

Effect of Student Loans on Income Inequality in the United States

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Student loan is a pervasive problem in the United States. Historically, higher education has been a major driver of intergenerational mobility in the United States. The current student loan has increased substantially over the years, surpassing credit card and auto loans. Using panel data from all States, this paper attempts to empirically predict if income inequality is affected by student loans. Statistical analysis points towards student loan exacerbating income inequality. Other variables such as private college tuition and household poverty have a highly significant negative effect on income inequality. The overall results suggest that increased access to higher education at the expense of higher student loans may be countervailing to the income distribution dynamics of the United States.

Keywords: Student loans, Income Inequality, Fixed Effect

INTRODUCTION

Student loan has been a major problem in the United States since the past few decades. Student loan has surpassed a total of 1 trillion dollar in the United States of America which is higher than credit card and other debts (Best & Best, 2014). There are several sources of loans for high education to students: Federal loans called Stafford Loans; Parent Loans for Undergraduates (PLUS); Perkins Loans program; private loans, among others. Reduced funding in higher education from the States have exacerbated the problem, as the funds had to be transferred to sectors like defense, healthcare, food and housing. To keep up with costs, schools had to raise their tuitions and fees, prompting students to take out even more loans than ever before. Current literature that focuses on the influence of student debt burden across different income and ethnic groups provide a bleak pessimism of the future (Wenisch, 2012). There are inequalities of opportunity when it comes to access to education (de Brey et al., 2019; Dickert-Conlin & Rubenstien, 2007; Goldrick-Rab et al., 2016, Price, 2004). The presence of this social inequality is well documented in the literature.

Generally speaking, student loan has a detrimental effect on home ownership and wealth accumulation, and is a major reason for college dropout. Negative marital behavior in young adulthood and other problematic social connotations have also been linked to student loan debt (Addo et al., 2019). Not to mention, college dropouts are severely worsened by burdensome student loans. Student debt also has a significant financial burden on the parents. Students from middle-income families have a higher risk of being indebted than their low- and high-income counterparts. Thus, this non-linear relationship

between parents' income and student loan debt is especially burdensome to middle class families (Houle, 2014). These debt burdens on low- and middle-income families are taking a toll on the living standard and poverty rates of households in the United States (Pressman & Scott, 2009). As of 2018, an average graduate student can expect to graduate with around \$30,000 worth of loans ("Trends in Student Aid 2019 Highlights", 2019). According to the Federal Reserve, one-fifth of students were behind on their student loan payments and forty-two percent of those who attended college have incurred at least some debt from their education ("The Fed - Student Loans", 2019). These negative connotations of student loans have detrimental effects on the socio-economic structure and dynamics of household income in the United States.

Financial assistance has substantially increased as affordable higher education has bipartisan support in the political discourse of the United States (Hendel et al., 2005). However, research has increasingly shown that a debt-based approach to financial aid and higher educational attainment has in fact exacerbated income inequities (Elliott, 2018). Push for social inclusion of higher education has come at the cost of income equality. Although, increasing access to diverse types of credits across many social groups were significant for economic development, this had implications for social inequality by making households more indebted (Dwyer, 2018). This important policy question has been studied and debated in the literature without any immediate solution. Only looking at indicators of economic performance of a nation may not be enough to be optimistic about the social and financial hurdles that a country may go through. Even increases in the average income of households may not reduce inequality or even lessen the burden of student debt. Income expansion in the United States have come at the expense of rises in income inequality (Auten & Splinter, 2017). Moreover, the average income in the United States has been in a steady increase, but so has the total student loan debt. It is understood that income inequality is caused by a plethora of factors. However, there is no general consensus on the holistic effect of student loans on the income inequality of the United States. Specifically, there is limited research on how student loan can influence income inequality and that is what this paper focuses on and intends to investigate.

The rest of the paper is structured accordingly. The next section continues with a review of literature. This is followed by the description of data. The 'Empirical Methodology' section details the econometric models and formulations used. This is followed by the results and analysis. Finally, the paper ends with concluding remarks.

LITERATURE REVIEW

Previous studies have focused primarily on different types of loans and how it affects the wealth accumulation or homeownership, among individuals with and without student debt. Some studies analyze which income group, race or ethnic groups struggle more in repayment of student debt (Jackson & Reynolds, 2013). Studies such as Avery & Tuner (2012), used data from several sources that included: U.S. Department of Education; National Center for Education Statistics; Bureau of Labor statistics; College boards, and found the direct cost of college, represented by tuition charges, have increased markedly in both the public and private sectors. This has led to increase in demand for borrowing among students who do not receive commensurate increases in financial aid. In addition, a decline in family resources generated by adverse shocks to parental income or assets could contribute to increased student borrowing. On the other side, a student might behave differently with the availability of student loans by deciding to borrow more to allow for consumption smoothing, leading to higher debt levels.

