

One of the most compelling, evidence-based arguments for why Friedman's defense of vouchers helped and encouraged segregationists in his promotion of privatization of public education comes from Nancy MacLean (2021). She argues that

> "Friedman and his allies saw in the backlash to the desegregation decree an opportunity they could leverage to advance their goal of privatizing government services and resources. Whatever their personal beliefs about race and racism, they helped Jim Crow survive in America by providing ostensibly race-neutral arguments for tax subsidies to the private schools sought by white supremacists. Indeed, to achieve court-proof vouchers, leading defenders of segregation learned from the libertarians that the best strategy was to abandon overtly racist rationales and embrace both an anti-government stance and a positive rubric of liberty, competition, and market choice."

In the previous chapter, the discussion on gender sorting across public and private schools in United States illustrated that gender inequality in terms of where students of differing genders attend school, cannot fully be explained by random chance. The results of Long and Conger (2013) showed that male students are overrepresented in irregular public schools, and under-represented in private schools. If private schools are generally better funded than public schools, male students then would be negatively impacted to a greater degree by the identified pathways than female students. For example, say a male student and a female student with all else identical (family background, academic achievements etc.) attended different types of schools, the male student public, the female student private, in line with where they are represented more. The female student would, in theory, benefit from the private school through the same mechanisms traced in the class example, while for the male student outcomes would depend on other factors

associated with their school in terms of location, facility, and resources. This illustrates that the education system in the United States may benefit certain groups over others however, the ultimate outcomes of inequality between where students of different genders go to school is dependent on factors like funding associated with those schools. This also displays the intersectionality of class, race, and gender, which raises difficulties in pinpointing exactly where inequalities in education stem from.

Understanding the intersection of health outcomes pathways and education finance while considering the roles class, race, and gender play works to deepen the understanding of how education finance gets under the skin. The following chapter will expand on these ideas bringing in empirical works related to cash and in-kind benefit distribution and a case study focusing on the Cleveland Scholarship Program, a voucher program launched in 1996.

Chapter 4: Empirical Research

Empirical Evidence: Literature Review of Cash vs In-Kind Benefits

Traditional welfare economics favor cash transfers over in-kind transfers based on prioritizing the preferences of potential beneficiaries and pointing to greater efficiency. There has long been a debate whether in-kind benefits are as efficient as cash or whether the motivation behind providing benefits in-kind is strictly paternalistic resulting in overprovision of benefits in-kind and therefore inefficiencies in the welfare system. Garfinkel (1973) argues that this favoring of cash benefits may be the result of only considering the preferences of beneficiaries and not including the preferences of taxpayers, who are ultimately funding welfare programs. By developing a model that includes both the preferences of potential beneficiaries and potential taxpayers, Garfinkel (1973) displays that the traditional case against benefits in-kind and also the established arguments in favor in-kind benefits are special cases that are subject to specific assumptions about preferences. Based on the model, Garfinkel concludes that in-kind benefits may be efficient, in general, depending on both beneficiary and taxpayer preferences and the distribution of income before the transfers take place. Specifically, traditional welfare economics assumes that taxpayer's utilities are independent from the beneficiary's utilities (ignoring taxpayer preferences all together). Garfinkel criticizes this assumption for being unproven and if it is the case that taxpayers prefer in-kind transfers,

then in-kind redistribution may be efficient. The case of taxpayers preferring in-kind transfers is supported by the work of Friedrichsen, König, & Lausen, 2020 examining the role that social status plays in voting in favor of the public provisions of private goods. Voting can be considered a tangible revealing of preferences. Friedrichsen, König, & Lausen (2020) find that as a result of concerns about maintain social status, richer individuals are more likely to vote in favor of public provision of private goods that they would purchase in the marketplace themselves in an attempt to maintain social exclusivity of such private goods. (Friedrichsen, König, & Lausen, 2020) Assuming that richer individuals pay more taxes[4], this transforms Garfinkel's hypothetical idea of taxpayers preferring in-kind benefits to a possible reality. Ultimately, the balance between how much of the benefits are in-kind and are in cash depends on taxpayer preferences, beneficiary preferences, and the community's social welfare function (Garfinkel, 1973).

Keeping this theory in mind, consider the following thought experiment. Public education in the United States can be considered an in-kind transfer of benefits, providing free education to the children of the country. School vouchers on the other hand stand in as a proxy for cash transfers. They are a proxy because vouchers mirror more of a conditional cash transfer as they can only be used on school, rather than just a cash transfer where recipients can decide for themselves what to spend it on. In the context of Garfinkel's theory, in-kind transfers for schooling will be efficient if the taxpayer's and beneficiary's utilities are not independent. For example, if a taxpayer contributes to the

[4] This is obviously a problematic assumption in general but should at least hold in the case of property taxes if richer individuals live in more expensive houses

welfare of society by paying property tax and therefore funding public schooling, they impact the utility of the beneficiary by increasing the funding available to the schools, providing a better education experience. Here the utilities of the two are decidedly not independent. The utility of the beneficiary also impacts the utility of the taxpayer, as educated population results in things like better democratic systems and lower crime rates. Therefore, if the taxpayer values these things, the two utility functions are again not independent. Through Garfinkel's lens, it seems as though for the case of education, in-kind benefits are efficient transfers.

