

Equity vs. Equality Debate on Public Spending for Higher Education in the United States

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Abstract: This research addresses an issue about funding for higher education in the modern United States. Ideally, to reduce financial pressures for the young adults, the government should either raise financial aids or educational spending. Yet, the decision between financial aid and educational spending is an “equity versus equality” debate, since financial aids are funds to low income students, whereas educational spending will benefit every student. With limited resources, the federal government should efficiently apply its funds to satisfy the public interest. To explore the public interest on education policy, this research will analyze opinions reported in the American National Election Study. Since the policy emphasizes on public spending, the study about opinions is based on income differences. The main research is about which of the two policy goals, aids to the poor for equitable education or equally affordable tuition to all students, and is preferred by Americans in different incomes. The research tool is chi-square statistical test, since the variables (income quintile as independent variable, preferences on public school spending and on aiding poor as dependent variables, employment status and education level as confounding variables) are ordinal. According to the chi-square tests for the relationships between independent and dependent variables, both relationships are significant (< 0.05), which indicates a rejection of null hypotheses (H_0) for both relationships. With the addition of both confounding variables, employment and education, the proportion of preference on public school spending is higher than the proportion of preference on aiding poor. Comparing the two relationships, the study is confident to emphasize on public school funding.

Key words: public administration, equality in education, social equity, education policy

1. Introduction

Education in the United States is one of the most significant indicators in career success. Many adults attend higher educational institutes for not only knowledge, but also practical trainings. Materials they learnt from schools will expand their experience, and these experiences will enable them to carry more responsibilities. Employers will depend more on college graduates than other employees due to more abilities to support the employers. As a result from employers' reliance, college graduates usually are paid more. Salary earned in the

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future is the strongest factor that persuades Americans to invest in higher education. According to the Digest of Education Statistics in 2011, from 2005 to 2010, the overall enrollment in degree-granting institutions had increased by 20 percent, which resulted 21 million of college students (Institute of Education Sciences, 2011). Nevertheless, the majority of young adults between age 18 and 24 remain difficult to afford education expenses. During the academic year of 2010–2011, approximately 41 percent of young adults attend college and 35 percent of them have applied student loans (Institute of Education Sciences, 2013). However, loans from private banks pressure students' long term finances, since student loans are large amount and have to be paid back (Chaffee 1983). Financial aid from the federal government is another popular option for students, but financial aid does not support as abundant as student loans (Melchor-Ferror & Buendia-Carrillo, 2014).

2. Literature Review

Among education and public policy scholars, the main debate is between financial aid and educational subsidies (Vonesek, 2011). Gregory Jackson and Michael Tierney, both are educational policy researchers, would favor more governmental spending to financial aids. They believe that the purpose of financial aids is to provide adequate resources and opportunities to lower income students, so these students can handle fewer financial pressures while receiving higher level of trainings (Jackson, 1978; Tierney, 1980). Contrast to Jackson (1978) and Tierney (1980), college professors including Adolf Reed and Sharon Szymanski (2004), as well as King Alexander and his scholars (2010), would prefer governmental expenditure to educational institutes. With more subsidies from either federal or state government, colleges and universities will not need to rely heavily on tuitions (Reed & Szymanski, 2004; King et al., 2010). As a result, tuitions will decrease, which save costs for all students. In short, scholars are divided into equity and equality debate — Jackson (1978) and Tierney (1980) stand for equity, whereas Reed and Szymanski (2004) as well as Alexander and his scholars (2010) support equality in higher education.

