

# Creating Equality through the Subsidization of Higher Education

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By: Katie Holland

**Abstract:** As more and more individuals attend higher institutions of learning, researchers and policymakers alike have been questioning the amount of government expenditure that should be spent on tertiary education. It is argued that public expenditure on education provides economic benefit for countries through development and growth. There is need for more quantitative analyses on the different levels of educational expenditure. The goal of this paper is to examine government expenditure on the tertiary level, and how it affects the income distribution of a country. Thirty-four, OECD countries are analyzed over a period of fifty-three years, from 1960-2012 to determine the relationship between public expenditure on tertiary educational institutions and income inequality.

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## I. Introduction

Education is a necessary and important determinant of the economic growth of any nation. Therefore, the traditional opinion has been that education should be provided by the state. However, as the higher education sector increasingly expands globally, countries are faced with the issue of finding ways to fund the rise in the demand. Governments have to allocate funds to a number of various sectors and as resources become scarce, it is important to determine which sectors provide the most social return. In the last few decades, there has been a vast amount of literature written regarding nations' expenditures on education. Many authors have proposed various funding techniques ranging from voucher programs to cost sharing to privatization of the tertiary sector. The examination of these policies raises the question of the importance of government spending on tertiary education, and its effects on a nation. It is generally assumed that increases in higher education are a social and economic advantage. If this were true, then more government expenditure on the tertiary sector would benefit society as a whole, and should be encouraged. Therefore, an interesting question has come to the surface of discussion: what are the social returns of government expenditure on the tertiary educational sector? This paper will, more specifically, examine the question: What is the effect of government tertiary educational expenditure on income inequality within developed countries?

The question examined in this paper is interesting because if it is determined that more government spending leads to a reduction in income inequality, then policymakers should reconsider placing the funding of tertiary education on the private sector. In this paper I will argue, based on empirical data, that nations can create more income equality through increases in government subsidization of higher education. My research will cover

the years 1960-2012 in thirty-four OECD countries. I will observe how government expenditure per student affects income distribution in each nation. The paper will begin with a discussion of the existing knowledge of the topic, and an explanation of my argument and hypothesis. Then I will provide a description of my research design including the sample, indicators, and measurements used. Next in the paper I will discuss the findings from the data analyses, and finally, the conclusion of this paper will summarize what has been determined and what policymakers should learn from this research.

## **II. Unpacking Contentions within the Literature**

### **II.1 Liberal vs. Neoliberal Opinions**

The debate over whether the state or the market should carry the burden of the costs of higher education first surfaced in mainstream discussion around the 1970's. Traditionally, nations followed Keynesian type policies, recognizing the power of the state in funding education for the masses. However, financial crises in the 1970's brought about economic reforms (Tilak 2004). A decline in Keynesian policies led to the introduction of neoliberal economics and the concept of the free market. An extreme form of neoliberalism was supported by authors such as Hayek (1976), who argued that individual freedom and choice are the most important considerations in determining policy, and the public good aspect of others' arguments are impossible and undesirable. Neoliberal economic reforms occurred in developing countries and the privatization of educational institutions was encouraged by international organizations such as the International Monetary Fund and the World Bank. The philosophy of these neoliberal policies was grounded in the belief that "any aspect related to public sector is inefficient, and any aspect related to private sector is,

*ipso facto*, efficient and desirable” (Tilak 2004). The role of higher education has been redefined and the state versus the market debate has remained in contention within the literature for many years.

There is a general consensus amongst all researchers that education is beneficial to the well being of a country. Education leads to more political participation (Glaeser 2007), is a socially collective good (Greenshields 2010), and leads to significant and positive economic effects within the development of a nation (Yelland 2011, Oketch 2003, Torres and Schugurensky 2002). The existing literature examines the importance of expanding education, as well as the issues that arise from such expansion. Higher education has begun to succumb to the effects of globalization. In most countries, demand for higher education is increasing, and much of the research presents the increasing need for governments to transition from free and subsidized education to more efficient and less costly systems of education. Those in favor of neoliberal reforms (Torres and Schugurensky 2002, Oketch 2003, Curs et al 2011) argue that the marketization of higher education will provide better efficiency and equity. These authors assert that public subsidization of education is inefficient and lowers the quality of the education whilst having perverse effects on income distribution, and therefore, privatization is ideal. However, the most contested argument is the difference in social returns and private returns. Those in favor of privatization insist that the private rates of return to education are consistently greater than those of the social returns.