Focusing specifically on when in-kind transfers are efficient, Bruce & Waldman (1991) argue that government transfers made in-kind will be efficient if they are working to avoid the Samaritan Dilemma. The Samaritan Dilemma refers to the phenomena where giving altruistic aid may result in recipients becoming reliant or dependent on the aid if their actions can control the outcome of the aid they receive. Bruce & Waldman 1991 use the example of parent and child and allowance to simply explain the dilemma. It is assumed that the size of the allowance likely depends on how much money the child has at the time of the transfer, thus the child should spend more prior to the transfer if they want a bigger transfer. In welfare, if cash transfers function in this way, people will spend, rather than save, to receive larger transfers and fall victim to the Samaritan Dilemma. If transfers are made in kind, spending is restricted, and recipients have no control over the amount of their transfer (Bruce & Waldman 1991). Applying this to education, if education were funded in cash low-income families may fall victim to the dilemma, as they may choose to spend too little on educational services. This choice may be the result of sharing the benefits with future taxpayers rather than reaping all

benefits/returns themselves spending on something else. We would expect the benefits to be shared as quality of education for the poor likely determines the number of individuals who will grow up and found themselves on welfare or not. If parents, choose to spend the right amount in education services then we would expect less people relying on welfare in the future and therefore less burden on taxpayers. If education is provided in-kind and parents have no choice, this dilemma and inefficiency is avoided all together.

Understanding these theoretical perspectives aids in explain why certain goods, like education, are provided in-kind, rather than through cash transfers. While these analyses focus on efficiency, what this thesis is concerned with is the impact of different kinds of transfers on health outcomes, specifically the impact of in-kind and voucher (cash) transfers of K-12 schooling. To provide a general understanding of benefit transfers impact on health, the following literature review matrix is provided, serving as a tool to highlight the implications[5] of different transfers on health outcomes.

[5] See the last column of the matrix for my interpretation of the implications for health outcomes

Author/ Date	Benefit type	Research Question(s)/ Hypotheses	Methodology	Results	Conclusions	Support of Cash or In-kind	Implications For Health[6]
(Miller & Neanidis, 2014)	*Government Assistance, Cash transfers In-kind transfers*	*Do cash and in-kind transfers affect parental fertility choices and economic welfare differently?*	*Two-period overlapping generations model*	*Cash transfers lead to higher fertility and welfare of parents who value the quantity of their children. In kind transfers lead to lower fertility but higher economic growth and greater welfare for parents who value the quality of their children*	*Governments choice of cash or in-kind transfers should align with their goals in terms of fertility and economic outcomes*	*Mixed*	*Both transfers improve children's health status, In-kind increase likelihood of survival into adulthood*
(Selsnick, 1996)	*In-kind transfers of food, capital service, and consumer services to impoverished people*	*Are in-kind transfers as efficient as cash transfers for those who have the lowest consumption levels?*	*Microsimulation using consumption data from the Consumer Expenditure Survey*	*In-kind transfers have about the same impact as cash for all goods expect energy and consumer goods, in-kind transfers target those who need benefits more accurately than cash*	*In-kind benefits are as effective as cash for eliminating poverty*	*In-kind*	*Both transfers eliminate poverty, thus benefiting health. Cases that already use in-kind benefits should continue to do so*
(Lusk & Weaver, 2017)	*Food assistance, Cash transfers, In-kind transfers*	*Are the effects of cash and in-kind transfers different in a controlled laboratory environment?*	*Experiment*	*The effects of in-kind and cash transfers are the same for inframarginal consumers, for extramarginal consumers food expenditures are higher for in-kind*	*In-kind benefits are as effective as cash on food expenditure, and in certain cases are more effective*	*In-kind*	*In-kind transfers of food benefits provide greater access to expenditure on food, thus benefiting the health of in-kind*

[6] This column represents my interpretation of the implications for health outcomes of each article in reference to the pathways identified in Chapter 3

							users more than cash users
(McEwan & Carnoy, 2000)	*Education, Vouchers (cash), public school (in-kind)*	*What are the relative effectiveness and efficiency of private voucher and public schools in Chile?*	*Multivariate linear regression to estimate the effect of private schools on achievement*	*Non-religious voucher schools are marginally less effective than public schools at producing academic achievement, public and Catholic schools produce about the same academic results*	*Public schools (in-kind benefits) are just as good, if not better than private voucher schools at producing academic achievement*	*Mixed*	*Health outcomes will be slightly worse or the same under voucher programs, not warranting large spread of voucher programs where there are already public schools*
(Levin, 1999)	*Education, Vouchers (cash), public school (in-kind)*	*What does the empirical evidence say about achievement between public and private schools, about educational equity, and costs of systems?*	*Literature Review*	*Private schools have only a small advantage over public schools if there is a difference at all, Catholic high school students are more likely to graduate, and attend and graduate college, Educational choice leads to greater segregation in terms of race and SES, Voucher programs are more costly than present school systems*	*Private schools are just as effective as public schools, if not a little better at producing academic achievement, School choice produces greater segregation thus the costs may outweigh the benefits of voucher schools even in religious cases*	*Mixed*	*Students who attend Catholic schools will have greater access to positive health outcome pathways, School choice hurts the health outcomes of racial minority and economically disadvantaged groups*
(Gahvari, 1994)	*General, cash grants and in-kind transfers*	*Do cash and in-kind transfers programs have different effects on labor supply?*	*Model*	*Labor supply will be higher under in-kind transfers if there is a high degree of Hicks substitutability between in-kind transfers and leisure, if there is an overprovision of in-*	*To warrant a higher labor supply, in-kind benefits must be over provided, and leisure must be normal, and there must be a weak separability of preferences between leisure and other goods*	*Mixed*	*Assuming that increasing the labor supply provides income to those who did not have it before, health outcomes should increase for this group, under the conditions specified*