Attending college is always one of the most significant decisions for most high school seniors and their parents. Although receiving college education will lead to greater success in occupation and incomes, lower income households often cannot afford magnificent school-related costs for four years (Chaffee, 1983; Vonesek, 2011). According to Michael Tierney's (1980) explanation, financial aid is the policy established by the federal government which reduces monetary expenses for people who pay themselves or their children to college. In his statistical research, he found a positive correlation between financial aids granted by the government and freshmen's college enrollments (Tierney, 1980, p. 542). In other words, financial assistance could effectively encourage students to receive higher education. Tierney (1980) strongly supported expanding financial aids to more monetary struggling students. In Gregory Jackson's research, he explored the relationship among financial aids offered, enrollment, and college GPAs (Pfeffer & Moore, 1980; Schick & Hills, 1982). The correlation between financial aid and enrollment was similar to Tierney's, which was also positive. The relationship between financial aid and college GPA was also strongly positive in Jackson's observation (1978, p. 563). Confounding variables, such as political party, race, region, and family education were also included for the statistical analysis, but those variables did not have as significant influence as financial aids on grades (Jackson, 1978, p. 562). Most of lower income students, with ACT score compared by Jackson, were willing to put more academic efforts than wealthier ones. Therefore, Jackson concluded that financial aids would improve not only college improvement, but also overall academic qualities (1978, p. 572).

Financial aid, illustrated by Jackson and Tierney, serves in the purpose of opening educational opportunities to socioeconomic disadvantaged students. In fact, educational rights are not improved by financial aids. According to Adolf Reed and Sharon Szymanski's (2004) report on student's college affordability, a household with average income of \$25,000 will pay 71% of school-related costs, and income more than \$50,000 will only afford at most 19% (2004, p. 40). Financial aids in recent years are mostly awarded to higher income students. Since the 1990s until 2000s, need-based aids had been reduced from 61% to 22%, but merit-based had been raised from 11% to 25% (Reed & Szymanski, 2004, p. 41). Merit-based aids, similar to scholarships, are awarded according to outstanding achievements (Pfeffer & Moore, 1980). Wealthier students are more likely to win the funds because most of them can afford higher quality of preparatory educations, which can provide them more knowledge and training. When tuitions, complained by Reed and Szymanski (2004), remain at similar amounts, education gap will be determined by wealth and is going to widen, King Alexander, Thomas Harnisch, Daniel Hurley, and Robert Moran's proposal of "Maintenance of Effort" (2010) will support Reed and Szymanski's (2004) demand of equally affordable higher education. The purpose of "Maintenance of Effort (MOE)" is to regulate state governments to contribute adequate amount of supports to colleges and universities. In recent years, schools raised tuitions due to reductions of budgets from the state government. As a result of fund shortage, financial aid, the most common method to afford tuitions, becomes more challenging to apply. Under MOE regulations, schools will receive more funds, which will prevent them to inflate tuitions (Alexander et al., 2010, p. 81). With stable expenses, students will be more affordable to enroll in college. Reed and Szymanski (2004) will support MOE due to its purpose of equalize costs for every student. Contrast to Jackson (1978) and Tierney (1980), Reed and Szymanski (2004), and Alexander's scholars (2010) believe that providing financial aids cannot encourage college enrollments, since limited of aids cannot completely afford inflated tuitions. To attract young adults to receive higher education, the federal and state governments are responsible to offer sufficient resources.

3. Research Methodology

Policy making, even for educational funding, is strongly related to political factors. David Tandberg (2010) conducted a statistical report to present the effect of governmental structure on school finance. Independent variables are political attributes including Gini coefficient, citizens' party preference, government culture, and legislative professionalism. Dependent variables are the types of state general expenditures for higher education (Tandberg, 2010, p. 428). Tandberg's research is observation, since his data is from the National Association of State Budget Officers (Tandberg, 2010, p. 428). According to statistics, Tandberg (2010) finds that political factors have significant influence on higher education spending. However, economic indicators, which are confounding variables in the research, have stronger effects on school policies (Tandberg, 2010, pp. 434–441). In conclusion, politics and economy are directions for solving higher education funding crisis. Yet, to determine the most appropriate policy, it is necessary to research about citizens' opinions regarding to this issue.