Others have written in opposition to the neo-liberal proposals of economic reform within tertiary educational systems (Tilak 2004, Docampo 2007, IIASA 2008, Yelland 2011). Harry Patrinos (1990), in the case of Columbia, argues that a transition to

privatization would create more problems for the quality of education and access to education. While Greenshields (2010) presents the case of Cuba, where a system of free education is performing successfully, and the country was famously able to eliminate illiteracy in the early years of its revolution. Greenshields asserts that Cuba is an example of a system where free education works, and the need for privatization of education have yet to arise. While some authors do not agree with the neo-liberal framework of privatized, market-based tertiary education, there is an overarching agreement that these transitions are taking place in most developing and developed countries today. However, it is argued that nations should look towards other funding techniques to promote equity and efficiency. Authors still assert that the state should play the primary role in funding higher education because the social benefits of education are numerous: "improvement in health, reduction in population growth, reduction in poverty, improvement in income distribution, reduction in crime, rapid adoption of new technologies, and the strengthening of democracy (Tilak 2004). Furthermore, it is argued that states should control higher education, because they are wiser than individuals in handling the investments, and markets are imperfect in ensuring an equitable supply of quality education (Vossensteyn 2004). Therefore, the existing knowledge is at a crossroads, and it is important to determine the effects of public educational expenditure both socially and privately. As previously mentioned, this paper will examine how government expenditure affects the income distribution of a nation, and it will become clear that this is another contested topic in the sphere of conversation.

## II.2 The Government Expenditure – Income Inequality Relationship

The existing literature contests the effects of public subsidization of education on changes in income inequality. While some authors argue that increases in higher education spending could have negative effects on income distribution (Psacharopoulos 1977), others have shown through empirical evidence that greater educational expenditures can reduce income inequality (Keller 2010, Sylwester 2002, Sylwester 2003). Psacharopoulos (1977) argues that free and subsidized education would aggravate social disparities. “Regardless of whether education is offered free or not, a *de facto* price selection takes place which favors the rich” (73). Docampo (2007) admits, in support of Psacharopoulos, that a strong rationale exists for asserting that subsidized education could involve a transfer of rents from the poor to the wealthy, and that governmental education expenditures would therefore be regressive (370). Psacharopoulos (1977) identifies three key issues with free education: inequality, inefficiency, and the creation of unemployment. He argues that free and subsidized education will always favor the higher income group within a country, and will negatively affect secondary education graduates.

In contrast, authors that favor free and subsidized education have found that government expenditure positively influences enrollment, which in turn reduces income inequality. Sylwester (2002) finds that these effects occur at a greater rate in high-income nations. However, his analysis in 2003 shows that these effects also occur significantly in non-OECD countries. Sylwester’s work further showed that the realization of these effects may be slow and that lagging data could be beneficial. In 2007, a study by Babones et al. examined the use of a lag structure when analyzing the education-income inequality relationship. The study concluded that there is no benefit from lagging data, despite the

various theoretical arguments to do so. However, the analysis in this paper will show that when examining the education expenditure-income inequality relationship, lagging is the necessary method.

Katrina Keller (2010) examines the effects of expenditure per student on reducing income inequality at all levels of education. She argues that the use of expenditure per student as a variable, rather than the use of total educational expenditure, may be a better indicator of education quality. "If consequently education quality declines, students will not obtain high enough productivity and incomes to decrease the wage gap" (72). Keller supports the assertion made by the Economic Policy Committee and Directorate-General for Economic and Financial Affairs (2010) that the quality of education plays a major factor in determining the effects of expenditure on income inequality. Keller (2010) furthers the research on the education expenditure – income inequality relationship by showing that increases in expenditure can lead to increases in enrollment, which can reduce fertility rates, and in turn decreases income inequality. However, Bergh and Fink (2008) have published a study that refutes all others arguments, asserting that there is no relationship between higher education expenditures, enrollment, and income inequality. These authors argue that income inequality can either increase or decrease depending on the level of initial enrollment in both secondary and tertiary institutions. Therefore, they conclude that the use of educational policy as a tool for decreasing income inequality could prove futile.