				kind transfers, and leisure is normal			*in the results and conclusions*
(McEwan, 2001)	*Education, Vouchers (cash), public school (in-kind)*	*Are there differences between public and voucher participating schools in terms of Spanish and mathematics achievement in Chile?*	*Model, Linear regression analysis*	*Catholic schools have a slight advantage over public schools, non-religious voucher schools and public schools are largely the same*	*There is a lack of consistent differences between public and non-religious voucher schools in terms of achievement*	*Mixed*	*Students who attend Catholic schools will have greater access to positive health outcome pathways, Health outcomes between public and non-religious voucher schools will remain unimpacted*

There are a few implications apparent from this summarized literature review that are worth highlighting. First, while the support of in-kind or cash benefits is often identified as mixed, that does not discredit the ability or effectiveness of in-kind benefits. Results were identified as mixed if articles conclude that in-kind benefits, more or less, were as effective as cash transfers. Often, studies showed that the impact of each benefit type was largely the same, often giving a slight advantage to in-kind benefits, although sometimes to cash. Second, the general implications for health outcomes show that health outcomes are the same or slightly better under in-kind transfers. Placing these studies into the context of the pathways to health outcomes bridges the gap between discussion of public finance and benefits transfers and discussion of health outcomes. If decisions about what kind of benefit to offer are being made under the assumption that all that matters is efficiency, like the neoclassical school would want, then these implications do not hold any weight in the decision. However, if a more comprehensive assessment is used that applies a social determinants of health perspective, these implications inform decision making to a greater degree.

A third implication that can be drawn from the literature review matrix deals specifically with the sources focusing on education. McEwan & Carnoy (2000) and McEwan (2001) both investigate the impact of voucher programs in Chile. For background, because of the influence of Milton Friedmans ideas about privatization of education, in the 1980 public schools were decentralized by Chile's military government, leading to most public and private schools to be financed by vouchers (McEwan &

Carnoy, 2000). The results of the first study indirectly showed that health outcomes were slightly worse or the same under vouchers, because academic achievement was slightly lower or the same at voucher schools. This result does not warrant the spread of voucher programs if health outcomes are a consideration in the decision process. The second study indirectly shows that health outcomes do not change between private and public schools in Chile expect in the case of Catholic schools, where positive health outcome pathways would be highlighted because of the academic achievement advantage that these schools have. This result still does not warrant the spread of voucher programs as academic achievement and, therefore health outcomes, will not improve under such systems. For United States context, Levin (1999) looked at the literature about vouchers, focusing on the Milwaukee Experiment[7]. The results of this study also showed an advantage for those who attended Catholic schools, however the results stressed disadvantages for racial minority and low-income groups as segregation in terms of the two increased under school choice. These results show that the same groups that get left behind by the traditionally funded education system in the United States, only further suffer in the case of vouchers. Yes, it is true that an individual from either, or more likely both, of these groups may benefit from receiving a voucher and attending a private school, however when looking at the impact on the group, the structural impacts outweigh the positive individual outcome.

The interpretation of the impact of benefit type on health outcomes in the last column of the literature review matrix largely relies upon the main idea that gains in

[7] The first voucher experiment in the United States where low-income families could receive publicly funded vouchers to attend nonsectarian private schools (Levin, 1999)

academic achievement produce better health outcomes. To grasp a deeper understanding of this, the following section investigates the Cleveland Scholarship Program, a voucher program in Cleveland Ohio to see if voucher programs produce more positive health outcomes than traditionally funded public schools.

Case Study: Cleveland Scholarship Program

The Cleveland Scholarship Program, implemented in 1996, is the second oldest publicly funded private school voucher program in the United States (Stewart & Moon, 2016). The program operates within the city of Cleveland, Ohio's metropolitan school district, Cleveland Municipal School District. For schools to participate in the program they must be non-public charter schools located within the district and approved by the state superintendent (Belfield, 2006). The purpose of the program is to increase educational opportunity for primarily low-income households by providing vouchers to purchase private education; however, student eligibility is only based on residence within the school district, with priority of available scholarships going to families below two hundred percent of the poverty line. Originally, the program provided families with incomes below two hundred percent of the poverty line with 90% of tuition and families above with 75% capped at $2,500. The respective remaining 10% and 15% of tuition costs being the family's responsibility, as well as all other costs associated with attendance not captured by tuition (i.e., materials). At first, the program was only available to students in kindergarten through third grade, but by the 2006-2007 school year had expanded to all grades (Stewart & Moon, 2016). Voucher caps also expanded

since the beginning of the program providing a maximum of $5500 for K-8 and $7500 for high school for the 2021-2022 school year (Ohio Department of Education, 2022).

The Cleveland Scholarship Program provides the opportunity to investigate the impacts of voucher funded education on student outcomes. Since its implementation, the program has been the focus of many evaluations and academic works surrounding student achievement and other outcomes.

The first evaluation of the Cleveland Scholarship (Greene, Howell & Peterson, 1997) program was conducted in 1997, soon after the program launched. A parent survey and test score analyses were conducted for the purpose of evaluating important aspects of the program related to parents' decisions to apply, why parents choose not to participate in the program, school satisfaction, student retention and student academic outcomes.