Ratcliffe & McKernan (2013) is another study that used data from FINRA Investor Education Foundations 2012's National Financial Capability Study, and found that student loan is not exclusive to highly educated individuals. 9 percent of people with no more than a high school degree have student loan debt and these debts could have been incurred for a non-degree training certificate or by funding a child's education. The portion increases to 25 percent for people with some college education but no college degree. So, these student debt holders might still have failed to complete the degree for which they took out the loan. Not to mention, for those with a college degree the percentage is around 28-30 percent. Overall 27 percent of Americans with at least some college degree have student loan debt. On a racial

comparison, around 16 percent of whites, 34 percent of African Americans and about 28 percent of Hispanics have student loan debt. Ratcliffe & McKernan (2013) also finds that, considering income, age, race and other factors fixed, 57 percent of student with loans are worried about repaying it. African Americans are more likely to worry about student loan repayment than non-Hispanic whites.

Twenty percent of U.S. adults and thirty-five percent of people in their 20s and 30s have student loan debt and those who are unable to payback will end up with poor credit reports. Poor credit reports can affect individual's ability to get traditional credit. Accumulating debt early makes it difficult to build assets later on, and this negatively impact family formation and homeownership (Chopra, 2013; Consumer Financial Protection Bureau, 2013). Geiger (2015) collected data from "The Joint Committee on Taxation", which is a nonpartisan committee of the United States Congress, and showed that the largest expense for American higher education is federal funds transferred to private individuals to pay expenses for higher education. This may be one of the reasons for rising tuition. These funds not only support the for-profit sectors, but the availability of these funds allow educational institutions to sustain operations even by increasing tuitions. Tuition escalation in the public sector have been aggravated by the failure of States to maintain appropriations for public colleges and universities. The ultimate consequences of this system are higher tuition prices and higher student debt, otherwise known as the affordability crisis, which contribute significantly to inequality. Armstrong & Hamilton (2013) explained how college life only benefit the wealthy students and does not bring much to the table for the poor ones. Using qualitative data from student respondents of residential halls from different universities, they found wealthy families readily pay any tuition fees for higher education for their children. This has raised tuition of selective colleges and universities that are a gateway for career opportunities with high status. Non wealthy students with limited choices of schools face rising costs and falling returns and often get discouraged to complete degrees. This tends to create and exacerbate inequality of wealth and outcomes.

An empirical study by Cooper & Wang (2014) examined the impact of student loan and its liabilities on individual homeownership and wealth accumulation using two different sources of secondary data. One was the 'Panel Study of Income Dynamics' which is a representative survey of US households' and the other was the '1988 National Educational Longitudinal Survey' (NELS88). The results showed that students with outstanding student debt are associated with a lower rate of homeownership and wealth holdings. The effect is found stronger among homeowners than among renters. These results have been drawn after controlling for many observable factors that might impact homeownership and wealth accumulation. Stranahan et al. (2014) designed a study to find if student loan is contributing to increased inequality across different demographic and economic standings of students who have this large debt burden. The study gathered individual demographic (Gender, Race, Marital Status, Age) and household financial data from the 'Free Application for Federal Student Aid' (FAFSA) in 2012. Using Probit model estimations on various demographic and income variables and a truncated Tobit model to estimate the total amount of loans accumulated by individuals, the study found that females students are more likely to take student loans compared to males. African Americans or Hispanic students tend to take out more loans compared to other races. Also, students from families with median income of around \$44,100 are more like to take loans compared to low income families of median wealth between \$21,900 and \$44,100. Moreover, unmarried students bear a significantly larger share of debt than other student groups who are married or has children.

Home equity is one of the best ways to build wealth in United States. Current financial aid debt hinders people to rise in the social class through the education system and this debt even increases inequality in the housing market. The median home equity amount for households in the year 2009 with no outstanding student loan debt is nearly twice that of households with outstanding student loan debt (Elliott et al., 2013). This suggests that simply having student loan debt may reduce households' capacity to amass home equity. The current reliance on student borrowing within the financial aid system reduces the extent to which education can serve as an economic equalizer. Households with a four-year college graduate have more home equity than households without a four-year college graduate (Claus & Claus, 2016). Houle (2014), in an attempt to find how parents' income and education are linked to young adults' student loan debt, developed and testing two perspectives regarding the functional form of the association

between parents' income, parents' education, and student loan debt. The study used data from 'National Longitudinal Study of Youth, 1997' by the 'Bureau of Labor Statistics' and showed that the association between parents' Socio Economics Status (SES) and debt appears stronger at private institutions compared to public institutions. Using Craggit Model, the study showed parents' SES is a strong predictor of the likelihood of having very high debt. In particular, students from high-income and highly educated families are significantly less likely to have high debt loads than those from less affluent backgrounds. Houle (2014) reveals an insightful finding that young adults from step families and single-parent households have a significantly higher risk of being indebted by student loans than young adults from two-parent families.