The existing knowledge and theories have shown that the relationship between educational expenditure and income inequality is not simple. The current empirical research is debated amongst researchers, and the contention that exists asserts the necessity to consider many factors when examining the social effects of governmental

expenditure on education. While the literature on this relationship is thorough, there are some gaps within the research that necessitate further analysis. Most of the studies (Psacharopoulos 1977, Keller 2010, Sylwester 2002) focus on primary and secondary institutions, while only vaguely discussing tertiary institutions. Furthermore, the bulk of existing literature discusses the effects of educational expenditure on income inequality within developing and lesser-developed nations. The prevalence of literature focused on these nations may be explained by the need of developing countries for economic and educational reform, as more and more students are attending higher institutions of learning, and governmental resources are becoming more and more limited. Also, since primary and secondary education has shown to have the most beneficial effects on economic growth (IIASA 2009, Loening 2005), these institutions have been the focus of most research. However, there is a need to further analyze the educational expenditure – income inequality relationship on the tertiary level and within developed nations.

### **III. Argument and Hypothesis:**

This paper intends to examine the effect of governmental tertiary educational expenditure on income inequality in developed nations. Governmental expenditure in the tertiary education sector is defined as the total amount of money and resources the government, at all levels, provides for higher education institutions. Income inequality is defined as the unequal distribution of income within a nation. It is expected that greater governmental expenditures in the tertiary sector will decrease the private costs of educational attainment, which would be an incentive for individuals to enroll in higher educational institutions. As Curs et al (2011) write, “Endogenous economic growth theory

predicts that when investments in higher education are financed through non-distortionary taxes it promotes economic growth by creating a labor force that is more productive.” It is argued that this form of economic growth can lead to decreases in income inequality. Furthermore, as Sylwester (2003) notes, greater participation in higher education would change the composition of the labor force, thereby affecting income dispersion. As more and more unskilled workers become skilled within a country, the wage premium would lower for skilled workers consequently lowering income inequality. With these relationships in mind, the hypothesis of this paper is that higher levels of government spending on tertiary education will reduce income inequality within developed nations.

## **IV. Research Design:**

### **IV.1 Sample**

For this analysis, I designed a panel study that represents developed nations throughout the world. I collected information from thirty-four OECD countries. In my sample, I have included Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, the Republic of Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Within my sample there are developed countries (DCs) and lesser-developed countries (LDCs) that are from a wide range of geographical locations, though most are located in Europe. While the span of these countries differs culturally and demographically, two different approaches to higher education expenditure policy are represented in this sample: the Scandinavian approach and the Anglo-American approach.

Domingo Docampo (2007) identifies the two expenditure policy approaches through empirical research. The “Scandinavian model” is characterized by very high taxes, high spending in

tertiary education, large enrollment numbers, and a strong commitment to research and development. The “Anglo-American model” is defined by large enrollment and a strong commitment to research and development as well, but this model differs by having much lower taxes and substantial private spending in the higher education sector. Denmark, Norway, Sweden, and Finland are the countries identified as following the Scandinavian model, which generally treats higher education institutions equally. The United States, Australia, Canada, Korea, and the United Kingdom are identified as following the Anglo-American approach, which views higher education institutions as heterogeneous, treats them diversely, and compares quality between them (Docampo 2007). Therefore, my sample is well representative of various expenditure policies in different countries worldwide, and may be able to shine some light on the effects of expenditure policies on income inequality.