The results of the survey found that the most common reason for parents' decision to apply to the program was to improve academic quality for their children, followed, in order, by a search for greater safety, better location, religion and friends.

The most common reason that parents 'chose' not to participate in the program was not a choice at all. Almost half of the parents who did not participate in the program reported that they were never offered a scholarship in the first place. The survey results indicate that from the parents' perspective this was the result of inadequate communication between the program and the applicants, while Greene, Howell & Peterson (1997) working with statements from Cleveland Scholarship Program officials stating that strong efforts were made to reach all applicants, provide the explanation that low-income families often rely on other people for telephone and mail services, pointing

out that the survey team also struggled to make contact with many families. Furthermore, receiving the scholarship requires an income verification process, something that may not have been clear to families where contact was made. The remaining reasons that were found for families not participating in the program, roughly in most to least common order, were issues with transportation, financial reasons, offered admission at a desired public school, inability to secure admission to their desired private school.

The results relating to parental satisfaction show parents of recipients that were previously in public schools were significantly more satisfied with academic quality (66% compared to 30%), school safety (60% compared to 25%) and discipline (55% compared to 23%) than the non-recipients still in public schools. For the factors, private attention to the child, parent involvement, class size, and school facility satisfaction rates followed a similar pattern between recipients and non-recipients. The greatest difference between satisfaction rates (71% compared to 25%) resulted from the factor 'teaching moral values' where recipient parents were far more satisfied than non-recipient parents with children in public schools. The results of a regression analysis indicate that (1) recipients were far more satisfied with their school than non-recipients in public schools, (2) that parental satisfaction was particularly high in well-established private schools, (3) among recipients racial minorities were less satisfied than white parents, and (4) for non-recipients higher incomes indicate higher satisfaction but among recipients no income effect is observed.

A general consensus exists that education is more effective if it is not disrupted. Changing schools mid-year is considered a disruption, thus school mobility can be looked

at as an indicator for the effectiveness of the Cleveland Scholarship program. The survey found that only seven percent of all recipients reported not attending the same school for the full year. Of that seven percent the most common reason for switching schools was admission to a preferred private school, followed by being admitted to a preferred public school (possibly explained by Cleveland public schools allowing opportunity to attend magnet schools), moving during the course of the year, and transportation reasons.

Standardized test scores were analyzed for students attending the 'Hope schools,' schools formed in response to the Cleveland Scholarship Program. The Hope schools said they would accept all students who applied thus the school demographics reflected the most poor and disadvantaged students. Due to this, analysis of test scores says a lot about the effectiveness of the program as a whole as other schools participating in the program most likely function under better conditions. In other words, if scores at Hope schools are positive, other schools in the program should also produce positive results. The results show moderate test score gains in the subjects of reading and math and decline in language test scores (language tests were not normally given in Cleveland public schools). These scores were compared to scores from a similar voucher program in Milwaukee to be put into perspective. The results show that students' scores in the Hope schools outperformed those of comparable demographics in the Milwaukee school choice experiment. This comparison indicates a greater relative effectiveness of the Cleveland Scholarship program over similar voucher programs.

Overall Greene, Howell & Peterson (1997) find that their results support future school choice initiatives, however they express that, changes need to be made to ensure access to the program for low-income groups.

A 1999 report, (Lanese, 1999) summarizes the works of four studies from the Program on Education Policy and Governance report the American Federation of Teachers report, the Public Policy Forum report, and reports from Indiana University that generally investigated program implementation methods and participants, parental attitudes surrounding opportunity and the Cleveland Scholarship program as a whole, and achievement comparisons of recipients and non-recipient counterparts.

Lanese first investigates the Program on Education Policy and Governance report (PEPG) looking at parent satisfaction and academic achievement. The report showed that parents of recipients who previously attended public school were more satisfied with all aspects of their school choice than parents of applicants who did not revive a voucher and went to public schools. It also showed that choice schools, schools where vouchers were used, retained students at good rates. Determinants of parents' decision of to apply to the voucher program for students who previously attended public schools included academic quality, greater safety, location, religion, and friends. When comparing voucher recipients and non-recipients who remained in public schools, average family income was lower for voucher recipients. Voucher recipients were reached more easily and shared information more readily than non-recipients, indicating limitations and bias for the survey. Test scores in math and reading showed large gains for voucher students attending the two Hope schools. Based on the parent survey and test score findings the

report provides strong support for the continuation of the program although this result needs to be taken with a critical view[8].

The next report that Lanese examined was the report by the American Federation of Teachers that investigated the implementation of the first year of vouchers. The analysis in their report was meant to see if the intent of the law that created the Cleveland scholarship program was being achieved, funding a small number of low-income students at private schools. The report revealed that the program did not 'appreciably increase' educational choices available for parents of students who were enrolled in 'failing' public schools. The report also found that about half of students who were eligible for a voucher did not enroll in a private school. Of the students who did participate in the program, students who were already in private school and received a voucher received preferred placement compared to those coming from public schools where over half of those coming from other schools were placed in a newly formed school rather than a well-established one. The report also looked into the cost of the program, finding that it was mostly funded by state aid designated for Cleveland Public Schools, indicating that the public cost of the program was greater than believed. Another result related to cost found that 1.6 million dollars of taxpayer money was spend on vouchers for 496 students that already attended private school, while another 1.7 million was spent on vouchers for 525 students moving from public to private schools. The second group represents the students

[8] As noted, before, the survey results are most likely biased, as those who interviewed were likely voucher recipients and therefore are likely to respond positively about their experience. There is a lack of transparency surrounding the version, form, and level of the standardized tests used as well as the scoring methods to assess academic achievement. The way the reported test score results were calculated raises concern and correcting this technical issue leads to results that indicate normal progress over the academic year rather than large gains.

who enrolled in the four new schools, meaning that taxpayer money was going to schools with no educational or financial track record. The final result Lanese highlighted was that in the well-established private schools, the public cost per voucher was much larger than the amount of money spent on new voucher students, meaning that money designated for the education of voucher students was not being spent on them. Overall, this report provides support for the argument that the program is not meeting its goal of providing access to private schooling for low-income groups.