The data applied in this report is from the American National Election Studies, this study is an empirical research. From various variables, the study will explore the effects of individual income on opinions about governmental spending. Since both independent variable (income quintile) and dependent variables (spending on public school and on helping poor) are ordinal measurements, the appropriate statistical test will be chi-square. In addition, learning from Tandberg's (2010) experience about the importance of confounding variables on education spending, the study will also apply relevant socioeconomic factors which directly influence income, employment

status and education level, into the analyses. Due to complication with addition of confounding variables, dependent variables (spending on public school and spending on aiding poor) are categorized into “increase,” “no change,” and “decrease” spending. The null hypothesis is assuming that there are random relationships between income and spending preferences. On the contrary, the alternative hypothesis is confirming that there are significant relationships between the two variables. If alternative hypothesis is accepted, then we will need to determine which spending policy, on public school or helping poor, is mostly preferred by the voters.

4. Data Analysis

Independent variable, income, is divided into 5 quintiles from low to high. Two dependent variables, spending preferences, are measured in 7 positions from “increase a great deal” to “decrease a great deal.” The ANES data surveyed 2,323 samples, and 2,169 have responded their incomes and spending preferences. Among total valid responses, 43.6%, the highest proportion, considered that increasing educational fund is a great deal. In addition, 26.7% would prefer a moderate increase. The analysis is shown on Table 1.

Table 1 Relationship between Income and Preference on Public Schools Spending

Spend on Public Schools		R income quintile					Total
		1	2	3	4	5	
1. Increased a great deal	Count	208	168	234	160	175	945
	Expected Count	207.8	169.9	210.4	137.2	219.6	945.0
	% within R income quintile	43.6%	43.1%	48.4%	50.8%	34.7%	43.6%
2. Increased a moderate amount	Count	128	118	141	65	127	579
	Expected Count	127.3	104.1	128.9	84.1	134.5	579.0
	% within R income quintile	26.8%	30.3%	29.2%	20.6%	25.2%	26.7%
3. Increased a little	Count	29	18	8	20	32	107
	Expected Count	23.5	19.2	23.8	15.5	24.9	107.0
	% within R income quintile	6.1%	4.6%	1.7%	6.3%	6.3%	4.9%
4. Kept about the same	Count	91	69	92	58	114	424
	Expected Count	93.2	76.2	94.4	61.6	98.5	424.0
	% within R income quintile	19.1%	17.7%	19.0%	18.4%	22.6%	19.5%
5. Decreased a little	Count	8	1	1	3	14	27
	Expected Count	5.9	4.9	6.0	3.9	6.3	27.0
	% within R income quintile	1.7%	0.3%	0.2%	1.0%	2.8%	1.2%
6. Decreased a moderate amount	Count	6	4	2	6	20	38
	Expected Count	8.4	6.8	8.5	5.5	8.8	38.0
	% within R income quintile	1.3%	1.0%	0.4%	1.9%	4.0%	1.8%
7. Decreased a great deal	Count	7	12	5	3	22	49
	Expected Count	10.8	8.8	10.9	7.1	11.4	49.0
	% within R income quintile	1.5%	3.1%	1.0%	1.0%	4.4%	2.3%
Total	Count	477	390	483	315	504	2169
	Expected Count	477.0	390.0	483.0	315.0	504.0	2169.0
	% within R income quintile	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-square test and symmetric measures of relationship between income and preference on public school spending is shown in Tables 2 and 3.

Table 2 Chi-Square Test of Relationship between Income and Preference on Public School Spending

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	98.453 ^a	24	.000
Likelihood Ratio	101.691	24	.000
Linear-by-Linear Association	17.838	1	.000
N of Valid Cases	2169		
a. 2 cells (5.7%) have expected count less than 5. The minimum expected count is 3.92.			

Table 3 Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-b	.057	.018	3.115	.002
	Kendall's tau-c	.053	.017	3.115	.002
N of Valid Cases		2169			
a. Not assuming the null hypothesis.					
b. Using the asymptotic standard error assuming the null hypothesis.					