There are 1802 observations in my sample. My initial goal was to collect data for all countries from 1960 to 2012. While some data was available during all of these years, other variables I analyzed were only available for certain years. Income inequality was available for most countries every few years after 1980. Expenditure per student was available for most countries every few years from 1975, and almost every year after 1995. My bivariate analyses, using these two variables, averaged seven to ten years for each country. While it would have been ideal to have more observations for each of my variables, the data I was able to collect and analyze is still a fair indicator of the expenditure-income inequality relationship.

## IV.2 Measurement

### *Dependent Variable*

In my study, the dependent variable, income inequality measures “the degree of inequality in the distribution of family income in a country” (Central Intelligence Agency 2012). The measurement used is the GINI index, which uses the Lorenz curve to describe the distribution of

income. Data was first taken from the Luxembourg Income Study Database (LIS 2011), and then missing values were filled in using data from the OECD database (OECD 2012b) and the World Bank's World Development Indicators database (World Bank 2012b). The data from the World Bank was originally expressed as an integer ranging from 0-100, while the other GINI data was expressed as a decimal between 0-1. Therefore, the World Bank data was divided by 100 when added to the income inequality indicator. This variable is presented as an interval measure, and the values of the GINI coefficient range between 0, which represents "perfect equality" and 1, which represents "perfect inequality" (OECD 2012b). The income inequality variable ranges from a minimum value of .189 (Slovak Republic in 1992) to a maximum value of .562 (Chile in 1988), with a mean value of .316 (Canada in 1971). This indicator provides a good measure of income inequality for the purposes of this analysis.

### ***Explanatory Variable***

The explanatory variable in this study is government expenditure on the tertiary educational sector. This variable is measured as the amount of public expenditure spent per pupil in tertiary education, expressed as a percent of GDP per capita. The data for this variable was pulled from the World Bank's World Development Indicators database, which took information from UNESCO's Institute for Statistics (World Bank 2012a). This variable includes data that expresses current and capital government spending on both public and private educational institutions and educational administration. Also included are subsidies the government allocates to the private sector, which includes students, households, and other private entities. The values of this indicator range from a minimum of 4.80% (Republic of Korea in 2002) to a maximum of 147.32% (Chile in 1981) with a mean of 42.35% (Ireland 1990 and Netherlands 2006). This is a good indicator of government expenditure on tertiary education, because it includes all of the funds that governments allocate to higher education, including institutions and the private sector.

Furthermore, by using the expenditure per student indicator, this variable controls for quality with the increase in enrollment.

### ***Control Variables***

I used a number of control variables in my analysis to develop the precision of my findings. Based on the standard in the literature, these variables include enrollment, development status, and year. Enrollment refers to the percentage of the population that is enrolled in tertiary educational institutions each year. This variable was calculated by using the enrollment (total number of students) data from the OECD education database (OECD 2012a), and dividing it by the total population data, taken from the World Development Indicators database (World Bank 2012b). Development status is measured in each country using the gross domestic product (GDP) per capita in a particular year. GDP per capita is calculated by dividing the GDP of a country by their total population in the same year. The values for development status were recorded in constant 2000 U.S. dollars. Lastly, year is used to control for trending effects of income inequality in each country, because it has been found that income inequality can naturally rise with each increasing year.

The first control variable, enrollment, measured as the percentage of the population enrolled in tertiary education, had a total of 710 observations. The values of this variable ranged from a minimum of .18% (Japan in 1986) to a maximum of 10.02% (Czech Republic in 1967), with a mean value of 3.59%. In respect to the second variable, development status, measured as GDP per capita, had a total 1562 observations. The values ranged from a minimum of 1050.37 constant 2000 U.S. dollars (Hungary in 1960) to a maximum of 56285.28 constant 2000 U.S. dollars (Luxembourg 2007). The sample average of this variable was 15521.72 constant 2000 U.S. dollars. The last control variable, year, ranged from 1960-2012.