DESCRIPTION OF DATA

Data on all 50 States from 2012 and 2013 in panel format is used with around 100 observations. Data was collected from "The Project on Student Debt and College InSight" which is an initiative of 'The Institute for College Access & Success', 'Bureau of Labor Statistics', 'Measure of America', 'The College Board' and 'Annual Survey of Colleges & State Higher Education Executive Office' ("Project on Student Debt - The Institute for College Access & Success", 2014). A summary of data is shown in Table 1 and the Correlation Matrix in Table 2.

**TABLE 1
DESCRIPTIVE STATISTICS**

Variable	Label	Obs	Mean	SD	Min	Max
Income Inequality	GINI	102	0.46175	0.02218	0.408	0.534
Average Student* Debt	ASD	99	26.1393	3396.963	17.994	33.649
Median Household Income*	MHI	102	52.898	8749.228	37.479	72.483
Unemployment Rate	UR	102	7.0441	1.6716	2.9	11.5
Public College Tuition*	PubT	102	8.5965	2276.865	4.278	14.6516
Private College Tuition*	PrvT	100	27.2988	7832.417	6.177	39.3358
Funding from State*	SF	100	5.985	2237.359	1.6736	16.474
Household poverty rate	HP	102	15.18627	3.299656	8.7	24.2

*Indicates data are in thousand USD

**TABLE 2
CORRELATION MATRIX**

Variables	GINI	ASD	MHI	UR	PubT	PrvT	SF	HP
GINI	1							
ASD	-0.2122	1						
MHI	-0.186	0.2738	1					
UR	0.5053	-0.1159	-0.109	1				
PubT	0.0098	0.5783	0.4055	0.0643	1			
PrvT	0.3465	0.1176	0.3992	0.2096	0.408	1		
SF	0.1202	-0.2798	0.0963	0.1953	-0.4649	-0.0491	1	
HP	0.4945	-0.4788	-0.8489	0.3888	-0.4463	-0.2721	0.1232	1

Data on income inequality was sourced from the 'American Community Survey' (ACS) conducted under the 'United States Census Bureau' (Noss, 2014). The inequality across all the US States ranges

from 0.4 to 0.53 and does not show much variation across states. But there are several factors that can influence income inequality depending on whether the State is primarily agriculturally dependent or concentrates on manufacturing. The effects these may have is captured using Fixed Effect Regression. Average student debt, Median household income, unemployment rate, poverty rate and college tuitions vary a lot across states.

The Correlation Matrix in Table 2 shows that the expected linear direction of paired variables are generally in line with economic intuition. The correlation between MHI and HP is the sole exception where the correlation registered is high. But further testing has shown this does not pose any impeding statistical issue.

EMPIRICAL METHODOLOGY

The econometric model tested is show in the following equation

$$\text{GINI} = \beta_0 + \beta_1 \text{ASD} + \beta_2 \text{MHI} + \beta_3 \text{UR} + \beta_4 \text{PubT} + \beta_5 \text{PrvT} + \beta_6 \text{SF} + \beta_7 \text{HP} + \varepsilon$$

The purpose of the model is to predict if student loans affect income inequality along with other common predictors that can affect inequality across the States. Gini coefficient, indicated by ‘GINI’ is the dependent variable, and is a measure of income inequality that ranges from 0 to 1, where 0 indicates the society is perfectly equal in distribution and allocation, whereas 1 would indicate extreme level of unequal income distribution.

Average student debt is presumed to be a good predictor of the debt burden for students with student loans. Common predictors like Median Household income, Unemployment rate, and Household poverty are also indicators to test the level of income inequality across States. Moreover, variables like Public Tuition, Private Tuitions and State funding for Higher Education might have some degree of correlation with Average Student Debt, but these are good predictors of income inequality among students of different states.