Next, Lanese looked into the two-phase report by the Public Policy Forum[9]. The purpose of the first phase was to determine what factors mattered to parents when choosing a school for their child. Interviews revealed that the most common information parents wanted when deciding what school to choose was information surrounding schools curriculum and instruction, followed by information about the schools' teachers. Other information parents wanted, in order of preference, was school characteristics like class size and student body composition, general student outcomes like promotion rates, safety and discipline measures, standardized test scores, parent involvement and reputation. Teachers and administrators agreed that information regarding school's programs (curriculum and instruction) was the number one piece of information sought by parents. The final result of phase one of the report was that there is agreement across parents of private and public-school children in the information they want regrading school choice. The results of the second phase highlighted conclude that schools

[9] Lanese notes that the structure of these reports provides a unique perspective when evaluating school choice. First, information used in the study came from both the Cleveland and Milwaukee school choice programs. Second, researchers used open ended, non-structured interview strategies, meaning that the resulting answers were not impacted by artificial dichotomies.

participating in choice programs should have publicly available their mission, philosophy, governing structure, school program (curriculum and instruction), teacher and administrator qualifications, standardized test scores, financial matters, and rates of attendance, graduation, and suspension. A public board of both private and public-school representatives should be responsible for gathering and report such information for public use. To enforce the program, schools participating should have one year probation period, where after if they do not comply, they will lose public funds to some degree. The results regrading school selection support the finding of the PEPG report to some degree.

Lastly Lanese examined the Indiana University reports. The year one IU report focuses on the impact of voucher participation and non-voucher participation on student achievement. Important results of the report include that voucher students who previously attended public school in Cleveland were slightly higher achieving before entering the program than those who remained in Cleveland Public Schools. The report found that within these groups there was no significant differences across categories of eligibility of free school lunches, gender, race, or parental living arrangement. After eight months in the program, while controlling for background and demographic factors, no statistically significant differences were found for adjusted third grade achievement between voucher recipients and their public-school counterparts. The implications of these results are that the program draws a group of students that largely reflects that of non-voucher participating public school student bodies. Finally, results showed that achievement did not significantly change one way or the other for voucher using students. The second-year report by the IU team found that while those who returned to the program the next

year and those who did not, did not vary significantly in terms of background and demographics, those who remained in the program achieved significantly higher scores in reading, science, and social studies than those who left the program after one year. It also found that unlike the first year, voucher participants and their public-school counter parts were remarkably similar in terms of gender, race, class, and previous achievement. The report also found that classroom environments between participants and non-participants varied greatly in terms of class size, teacher advanced trainings, and teacher experience. For all three categories, public schools held more desirable outcomes, smaller class sizes, more advanced trained teachers, and greater teacher experience. Voucher students performed significantly better in language achievement when controlling for demographic, classroom, and prior achievement factors, however there were no significant differences in reading, science, math, or social studies. Lanese notes that the second-year study reinforces the results of the first-year study, being that participants and non-participants share similar demographic backgrounds, but their school settings vary greatly. Despite this, achievement outcomes do not vary significantly expect in language with select groups.

Using the examination of these programs Lanese points to three general conclusions. The first being that it does not appear that voucher students have greater achievement gains than their public-school counterparts in general. The second is that satisfaction and selection reasons may explain each other, meaning that parents tend to be satisfied with their choice when they are provided a choice. Lastly, looking at both private and public schools, parents tend to look for other factors before achievement in

making their decisions. Overall, Lanese's analysis points to an unclear impact of voucher usage on student achievement.

Five years into the implementation of the program, the People for the American Way Foundation, a non-profit progressive advocacy group, conducted their own evaluation of the Cleveland Scholarship Program. Unlike the previous reports, this report aimed at discussing key questions parents, the public, and policy makers were asking at the time. The report analyzed if vouchers really do provide choice for poor students and the educational impact of the program.

When analyzing whether the Cleveland Scholarship Program realizes its goal of provide school choice to low-income students, Pathak et al (2001) points to the figure that in its first year, the program spent $1.6 million in taxpayer funded money on the tuition of students that were already enrolled in private schools. That amount of money accounted for about one quarter of all of the taxpayer money dedicated to the program. Also highlighted is that between 1999 and 2000, forty percent of students that received vouchers were above the poverty line. Pathak et al. also pointed out that the ultimate choice with vouchers is held by the schools, as they are the ones who can decide to accept students or not. Parents simply can choose which schools they are interested in but ultimately schools hold the final decision. Voucher schools may exclude students due to special education status, behavioral issues, disabilities, academic performance, religious affiliation, or other factors, highlighting a key difference between public and private schools being that private schools are not required to educate every child, while public schools are, regardless of ability and needs.