The chi-square test proves that the relationship between income and preference on public school spending is not random, due to its significance is approximately 0. Therefore, the null hypothesis for these two variables is rejected, and the alternative hypothesis will be accepted. However, the relationship is very weak. According to the graph which compares the percentage distribution of those who strongly favor increasing public school spending, percentage slightly raises at the 3rd and the 4th income quintiles. In other words, Middle and upper-middle income individuals would support educational funds the most. In addition to the graph, Kendall's tau-c from the chi-square test presents the score of 0.053, which indicates that the relationship is positive but very weak. With all relevant statistical analyses, the study can conclude that as individuals earn more income, they will be slightly more supportive on federal expenditure to public educations.

Another dependent variable, preference of spending on aiding poor, is also measured in 7 positions, with attributes similar to spending on public school. The analysis is shown in Table 4.

Table 4 Relationship between Income and Preference on Aiding Poor

Spend on Aiding Poor		R income quintile					Total
		1	2	3	4	5	
1. Increased a great deal	Count	164	120	126	59	59	528
	Expected Count	117.1	94.9	117.8	77.2	121.0	528.0
	% within R income quintile	34.5%	31.2%	26.4%	18.8%	12.0%	24.6%
2. Increased a moderate amount	Count	149	104	164	83	108	608
	Expected Count	134.8	109.3	135.7	88.8	139.4	608.0
	% within R income quintile	31.4%	27.0%	34.3%	26.5%	22.0%	28.4%
3. Increased a little	Count	50	26	39	27	42	184
	Expected Count	40.8	33.1	41.1	26.9	42.2	184.0
	% within R income quintile	10.5%	6.8%	8.2%	8.6%	8.6%	8.6%

(To be continued)

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(Table 4 continued)

4. Kept about the same	Count	96	111	127	112	214	660
	Expected Count	146.4	118.6	147.3	96.4	151.3	660.0
	% within R income quintile	20.2%	28.8%	26.6%	35.8%	43.6%	30.8%
5. Decreased a little	Count	5	5	5	4	19	38
	Expected Count	8.4	6.8	8.5	5.6	8.7	38.0
	% within R income quintile	1.1%	1.3%	1.0%	1.3%	3.9%	1.8%
6. Decreased moderate amount ^a	Count	4	13	15	16	31	79
	Expected Count	17.5	14.2	17.6	11.5	18.1	79.0
	% within R income quintile	0.8%	3.4%	3.1%	5.1%	6.3%	3.7%
7. Decreased a great deal	Count	7	6	2	12	18	45
	Expected Count	10.0	8.1	10.0	6.6	10.3	45.0
	% within R income quintile	1.5%	1.6%	0.4%	3.8%	3.7%	2.1%
Total	Count	475	385	478	313	491	2142
	Expected Count	475.0	385.0	478.0	313.0	491.0	2142.0
	% within R income quintile	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

The chi-square test and symmetric measures are shown in Table 5.

Table 5 Chi-Square Test of Relationship between Income and Preference on Aiding Poor

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	185.764 ^a	24	.000
Likelihood Ratio	192.518	24	.000
Linear-by-Linear Association	141.831	1	.000
N of Valid Cases	2142		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.55.

Table 6 Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-b	.212	.017	12.727	.000
	Kendall's tau-c	.206	.016	12.727	.000
N of Valid Cases		2142			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

The chi-square test, similar to the one for public school, also proves that the relationship between income and aiding poor is statistically significant (approximately 0). However, both bar graph and Kendall's tau-c with a score of 0.206 indicate that the relationship between these two variables, comparing to the previous relationship, is stronger and more predictable. In addition, according to the table, 53% of all respondents agree to increase aids to poor, either by a great deal or moderately. Within this 53%, lower income individuals would favor the most, and then the proportions decrease as income rises. Individuals to prefer keeping the same or reducing spending are relatively supported by higher income quintiles. With all statistical analyses from the chi-square test, bar charts, and the table, it is certain that the null hypothesis should be rejected and the alternative hypothesis should be taken. The study concludes that income has a significant effect on preference of aiding poor.

Besides discovering the relationships between income and spending preference, this research is also interested about the effects of employment and education level. Hence, employment and education are included in the chi-square test as confounding variables. The chi-square tests are shown in Table 7.