The aforementioned econometric model will be used for both multiple linear regression and regressions with fixed effect. The study uses three versions of the fixed effect model for a more holistic interpretation of the estimations: Fixed effect regression with State as Fixed; Fixed effect regression with ‘year’ as fixed; and Fixed effect with AR(1) disturbance. Fixed effect is used because the time invariant component of error term in the panel data might be related to the independent variables (Wooldridge, 2006). Hence, removing the time invariant component will give a better estimation.

The expected sign of the coefficient of Student debt, Unemployment rate, Public Tuition, Private Tuition, Household Poverty are positive, as a unit increase in any of the variables may lead to increase in inequality. Increase in State funding and Median Household Income is expected to lower Income inequality hence a negative coefficient is expected, leading to a society with more equality in resource allocation.

There is the possibility the model might contain Multicollinearity and Heteroskedasticity problems. As panel data from 2012-2013 has been used for fixed effect regression there are chances of autocorrelation. All these are tested for and addressed in Table 7 to ensure proper econometric technique and statistical soundness. Multicollinearity usually occurs because two (or more) variables are related or they measure the same thing. If one of the variables in the model does not seem essential, removing it may reduce multicollinearity (Wooldridge, 2006). Examining the correlations between variables and taking into account the importance of the variables will help make a decision about what variables to drop from the model.

Heteroskedasticity is diagnosed using the Breusch-Pagan Test. Autocorrelation is measured through Wooldridge test for autocorrelation in panel data. It is corrected using Fixed Effect with AR(1) Disturbance and Prais-Winsten AR(1) regression.

RESULTS AND ANALYSIS

In the multiple linear regression, shown in Table 3, Average student debt (ASD) does have a detrimental effect on the income inequality as evident by the positive coefficient. The coefficient of 0.00626 implies a one thousand dollar increase in student debt will increase inequality by 0.00626 unit or 0.626 percent. An increase in income inequality over half a percentage point due to a thousand dollar of student loan is not nominal. Although this positive coefficient shows the expected economic intuition of higher student debt leading to higher Gini Coefficient, given all other variables remains constant, it does not register statistical significance.

TABLE 3
MULTIPLE LINEAR REGRESSION

GINI	Coefficient	Robust SE	T	P value	95% Confidence Interval	
ASD	0.00626	0.00557	1.12	0.264	-0.00480	0.00173
MHI	0.00142	0.00336	4.23	0	0.00752	2.09
UR	0.00501	0.00985	0.51	0.612	-0.00146	0.002459
PubT	0.00512	0.00931	0.55	0.584	-0.00134	2.36
PrvT	0.00936	0.00166	5.65	0	0.00607	1.27
SF	-0.00226	0.00131	-0.17	0.864	-0.00284	2.39
HP	0.007036	0.00101	6.97	0	0.00503	0.009043
Cons	0.230766	0.036251	6.37	0	0.158713	0.302819
Number of obs	95					
F(7, 87)	29.85					
Prob > F	0.0000					
R-squared	0.6015					
Root MSE	0.0125					

Median Household income has a positive coefficient, significant at the 0.1 percent level of significance. The positive coefficient has counter intuitive economic significance as higher median household income is generally expected to reduce Gini coefficient. This could suggest that, for the case of United States, increment in household income is skewed towards the upper echelon of high-income households. As overall income has been increasing in the United States, so has the inequality. The top one percent of earnings have been accruing a lion's share of additional incomes (Saez, 2018).

The estimation from Table 3 also shows that household poverty and private college tuition are highly significant in contributing to the worsening divide of income inequality. Historically, poverty has been associated with increased income inequality in the United States (Berger et al., 2018; Early & Many, 2018). Unemployment rate, Public tuition, State funding are statistically insignificant variables in the model although their coefficient gives expected economic implications. Unemployment rate and public tuition has positive coefficient indicating higher unemployment rate leads to more inequality in society. Similarly, State funding on higher education has negative coefficient which can lower Gini coefficient. As students will have to pay less for college, they will borrow less which will eventually improve the income distribution. Other variables like Private tuitions and Household poverty rate have a positive coefficient and are significant at 0.1 percent level of significance.

The overall F test shows Prob > F = 0.00, which implies the overall model is significant, the R-square is 0.6 which says 60% of the variation in the dependent variable are explained by the explanatory variables which is good given the nature of the model.