Ultimately, Pathak et al. provides support that the impact of vouchers is rather insignificant in terms of educational advantages and highlights issues with access to private schools even in the case of vouchers.

As a follow up to the first two reports from Indiana University, summarized in Lanese (1999), the Indiana Center for Evaluation published the second annual report investigating the operation and impact of the program. This year of the report focused on the characteristics of students, teachers, and classrooms in the program and in public schools, and the academic achievement of students in the program. The findings of this evaluation found that when compared to the demographic make-up of public schools, there are a greater proportion of white scholarship students than African American scholarship students, but there are nearly twice the proportion of Hispanic and multiracial scholarship students compared to the public schools. This implies that African American students may be underrepresented in the program, while Hispanic and multiracial student may be overrepresented. However, it is important to remember that the programs' goal is to provide access to private schools for poorer families in Cleveland, thus representation in the program should show that economically disadvantaged groups should be the majority in the program. Further findings show that when compared to previous evaluations students in the program at this point of study were less likely to qualify for free lunch compared to their public-school peers, meaning that they were economically better off than those who remained in public schools. Assumptions about which racial groups are economically disadvantaged can also be made and if true, African American student representation in the program should be higher if the program intends to meet its

goal. The evaluation also found that while the rates of teachers being fully certified at both public and private schools are high, they are slightly higher at public schools. This indicates that students in the program may not always be better off than their public-school counter parts in terms of ability and effectiveness of their teachers, raising concerns about whether or not these private schools are set up to produce greater academic outcomes. An interesting result found in this evaluation was that class size was positively related to achievement growth, meaning that students in larger classes were more likely to experience greater achievement growth. This relationship was the only teacher or classroom variable that explained a significant portion of student achievement; however, it was also a weak association. Keeping that in mind, private schools tended to have greater class sizes when compared to public schools. This should indicate higher academic achievement for students in private schools, however a further finding, that there were no significant and consistent differences between achievement for vouchers recipients and public-school students negates this prediction. The last finding of importance from this evaluation was that students who were in the program and left achieved at the lowest levels when compared to all other groups, emphasizing the importance of retention once in the program (Metcalf et al. 2002). This evaluation reinforces the finding that the program demonstrates little, if any, impact on academic achievement and raises concerns about if the program is actually impacting the target group of poor Cleveland families.

A 2006 report, “Vouchers and the Cleveland Scholarship Program: Little Progress so far” used the data set created by the Indiana University team to evaluate the impact of

voucher status on academic achievement. The report goes into detail about the impact of voucher use in specific subject areas but ultimately shows that any voucher effect is weak, if prior achievement is not controlled for the results do not favor voucher use. The results also showed that voucher using African American students appeared more disadvantaged. Ultimately, the results of the study showed that there is no clear advantage for voucher students and if anything, there may be a slight disadvantage, confirming the lack of impact of vouchers on achievement found in previous evaluations (Belfield, 2006).

In a response to widespread claims that voucher programs lead to greater segregation of schools in the United States, Greg Forster and the Milton and Rose D. Freidman foundation published a 2006 report that investigated segregation levels in both Cleveland Public Schools and the Cleveland Scholarship Program[10]. The results of the study showed that private schools participating in the Cleveland Scholarship Program were 18 percent less segregated than public schools in Cleveland, while nationally public

[10] Before looking into data about segregation levels in Cleveland Schools, Forster first criticizes the measurement tools typically used for quantifying segregation in schools. The criticism rests on the idea that commonly used measurements typically only compare a school's level of segregation to the racial make-up of the school district, private school system, or municipality. Forster claims, this comparison ignores the contribution of the segregation of these greater units as causes for segregation of the school under investigation. Foster lists, the Index of Dissimilarity, the Index of Exposure, and The Gini Index, commonly used and widely accepted measurement tools in social science research, as common measures that fall victim to this issue. To avoid this issue, Forster says that comparison should be made to the racial composition of the larger metropolitan areas in which schools are located and uses this as the basis of the method for looking at segregation in Cleveland. Forster used census and education demographic data to find the percentage of white students in each school in the program and subtracted the percentage of percentage of white people in the metro area from each school percentage to produce a segregation measurement for each school. To present this data in an intuitive way each segregation percentage was multiplied by 100, this was so when talking about the data a unit of 10 meant that the school's percentage of white students varies from the metropolitan areas' percentage of white people by 10 percentage points. With this data Forster moved to linear regression to compare segregation between public and private schools, controlling for elementary or secondary school, and weighing data by school enrollment to avoid small schools from distorting the analysis. Similar analysis was conducted at the national level to give context for the Cleveland results.

schools were two percent less segregated than private schools (Foster 2006). The results of this report imply that the Cleveland Scholarship Program places students into less segregated schools, however the results need to be interpreted with the understanding that the measurement used for segregation is neither commonly use nor reviewed extensively by other researchers in the field at the time of this report, as it was not published in a peer-reviewed journal.