Table 7 Chi-square Tests for Income and Prefer Spending on Public Schools with Employment Status as Confounding Variable

Employment status		Value	df	Asymp. Sig. (2-sided)
1. Working now	Pearson Chi-Square	40.287 ^b	4	.000
	Likelihood Ratio	40.458	4	.000
	Linear-by-Linear Association	27.748	1	.000
	N of Valid Cases	1372		
2. Temporarily laid off	Pearson Chi-Square	1.873 ^c	4	.759
	Likelihood Ratio	2.507	4	.643
	Linear-by-Linear Association	.030	1	.862
	N of Valid Cases	34		
4. Unemployed	Pearson Chi-Square	3.189 ^d	4	.527
	Likelihood Ratio	3.997	4	.406
	Linear-by-Linear Association	.360	1	.548
	N of Valid Cases	97		
5. Retired	Pearson Chi-Square	15.213 ^e	4	.004
	Likelihood Ratio	16.992	4	.002
	Linear-by-Linear Association	4.695	1	.030
	N of Valid Cases	342		
6. Permanently disabled	Pearson Chi-Square	16.032 ^f	4	.003
	Likelihood Ratio	10.143	4	.038
	Linear-by-Linear Association	3.417	1	.065
	N of Valid Cases	124		
7. Homemaker	Pearson Chi-Square	5.001 ^g	4	.287
	Likelihood Ratio	7.888	4	.096
	Linear-by-Linear Association	1.807	1	.179
	N of Valid Cases	133		
8. Student	Pearson Chi-Square	4.980 ^h	4	.289
	Likelihood Ratio	6.773	4	.148
	Linear-by-Linear Association	.632	1	.427
	N of Valid Cases	63		
Total	Pearson Chi-Square	40.032 ^a	4	.000
	Likelihood Ratio	39.633	4	.000
	Linear-by-Linear Association	16.902	1	.000
	N of Valid Cases	2165		

Employment directly affects individual incomes, so it is the most significant confounding variable to be observed. Comparing each employment status, respondents who are temporarily laid-off or are unemployed support the most on education spending, with 82.4% and 81.4% of each status respectively. Other respondents also prefer increasing educational spending, but slightly smaller percentages.

Table 8 Chi-square Tests for Income and Prefer Spending on Aiding Poor with Employment Status as Confounding Variable

Employment status		Value	df	Asymp. Sig. (2-sided)
1. Working now	Pearson Chi-Square	78.433 ^b	4	.000
	Likelihood Ratio	79.047	4	.000
	Linear-by-Linear Association	68.237	1	.000
	N of Valid Cases	1358		
2. Temporarily laid off	Pearson Chi-Square	1.595 ^c	4	.810
	Likelihood Ratio	1.975	4	.740
	Linear-by-Linear Association	.509	1	.476
	N of Valid Cases	30		
4. Unemployed	Pearson Chi-Square	4.930 ^d	4	.295
	Likelihood Ratio	5.573	4	.233
	Linear-by-Linear Association	.606	1	.436
	N of Valid Cases	95		
5. Retired	Pearson Chi-Square	9.954 ^e	4	.041
	Likelihood Ratio	9.741	4	.045
	Linear-by-Linear Association	6.342	1	.012
	N of Valid Cases	339		
6. Permanently disabled	Pearson Chi-Square	16.239 ^f	4	.003
	Likelihood Ratio	9.484	4	.050
	Linear-by-Linear Association	7.979	1	.005
	N of Valid Cases	126		
7. Homemaker	Pearson Chi-Square	3.980 ^g	4	.409
	Likelihood Ratio	5.476	4	.242
	Linear-by-Linear Association	.049	1	.825
	N of Valid Cases	134		
8. Student	Pearson Chi-Square	5.252 ^h	4	.262
	Likelihood Ratio	6.051	4	.195
	Linear-by-Linear Association	.124	1	.725
	N of Valid Cases	63		
Total	Pearson Chi-Square	116.683 ^a	4	.000
	Likelihood Ratio	114.674	4	.000
	Linear-by-Linear Association	101.603	1	.000
	N of Valid Cases	2145		

For poor aid spending, 78.9% of unemployed and 77% of disabled respondents, which are the highest proportion, prefer an increase. Other respondents, besides those are currently working, also largely support aids to poor. Comparing with two spending preferences, most respondents, regardless of employment, would support more funding to public education.