TABLE 4
FIXED-EFFECT (WITHIN) REGRESSION WITH STATE AS FIXED

Fixed-effects (within) regression		Number of obs			95	
		Number of groups			48	
	0.6758		Min			1
R-square	0.2818	Obs per group	Average			2
	0.2738		max			2
		F(7,40)			11.91	
corr(u _i , Xb) = -0.8864		Prob > F			0	
GINI	Coefficient	SE	T	P value	95% Confidence Interval	
ASD	-0.00169	0.00716	-0.24	0.815	-0.00162	0.00128
MHI	-0.00279	0.00958	-2.91	0.006	-0.00472	-0.00853
UR	-0.001732	0.00131	-1.32	0.194	-0.00438	0.00915
PubT	-0.00148	0.00393	-0.38	0.708	-0.00942	0.00645
PrvT	0.00562	0.00114	4.93	0	0.00331	0.00792
SF	-0.00305	0.00210	-0.15	0.885	-0.00455	0.00394
HP	0.0021769	0.001542	1.41	0.166	-0.00094	0.0053
Cons	0.4515067	0.066314	6.81	0	0.31748	0.5855
sigma_u	0.0363492					
sigma_e	0.0032924					
rho	0.9918625	(fraction of variance due to u _i)				
F test that all	u _i =0:	F(47, 40) =25.99			Prob > F	0

Table 4 shows that with State being fixed, Median Household income and Private Tuition are statistically significant at the 1 percent level. However, the coefficient of Average Student debt, Median Household income and Public Tuition has changed making it difficult to prove its economic significance. The high p-value makes any impact of ASD redundant so the negative relationship may not hold much water. It could simply be that Fixed effect regression when States are considered fixed does not provide any valuable insight. The Overall F test is 11.29 > 10, so the model is significant, and the R square is 0.67 which is slightly higher than that of the Multiple Linear Regression, indicating 67% of the variation in the dependent variables is explained by the explanatory variables.

TABLE 5
FIXED-EFFECTS (WITHIN) REGRESSION WITH YEAR AS FIXED

Fixed-effects (within) regression				Number of obs	95	
Group variable	Year			Number of groups	2	
	within	0.6061		Obs per group: min	47	
R-square	between	1.0000		avg	47.5	
	overall	0.6002		max	48	
				F(7,86)	18.9	
corr(u _i , X _b)	0.0195			Prob > F	0	
Gini	Coefficient	SE	T	P Value	95% Confidence Interval	
ASD	0.00517	0.00541	0.96	0.342	-0.00559	1.59
MHI	0.00133	0.00378	3.51	0.001	0.00576	2.08
UR	0.0010561	0.00114	0.93	0.357	-0.00121	0.003322
PubT	0.00406	0.00924	0.44	0.662	-0.00143	2.24
PrvT	0.00912	0.00203	4.5	0	0.00510	1.31
SF	-0.00337	0.00930	-0.36	0.718	-0.00219	1.51
HP	0.006645	0.0011121	5.98	0	0.004434	0.008856
cons	0.2427266	0.037743	6.43	0	0.167696	0.317757
sigma_u	0.00294963					
sigma_e	0.01244049					
					(fraction of variance due to u _i)	
rho	0.05322396					
F test	u _i =0:		F(1, 86) = 2.37			Prob > F = 0.1276

In Table 5, Year is considered as fixed. The year fixed effect has been considered to remove the time invariant error term in the model. The results show Average student debt is significant at 34 percent level of significance and Median household income, Private Tuition and Household poverty rate is significant at 0.1 percent level of significance. The economic significance of Average student debt shows that a one thousand dollar increase in student debt increases income inequality by 0.00517 unit or 0.517 percent. Moreover, private college tuition shows a high level of significance. The F value is 18.9 > 10 which shows a global significance of the model. The R square is 0.60 implying explanatory validity of the independent variables.

The Auto Regressive (1) model, shown in Table 6, has a focus on estimating the AR parameter whereas the individual-specific effect or the parameters describing specific features of their distribution are treated as nuisance parameters (Wooldridge, 2006). Moreover, it is also used for unbalanced or unequally spaced data which is the case in the panel data set that has been used.

With Fixed Effect Regression & Auto Regression (1), the average student debt is now statistically significant at the 0.1 percent level of significance and other variables like Median household income, private tuition and household poverty remains significant at 0.1 percent level of significance as well. Private college tuition has proven to be significant in the models tested implying a strong case that private college tuition does in fact worsen the income inequality divide in the United States. The existence of household poverty is also another variable that is generally an aggravator of income inequality. Moreover, the F-test (23.66) remains greater than 10 indicating a global significance of the model. R-square has increased to 0.66 again implying explanatory variability of the dependent variables. The problem that could not be solved is the economic significance of Median Household income. In 2 out of 3 models the coefficient of MHI is positive which means increase in median household income increases the Gini coefficient, implying an increase in inequality.