To assess whether or not the Cleveland Scholarship Program enrolls the targeted group, low-income families, a 2007 article published in Education and Urban Society analyzed demographic data from the Cleveland Municipal School District and the Cleveland Scholarship Program on race, family size, income, and previous school of enrollment for those who applied for vouchers. The cohort of data ranged from 1997 to 2001, looking at families who applied for vouchers each year. Results of the analysis found that the only significant difference between those that applied for the voucher program and the entire population eligible was for the 2000-2001 school year, where a lower percentage of students in the voucher cohort were minority compared to the percentage of minority students in the Cleveland Municipal School district. Or to summarize, applicants of the voucher program are relatively similar when considering minority status to the general population of public schools in Cleveland. The analysis also compared race, family size, and income and found that the student populations between the two groups are remarkably similar. The implications of this are that the application process does not appear to have bias toward who applies and who does not. The results also found that the initial awarding of vouchers does target low-income families, aligning

with the goal of the program, and that the racial and income make-ups of these families is roughly a mirror of the Cleveland public school population. Along with this, families who applied and did not receive a voucher were more likely to be higher income families, further highlighting that the organizational process of application and award follows the goals of the program. Despite this equality in opportunity, the data on the use of vouchers showed that those who were awarded a voucher and did not use it were more likely to be minority and low-income[11], displaying that the use of vouchers was less well distributed than the awarding of vouchers (Paul et al, 2007). This study supports any claims that the program does not fully meet its goal of providing poor families with private school education.

In 2008, an article looked specifically at differences in achievement of high ability or 'gifted' children between the Cleveland Scholarship Program and Cleveland Public Schools. After multivariate analysis of variance, results found that there was no significant difference for test performance between gifted students attending private schools using vouchers and gifted students in public schools (Plucker et al, 2008). The results of this study algin with the results of many of the previous studies, that use of vouchers does not produce higher academic achievement when compared to non-voucher using peers.

This review of the evaluations of the Cleveland Scholarship program illustrates that the program, designed to primarily help low-income students increased their

[11] Followers of neoclassical thought would argue that the families simply chose not to attend private schools, while a heterodox perspective would explain that the structure of funding for vouchers may have prevented parents for having a full choice, as the vouchers do not cover all costs.

educational opportunity, does not excel at meeting it's goal. While the voucher program does increase access for some families, issues with costs and program logistics have run rampant, preventing the program from thriving. Even for the students whose educational opportunity has increased, this review finds that the expected increases in academic achievement from attending private schools did not occur.

This review is extremely limited in what it can say about how efficient the program is. While conclusions can be drawn about how effective the program was is, in terms of meeting its initial goals, little can be said about if the program is effective in terms of cost. Pathak et al (2001) discussed taxpayer money being reallocated to students who were already enrolled in private schools previous to program participation, implying that the money that would have gone to public schools. Here the program likely cost taxpayers more money as they funded both private and public schools, rather than just public schools, illustrating a lack of economic efficiency as the program was not cost saving if this is the case.

Implications and Relation to Health Outcomes

This review of the evaluations of the Cleveland Scholarship program suggests little difference between voucher users and voucher non-users in terms of impact on academic achievement. Generally, the evaluations displayed no significant differences between the two groups in terms of academic achievement, therefore, when considering these evaluations in the context of the health pathways identified in the previous chapter, the health pathways that both groups follow are unlikely to have changed for better or for worse. This conclusion can be reached as 'years of education' has been identified as one of the main determinants of health outcomes in our pathway framework. Because

academic achievement can be used as an indicator of continuing education, it is safe to assume that if there were major differences between the two groups across academic achievement, then one group would be more likely to receive more years of education than the other and therefore have better health outcomes than the other. This review has shown that this is not the case. While the program has shown mixed evidence on if the intended low-income groups are actually reaping the benefits of the program, the lack of achievement differences between the two indicates that even if the program is targeting users perfectly, it is not providing the means for these families to increase their social mobility through increasing education and therefore income and wealth. As a result, the evidence does not support that participation in the program provides users with a better chance of positive health outcomes, as the healthy segment of the population is the wealthy segment.

As shown throughout the review of evaluations, there is a substantial body of evidence illustrating the mismatch between the goal of the Cleveland Scholarship Program; to provide access to private schools for low-income families in Cleveland and the actual impact of the program. Greene, Howell, & Peterson (1997), Lanese (1999), Pathak et al. (2001), Metcalf et al. (2002), and Paul et al. (2007), all point to a variety of evidence supporting this statement. In the early years of the program issues with communication between the program and low-income families seems to be the blame for why target groups were not reached. A few years into the program, when it was more established, issues with access to using vouchers, whether for financial, logistical, or other reasons explained the mismatch between targeted group and actual voucher use.

This implies that structural issues with implementation and organization of the program may have prevented access for targeted low-income groups. Considering this within the context of health pathways reveals that even if the program produced all the positive determinants of health, low-income families would not be able to benefit from the program and climb the social mobility ladder to more positive health outcomes. Understanding this, the conclusion can be drawn that voucher programs will only be relatively beneficial, in terms of health outcomes, if the programs target and provide full access to private schools that produce academic achievement gains to groups of the population that can use such gains to increase their social mobility in terms of income. Evidence from the review has shown that this is not the case for the Cleveland Scholarship Programs, and thus the voucher program is no better at producing positive health outcomes than traditionally funded public schools.

While academic achievement does not make the case for better health outcomes being associated with voucher schools, unobserved variables associated with parent satisfaction may support that case. The literature has shown that parents are much more likely to have higher satisfaction with private voucher schools than public schools. As addressed before this may be a choice bias, where parents say they are more satisfied because they made the choice to send their child to a private school and thus support their own decision. While this bias most likely exists, there still may be non-academic factors like safety, location, and facilities that parents are more satisfied with. As these factors are included in our health pathways, they will also impact health outcomes later in life.