### **IV.3 Method**

To analyze these variables, I used bivariate correlations and inferential statistics. The bivariate correlations were used to determine an association between educational expenditure and

income inequality, and are expressed in Figure 1 in the appendix. The inferential statistical technique used was linear regression, because all of the variables analyzed are continuous. This was the best technique to establish the average effect of the explanatory variable and the control variables on the dependent variable. In order to control for the effects of time lags in the expenditure-income relationship, I lagged the explanatory variables by one year. Therefore, I created a new dependent variable called “Lead Income Inequality,” which refers to the income inequality of each country for the following year. Using linear regression, I have estimated four models, which can be found in Table 1 in the appendix. The first model analyzes the effect of only the expenditure indicator on the lead income inequality variable. Each model following includes an additional control variable.

## **V. Findings:**

I expected the countries with higher expenditures per student in tertiary education to have lower levels of income inequality. The regression analysis, displayed in Table 1 in the appendix, expresses that the expenditure variable and the income inequality variable maintains a negative relationship across all models. Furthermore, the effect of expenditure on income inequality remains statistically significant. This analysis supports my hypothesis. Model 4 presents the relationships between income inequality and all the explanatory variables used (expenditure, enrollment, development status, and year). This model shows that enrollment and development status all have a negative and statistically significant effect on income inequality, as well. Year, however, appears to have a positive and statistically significant effect on income inequality.

How large are the effects of expenditure, enrollment, and development status on income inequality? According to the estimate of Model 4, the full model, for each 1% increase in expenditure per student within a country, there is a .001-point decrease in the GINI coefficient, representing income inequality, within that same country. In regards to enrollment, for each 1%

increase in the number of students enrolled in higher education, there is a .015-point decrease in income inequality. Under this model, enrollment has a larger effect on income inequality than expenditure per student. GDP per capita, however has the smallest effect. For each 1-point increase of the GDP per capita of a nation, there is a .0000067-point decrease in income inequality. Finally, year has shown to have positive effect, for each year that passes, income inequality increases by .003 points.

How strong are these effects that have been recorded? The R-squared statistic, listed in table 1, indicates the proportion of the variation in the dependent variable that is explained by the independent variables. Using this statistic, according to the full model, the variables expenditure, enrollment, development status, and year account for 25.1% of the variation in the lead income inequality variable. Considering this paper is analyzing a political topic, using multi-causal variables, this proves to be a fairly strong effect. However, this statistic indicates that there is 74.9% of the variation in income inequality that is not explained, though it needs to be through other measures.

## **VI. Conclusion:**

The goal of this paper was to determine one type of social return from government expenditure on higher education. In my argument I asserted that higher public expenditure on tertiary educational institutions would increase enrollment within a country, and in turn affect the income distribution of that nation, possibly providing a positive social return. I hypothesized that increases in government expenditure will negatively affect income inequality, and the empirical analysis provided within this paper supported this hypothesis. The findings of my research can be found in tables 1 and 2 in the Appendix. This project represents an in-depth study of thirty-four developed OECD countries' total public expenditures per student on tertiary institutions, administrations, and private entities and their effects on income inequality. This study brought

together the existing knowledge of this relationship and added to the current literature by examining only developed countries that follow the Scandinavian and Anglo-American policy models, and only examining expenditure at the tertiary level.

To further the analysis, I conducted one more bivariate comparison of the expenditure – income inequality relationship that only considered the United States. The findings of this comparison are listed in Table 2 in the Appendix. This comparison negated my hypothesis, and showed a positive relationship between government expenditure on tertiary education and income inequality in stark contrast to my total findings. Substantively speaking, this analysis displayed an increase in the GINI coefficient from low expenditure to high expenditure. Low tertiary educational expenditure compared to a mean of .359 in regards to income inequality, and high expenditure had an average of .3742. It has been noted in the literature that countries which rely too heavily on market forces to regulate the higher education system will display a reduction in the public benefits of that education (World Bank 2000). The United States is one country that has a relatively large private education sector, and this information could provide an explanation for the results found in this project. However, It is important to note that the sample for this comparison only consisted of nine observations. This is an extremely small sample, and may not be indicative of the true relationship, but it is important to observe this possibility. These results necessitate further research to be conducted that examines this relationship in the United States alone.