TABLE 6
FIXED EFFECT WITH AR(1) DISTURBANCE

FE (within) regression with AR(1) disturbances				Number of obs		93
Group Variable: Year				Number of groups		2
R-sq	Within	06635		Obs per	Min	46
	Between	1.0000		group	Avg	465
	Overall	0.5784			max	47
Corr(u _i , Xb)			0.0592	F(7,84)		23.66
				Prob>F		0.000
GINI	Coefficient	SE	T	P value	95% Confidence Interval	
ASD	0.00182	0.00570	3.19	0.002	0.00686	0.0295
MHI	0.00233	0.00388	6.01	0.000	0.00156	0.0310
UR	0.000136	0.000123	0.11	0.917	-0.002434	0.00271
PubT	-0.00557	0.00105	-0.05	0.985	-0.00214	0.0203
PrvT	0.00928	0.00239	3.88	0.000	0.00452	0.0140
ST	-0.00714	0.00105	-0.68	0.500	-0.00281	0.0138
HP	0.009778	0.00111	881	0.000	0.007571	0.11984
Cons	0.085224	0.03040	2.80	0.006	0.0247626	0.14569
rho_ar	-0.17462361					
sigma_u	0.00194475					
sigma_e	0.01471841					
rho_fov	0.0171589					
				(fraction of variance because of u _i)		
F test that all u _i = 0			F(1,84) = -17.08		Prob > F = 1.0000	

Further robustness test for validation of model and OSL include: testing for Multicollinearity; Heteroskedasticity; and Auto correlation. The estimations from Table 7 shows there are no imposing problems that warrants any daunting statistical issue.

TABLE 7
ROBUSTNESS TESTS

Multicollinearity			Heteroskedasticity	Autocorrelation for Panel Data
Variable	VIF	Tolerance	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	Wooldridge test for autocorrelation in panel data
HP	7.65	0.130716	Ho: Constant variance	
MHI	6.31	0.158501	Variables: ASD, MHI, UR, PubT, PrvT, SF, HP	H ₀ : no first-order autocorrelation
PubT	2.62	0.381614		F(1,1)=2.814
ASD	1.97	0.506453	chi ² (7) = 49.26	
UR	1.75	0.572103		Prob>F=0.3422
SF	1.71	0.583766	Prob > chi2 = 0.2658	
PrvT	1.42	0.703319		
Mean VIF	3.35			

According to the rule of thumb, if the Variance inflation factor is greater than 10 there is Multicollinearity, which is not the case for our estimation. For the tests of Heteroskedasticity, the probability of Chi Square is greater than 0.05 so we fail to reject the null hypothesis of constant variance. Thus, the estimation points towards the existence of homoscedasticity. Furthermore, Table 7 shows the

probability of $F > 0.05$ so we cannot reject the Null Hypothesis, hence there is no first order autocorrelation.

CONCLUSION

Using panel data from 2012 and 2013, this paper attempts to empirically predict if student loans exacerbate income inequality in the United States. Statistical analysis did point towards this positive linear relationship, but without much evidence of statistical significance. The overall results suggest that student debt, or factors that cause students to borrow, can increase income inequality. This paper, as well as previous literature, show how student debt can influence the future of current students. Theoretical advancements and empirical research often fail to find a positive relationship between inequality and redistributive spending (Moldogaziev et al., 2018). This may help explain why student loans repayments do not bode well with low- and medium-income households.

Higher education has almost become a necessity in today's competitive age. Students from all ethnic groups and income strata attempt to get into decent schools which will give them a better opportunity in future and help them to move up with higher income and better living standards. However due to rising tuitions and fees, the total amount borrowed and repayment time of students have been increasing rapidly which in itself is making it very difficult for graduates to save or accumulate wealth which can be used to improve their lives. The federal government offers flexible financial aid to students, but it still remains difficult to repay until the graduates can land a decent paying job. With average employment rate lower than before it is becoming extremely tough for graduates belonging to lower- or middle-income families to repay and in fact some of them have to severely cut expenditure to payback their loans. Homeownership and small entrepreneurship have been significantly reduced among people with student loan debt.

Hence both the federal and state authorities should allocate more funds to higher education, which would not force schools to raise tuitions and in-turn make college more affordable in real terms to students. Another aspect which has to be regulated is over borrowing among college students, because this can often lead to declaration of bankruptcy or inability to payback the student loan in the long run. After decades of policy changes in the U.S. financial aid system, the status quo of student loan debt has not improved. There is a need to develop truly novel approaches to paying for higher education (Elliott, 2018). This important social question and policy issue needs to be addressed in a more holistic and detailed way in the literature for there to be consensus on the solution.