However, the literature does not discuss these factors, and thus definite conclusions about their impacts cannot be drawn.

When considered together, the literature surrounding cash and in-kind benefits and the Cleveland Scholarship program does not outwardly support voucher programs as a way to fund education in the United States that will improve health outcomes. Little difference is shown in terms of effectiveness between cash and in-kind benefits in general and the Cleveland Scholarship program confirms this when looking at academic achievement. If the literature favored cash over in-kind benefits, and major academic gains were shown under voucher schools, then support for expanding voucher programs, in the context of health outcomes would exist. This, however, is not the case, thus the spreading of voucher programs in the United States is not supported as a way to improve health outcomes.

Here it is important to acknowledge that this program evaluation is extremely narrow. Through the evaluation of the literature the only factors considered in determining program effectiveness and efficiency were changes in academic achievement and cost of the program. Due to the nature of the evaluation, only these observable factors could be used in this evaluation. Factors outside of the literature, such as family environments, social capital and cultural influences, are not considered in this evaluation, but clearly are important in the story of determining academic achievement. This displays how narrow this evaluation is and implies that the results should be considered carefully given that acknowledgement.

Conclusion

This thesis aims to demonstrate the connection between K-12 education finance and health outcomes in the United States. Education finance is critical in determining both quality and quantity of education (i.e., how much education students receive) and, in turn, indirectly affecting health outcomes much later in life.

This thesis compares both the mainstream and non-mainstream (or heterodox) approaches in economics to understand and conceptualize the nexus between financing education and health outcomes. The former envisions the nexus from an individualistic perspective in line with its well-known methodological individualist perspective. On the other hand, the latter does put the individual and individual's preferences in its social context with the help of the social determinants of health approach in the public health field. As a result, the thesis argues that the latter approach is more suitable to explain the nexus between financing education and health outcomes that involves a complex web of various factors at different times and levels in an individual's life rather than their preferences and choices based on hedonistic calculations as in mainstream approach in economics.

More specifically, the thesis compares in-kind (e.g., public school system) and cash (e.g., vouchers as a proxy) in financing education and their respective impacts on health outcomes in the U.S.A. through various pathways that are identified according to the social determinants of health approach. It is argued that voucher programs have the

potential to change those pathways by providing certain groups with the opportunity to attend better quality schools. If vouchers provide access to better funded and higher quality schools that should produce gains in academic achievement, then health outcomes for groups who use vouchers should be better than if they do not use vouchers. However, an evaluation of benefits of voucher programs has shown that the private schools that groups are gaining access to do not produce significantly better academic gains, and therefore do not seem to have the capacity to realize the potential of improving health outcomes. In short, the results do not support the spread of voucher programs in the United States as a tool for improving health outcomes.

Policy Recommendations

Based on the findings of this analysis, a holistic approach to policy reform, outlined by Diderichsen et al. 2011, is recommended. This approach to policy reform involves looking at policy solutions at different entry points where various social factors at different levels determine one's health in distinct ways. Diderichsen et al. 2011 identifies four such entry points that when utilized ensure that the policy making recommendations include consideration of the link between social hierarchy and inequities in health outcomes. Policy entry point A serves as the starting point for policy reform by targeting the starting point of social stratification and aims to reduce the social stratification and its impact on health outcomes as much as possible. Accordingly, appropriate policy measures are usually defined at macroeconomic level such as progressive taxation policies, affirmative action, employment creation, access to education, etc. Policy entry points B and C consider what can done to decrease exposure

to negative health factors and reduce vulnerability for more effective groups, respectively, by designing policies at meso-level (e.g., workplace safety, targeted smoking cessation campaigns, etc.). The last policy entry point D considers what can be done to prevent unequal consequences of ill health if and when the previous policy measures could not make a big difference in reducing social inequalities. Specifically, policies target access to and financing of medical care services based on "need" rather than "ability to pay" in line with horizontal and vertical equity criteria.

This frameworks for thinking about policy reform can be adapted to look at what can be done on a policy level to reduced inequalities in health outcomes that arise from the K-12 education system in the United States. Thinking about policy entry point A, any policy that decreases the unequal distribution of wealth and income in the United States can help reducing inequalities in health outcomes that arise from the K-12 education system in the United States. Education, even in the public case, is determined to some extent by income, as school funding is determined by property taxes, thus the wealthier you are, assuming you live in an equally wealthy neighborhood, the better funded education you will receive. Moving to policy entry points B and C, policy that ensures schools are located in areas that do not expose students to environmental hazards, that allow schools to provide before and after care for those who need it and, regulated and increase access to school nutrition programs can help to reduce the inequalities in health outcomes that arise. Finally, policies that align with entry point D include need-based financing and access to medical care services.

Limitations

There are a few limitations within this thesis. Primarily, it is difficult to draw definite conclusions because the connection between health outcomes and education finance is indirect and takes place through a complex web of pathways. The pathways that can be identified are rather general, limiting the degree of analysis possible at this stage. Another limitation is that this thesis does not use quantitative analysis to support its argument. Quantitative analysis was not used as a result of issues with availability of data, the lag between when one is in school and when health outcomes appear later in life that is almost impossible to trace due to mobility of people across states. A final limitation of this thesis is the lack of discussion about mental health throughout. While there is brief discussion, the importance of the consideration mental health within any conversation on health is not sufficiently displayed. Future research should focus on providing quantitative analysis to deepen the understanding of the connection while being sure to pay close attention to mental health as well as physical health.

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