The research into the topic of the social and private effects of higher education expenditures indicated some interesting implications of the measurements that were used in this paper. Curs et al. (2011) examined the relationship between educational expenditure and economic growth within the United States alone. These authors found that the size of the private higher education system within each state provides a different effect on economic growth. Therefore, it is pertinent for future studies to control for the amount of private institutions in a nation when analyzing the effects of public expenditures. I did not control for private institutions in my analysis due to the

number of countries used in my sample and the lack of data. However, when examining individual nations, this method would be a better determinant of the true expenditure – income inequality relationship.

In consideration of the findings of this paper, there are several policy recommendations that can be made for the leaders of developed nations that are contemplating different funding techniques for tertiary education. First, it has been made clear that higher education expenditures are indeed a social good as they improve the income distribution of a nation. Therefore, it would seem that countries should not consider the complete privatization of their tertiary education systems. Instead, it would seem complete subsidization may be the best funding technique. However, since the resources in many countries are publicly and privately dwindling, I would recommend a mixed-funding model. While state policies are necessary to provide proper funding and to promote the public interest in higher education, no system should forgo the advantages of private investment for private benefit. Therefore, in order for this model to work, it is necessary that states maximize the financial inputs of the private sector by encouraging philanthropic individuals and institutions to donate in the name of the social good. Furthermore, states need to focus on efficient and effective spending. There is a vast amount of literature written on the topic of effective and efficient educational expenditure, way too much to discuss in this paper. Nevertheless, it is clear that efficiency and effectiveness are important aspects of educational expenditure. Effective spending leads to efficient educational systems that are high in quality and the assurance of quality education encourages individuals to invest in their own higher education.

The data in this paper indicate that policymakers should find the means to increase their tertiary educational expenditures if they intend to improve the income distribution of their nation. This might entail states cutting funding from other sectors. Further research is necessary to determine the best methods for nations to follow. It would prove pertinent to examine the effects of other sectors on income inequality, so that researchers and policymakers alike can determine

which sectors should receive the most government funding. Furthermore, the discussions of this paper necessitate more research to be completed that analyses nations individually, and includes the size of the private educational system as a control. While there is more to research on this topic, this paper has concluded that income inequality can be decreased within a developed nation if leaders increase their public expenditure on tertiary education.

## Appendix

**Table 1.**

<b>Variables</b>	<b>Dependent: Lead Income Inequality</b>			
<b>Explanatory</b>	Model 1	Model 2	Model 3	Model 4
Expenditure Per student (%GDP)	<b>-.001*</b> (.000)	<b>-.002*</b> (.000)	<b>-.002*</b> (.000)	<b>-.001*</b> (.002)
Enrollment (%population)		<b>-.017*</b> (.000)	<b>-.012*</b> (.006)	<b>-.015*</b> (.000)
GDP per capita			<b>-1.601E-006*</b> (.000)	<b>-1.67E-006*</b> (.000)
Year				<b>.003*</b> (.000)
N	268	210	210	210
R Squared	0.80	.140	.193	.251