REFERENCES

- Addo, F. R., Houle, J. N., & Sassler, S. (2019). The Changing Nature of the Association Between Student Loan Debt and Marital Behavior in Young Adulthood. *Journal of Family and Economic Issues*, 40(1), 86-101.
- Armstrong, E. A., & Hamilton, L. T. (2013). *Paying for the Party*. Harvard University Press.
- Auten, G., & Splinter, D. (2017). *Income inequality in the United States: Using tax data to measure long-term trends*. Draft subject to change. Retrieved from http://davidsplinter.com/AutenSplinter-Tax_Data_and_Inequality.pdf
- Avery, C., & Turner, S. (2012). Student Loans: Do College Students Borrow Too Much--Or Not Enough? *Journal of Economic Perspectives*, 26(1), 165-92.
- Berger, L. M., Cancian, M., & Magnuson, K. (2018). Anti-poverty Policy Innovations: New Proposals for Addressing Poverty in the United States. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 4(3), 1-19.
- Best, J., & Best, E. (2014). *The student loan mess: How good intentions created a trillion-dollar problem*. University of California Press.
- Chopra, R. (2013). *Student Debt Domino Effect?* Washington, DC: Consumer Financial Protection Bureau.
- Claus, E., & Claus, I. (Eds.). (2016). *A Collection of Surveys on Savings and Wealth Accumulation*. John Wiley & Sons.
- Consumer Financial Protection Bureau. (2013). Consumer Response Annual Report (January 1 – December 31, 2013). Retrieved from <https://www.consumerfinance.gov/data-research/research-reports/2013-consumer-response-annual-report/>
- Cooper, D., & Wang, J. C. (2014). *Student Loan Debt and Economic Outcomes*. *Current Policy Perspective No. 14-7*. Federal Reserve Bank of Boston.
- de Brey, C., Musu, L., McFarland, J., Wilkinson-Flicker, S., Diliberti, M., Zhang, A., Claire, B., & Wang, X. (2019). *Status and Trends in the Education of Racial and Ethnic Groups 2018*. NCES 2019-038. National Center for Education Statistics.
- Dickert-Conlin, S., & Rubenstien, R. (Eds.). (2007). *Economic inequality and higher education: Access, persistence, and success*. Russell Sage Foundation.
- Dwyer, R. E. (2018). Credit, debt, and inequality. *Annual Review of Sociology*, 44, 237-261.
- Early, J. F., & Many, U. S. (2018). Reassessing the Facts about Inequality, Poverty, and Redistribution. *Policy Analysis*, (839).
- Elliott, W. (2018). *Children's Savings Accounts: Increasing the Postsecondary Payoff for Low-Income Children*. MHEC Policy Brief. Midwestern Higher Education Compact.
- Elliott, W., Grinstein-Weiss, M., & Nam, I. (2013). *Is student debt compromising homeownership as a wealth-building tool?* CSD Working Paper No. 13-33, Washington University in St. Louis. Retrieved June 5, 2015, from <http://csd.wustl.edu/Publications/Documents/WP13-33.pdf>
- Geiger, R. L. (2015). Does Higher Education Cause Inequality? *American Journal of Education*, 121(2), 299-310.
- Goldrick-Rab, S., Kelchen, R., Harris, D. N., & Benson, J. (2016). Reducing income inequality in educational attainment: Experimental evidence on the impact of financial aid on college completion. *American Journal of Sociology*, 121(6), 1762-1817.
- Hendel, I., Joel Shapiro, J., & Willen, P. (2005). Educational opportunity and income inequality. *Journal of Public Economics*, 89(5-6), 841-870.
- Houle, J. N. (2014). Disparities in debt: Parents' socioeconomic resources and young adult student loan debt. *Sociology of Education*, 87(1), 53-69.
- Jackson, B. A., & Reynolds, J. R. (2013). The price of opportunity: Race, student loan debt, and college achievement. *Sociological Inquiry*, 83(3), 335-368.