The chi-square significance tests prove that employment status, except those who are currently working, retired, and permanently disabled, has no relationship (sig. > 0.05) to income and either spending preferences, since most respondents have similar opinions.

Education is an important social indicator which Tandberg did not explore. According to the survey, 80.9% of respondents who receive less than high school education would prefer spending on aiding poor and also 74.7% would support public school, both are highest proportions among 3 levels. The chi-square tests for both spending preference with education as confounding variable are shown in Table 9.

Table 9 Chi-square Tests for Income and Prefer Spending on Public School with Education Level as Confounding Variable

Highest grade of school or year of college respondent completed		Value	df	Asymp. Sig. (2-sided)
0-11 yrs	Pearson chi-square	7.734 ^b	4	.102
	Likelihood ration	11.688	4	.020
	Linear-by-Linear Association	5.609	1	.018
	N of valid cases	293		
12 yrs	Pearson chi-square	3.214 ^c	4	.523
	Likelihood ration	3.181	4	.528
	Linear-by-Linear Association	1.035	1	.309
	N of valid cases	646		
13-more yrs	Pearson chi-square	37.489 ^d	4	.000
	Likelihood ration	38.728	4	.000
	Linear-by-Linear Association	21.665	1	.000
	N of valid cases	1229		
Total	Pearson chi-square	42.020 ^a	4	.000
	Likelihood ration	41.929	4	.000
	Linear-by-Linear Association	17.098	1	.000
	N of valid cases	2168		

Similar to employment status, education level does not have significant relationship with income and school spending, since most respondents, regardless of education level, would agree on rising public school funding.

Table 10 Chi-square Tests for Income and Prefer Spending on Aiding Poor with Education Level as Confounding Variable

Highest grade of school or year of college respondent completed		Value	df	Asymp. Sig. (2-sided)
0-11 yrs	Pearson chi-square	13.441 ^b	4	.009
	Likelihood ration	11.971	4	.018
	Linear-by-linear association	.590	1	.442
	N of valid cases	292		
12 yrs	Pearson chi-square	45.845 ^c	4	.000
	Likelihood ration	44.558	4	.000
	Linear-by-linear association	30.555	1	.000
	N of valid cases	636		
13-more yrs	Pearson chi-square	59.610 ^d	4	.000
	Likelihood ration	60.287	4	.000
	Linear-by-linear association	50.138	1	.000
	N of valid cases	1212		
Total	Pearson chi-square	114.636 ^a	4	.000
	Likelihood ration	112.830	4	.000
	Linear-by-linear association	99.441	1	.000
	N of valid cases	2140		

Spending on aiding poor, on the contrary, is significantly related to income and education level. This relationship implies that opinions are varied among different groups, so it is more difficult to decide poverty aid policies than education budgets.

Although income has stronger relationship to poor aid than to public education, public education is more preferred by the respondents. The chi-square tests prove that both employment and education level are more weakly related with public education than with poor aid. Weaker relationship implies that the spending preferences will remain similar regardless of different confounding variable attributes. In short, comparing with public school and poor aid, more citizens from different income, employment, and education level, will favor spending on public school than poor aid.

5. Conclusion

This study indicates that the citizens would favor “equality” of higher education, which requests the state government to provide more funds to colleges and universities in order to reduce tuitions for all students. Financial aid, which improves “equity”, is not popularly supported due to limited of populations can be benefitted. After all, financial aid is shifting resources from taxpayers to low income students, and taxpayers might not receive any return. Unlike in the previous decades when people had abundant resources to spend, in recent years people cannot afford expensive costs of higher education. According to the empirical research, in order to sustain young generation’s compatibility for the future, both the federal and state governments should play the main role of encouraging more college enrollments to receive more professional education and training.

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