\* $p \leq 0.01$

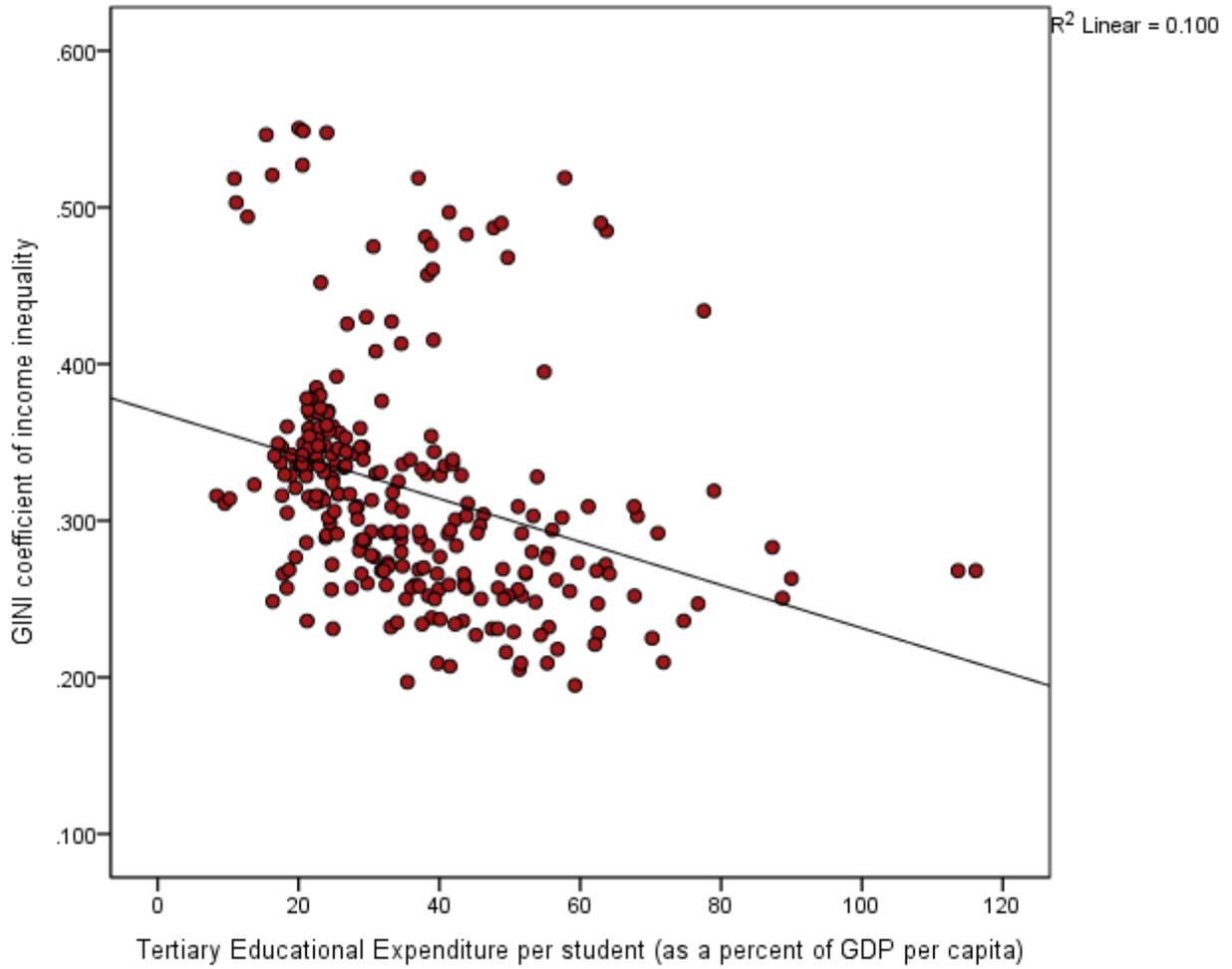
**Effect of Expenditure:** Based on this sample, expenditure has a negative and statistically significant (98%) effect on income inequality. One percentage point increase in expenditure per student leads to a .001-point decrease in the GINI coefficient representing income inequality.

**Effect of Enrollment:** Based on this sample, enrollment has a negative and statistically significant (100%) effect on income inequality. One percentage point increase in enrollment leads to a .015-point decrease in the GINI coefficient representing income inequality.

**Effect of GDP per capita:** Based on this sample, GDP per capita has a negative and statistically significant (100%) effect on income inequality. One point increase in GDP per capita leads to a .00000167-point decrease in the GINI coefficient representing income inequality.

**Effect of Year:** Based on this sample, while holding everything constant, the year has a positive and statistically significant (100%) effect on income inequality. Each increasing year leads to a .003-point increase in the GINI coefficient representing income inequality.

Figure 1.



**Table 2.****Comparison of Means Report****Expenditure and income Inequality in the United States**

Dependent Variable: Lead Income Inequality

Explanatory Variable:	Mean	N	Std. Deviation
Expenditure per student (%GDP)			
Low	.3590	5	.01773
High	.3742	4	.00591
Total	.3658	9	.01533

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