- Moldogaziev, T. T., Monogan, J. E., & Witko, C. (2018). Income inequality and the growth of redistributive spending in the United States (US) states: is there a link? *Journal of Public Policy*, 38(2), 141-163.
- Noss, A. (2014). Household income: 2013. *American Community Survey Briefs*, ACSBR/13-02.
- Pressman, S., & Scott, R. (2009). Consumer Debt and the Measurement of Poverty and Inequality in the US*. *Review of Social Economy*, 67(2), 127-148.
- Price, D. V. (2004). *Borrowing inequality: Race, class, and student loans*. Lynne Rienner Publishers.
- Project on Student Debt - The Institute for College Access & Success. (2014). Retrieved June 18, 2014, from <https://ticas.org/our-work/student-debt/>
- Ratcliffe, C., & McKernan, S. M. (2013). *Forever in your debt: Who has student loan debt, and who's worried*. Washington, DC: Urban Institute.
- Saez, E. (2018). Striking it richer: The evolution of top incomes in the United States. In *Inequality in the 21st Century* (pp. 39-42). Routledge.
- Stranahan, H., Borg, M., & Beal-Hodges, M. (2014). Transferring the Cost of Higher Education To Students and Families: Who Bears the Greatest Burden? *GSTF Journal on Business Review (GBR)*, 3(3).
- The Fed - Student Loans. (2019). Retrieved November 22, 2019, from <https://www.federalreserve.gov/publications/2018-economic-well-being-of-us-households-in-2017-student-loans.htm>
- Trends in Student Aid 2019 Highlights. (2019). Retrieved November 22, 2019, from <https://research.collegeboard.org/trends/student-aid/highlights>
- Wenisch, M. (2012). The student loan crisis and the future of higher education. *Catholic Social Science Review*, 17, 345-350.
- Wooldridge, J. M. (2006). *Introductory econometrics: A modern approach*, 3rd. New York: Thomson.

APPENDIX

Scatter Plots

FIGURE 1
SCATTERPLOT OF GINI COEFFICIENT AND AVERAGE STUDENT DEBT

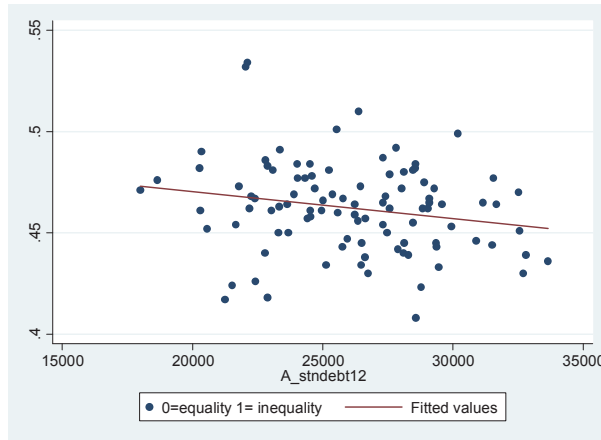


FIGURE 2
SCATTERPLOT OF GINI COEFFICIENT AND MEDIAN HOUSEHOLD INCOME

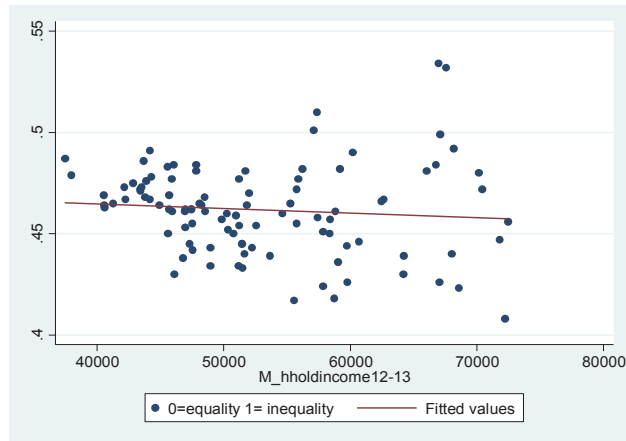


FIGURE 3
SCATTERPLOT OF GINI COEFFICIENT AND PRIVATE TUITION

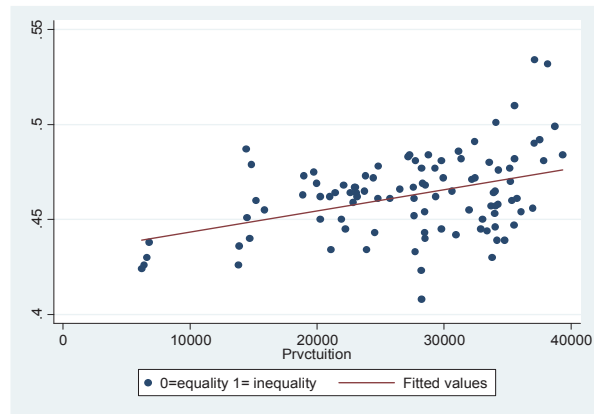


FIGURE 4
SCATTERPLOT OF GINI COEFFICIENT AND HOUSEHOLD POVERTY

