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Obamacare and the Fight Against Income Inequality

Abstract

In this paper, we analyze the Affordable Care Act to determine the magnitude and significance of its effects on income inequality in America. Specifically, we find that the ACA decreased the Gini coefficient by 0.67% and reduced the share of income held by the top 20 percent of income earners by 0.67% over the time period of our study. Furthermore, we estimate that the ACA accounts for a redistribution of approximately $13 billion from the top 20 percent of income earners to the bottom 80 percent of income earners.

Keywords

Inequality, Healthcare

Cover Page Footnote

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1. *Introduction*

From 1971 to 2015, the percent of Americans earning twice the median income grew by 50%, while the percentage of Americans earning less than two-thirds the median income experienced a growth rate of 42% (Kocharr et al, 2015); hence, the many references made to the vanishing middle class. Some income inequality is expected, and some form of inequality is necessary in a capitalist economic system to promote competition and innovation (Reich, 2014). Reich (2014) adds that the pertinent question is not whether income inequality is good or bad, but rather the debate is at which point these inequalities become so great that they pose a serious threat to our economy, equal opportunity, and our democracy. Sixty-three percent of Americans believe that we are near or have already reached that point in America where the unequal distribution of wealth poses a threat to society (Gallup, 2016).

The effects of higher income inequality on decreased social mobility in America are of increased concern (Andrews and Leigh, 2009). Reich (2014) estimates that 42 percent of children in America who are born into poverty will remain in poverty for the entirety of their lives. Further, increased levels of income inequality are associated with increased youth crime (Elgar et al. 2009; and Wilkinson and Pickett, 2009) and more frequent bullying among preadolescents (Elgar et al. 2009). Wilkinson and Pickett (2009) estimate that there is more conflict between children in countries with higher income inequality. Although this is not a problem unique to the United States, the US has the most unequal distribution of wealth among social classes of all developed nations in the world (Wilkinson and Pickett, 2009; Reich, 2014).

Additionally, income inequality is associated with decreased levels of health (Kennedy et al. 1998; Muller, 2002; Sturm and Gresenz, 2002; and Wilkinson and Pickett, 2009). Specifically, in areas with higher income inequality, one observes lower levels of measured health, lower levels of self-reported health, and increased mortality rates (Kennedy et al. 1996). Each percentage point increase in inequality (as measured by the Robin Hood Index[1]) leads to an increase in total mortality of 21.68 deaths per 100,000 in the United States. When the wealth distribution is skewed toward high income families, low income families often do not have the necessary disposable income to afford treatment or preventative care. Therefore, legislation that decreases income inequality can also improve levels of health.

[1] Kennedy et al. (1996) define the Robin Hood Index as the portion of the total community income that would have to be redistributed (taken from the richer half of the population and given to the poorer half) for there to be income uniformity.

Conversely, increased spending on healthcare legislation may be beneficial in the fight against income inequality in America. The Patient Protection and Affordable Care Act (ACA) was implemented on March 23, 2010. Since its implementation much has been written about its effects on the healthcare market, the insurance market, and the market for employment (Antwi et al. 2012; Cantor et al. 2012; Collins et al. 2012; Chen et al. 2015; Depew and Bailey, 2015). Despite the ACA's implications on the workforce and access to healthcare, little if any research has been conducted to understand the relationship between the ACA and income inequality.

In this paper we estimate the causal effect of the ACA on income inequality; thus, beginning the conversation of the potential implications of a wider-range of healthcare-related legislation on income inequality. The remainder of this paper is organized as follows: we first complete a thorough review of current literature surrounding income inequality. We then introduce our data, which provides a rich set of control variables for our estimation. We then review our model and estimation results, and the final section concludes.

2. *Literature Review*

Income inequality, often measured using the Gini coefficient[2], is the extent to which income is distributed in an uneven manner among a population (Gardner and Abraham, 2011). In previous economic literature the Gini coefficient has been used to estimate the effects of a variety of demographic, socioeconomic, and cultural characteristics on income inequality, including: education (Sylwester, 2002; Shugart II et al. 2003; and McMahon 2004; Rehme, 2007; Hojo, 2009; and Hasanov and Izraeli 2011), age (Martinson, 2012; Gunasekara et al., 2013; and Mather et al., 2014), availability of employment (Apergis et al., 2010; and Wolff, 2015), teen birth rate (Wilkinson and Pickett, 2009; and Kearny and Levine, 2014), accessibility of fringe benefits (Pierce, 2001; and Chung, 2003), crime (Patterson, 1991; Hsieh and Pugh, 1993; and Wilkinson and Pickett, 2009), obesity (Gates et al. 2008; Wilkinson and Pickett, 2009; and Lunborg et al. 2014), race (Van der Berg, 2014; and Wilkinson and Pickett, 2009), and political affiliation (Muller, 1985; and Hayashi et al. 2014). The effects of education and educational spending on income inequality are mixed.

Higher educational expenditures have frequently been linked to lower income inequality (Sylwester, 2002; Shugart II et al. 2003; and McMahon 2004; Rehme,

[2] The Organization of Economic Cooperation and Development (2006) defines the Gini coefficient as a measure of the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution.

2007; Hojo, 2009; and Hasanov and Izraeli 2011). In a cross-sectional analysis of multiple countries Sylwester (2002) finds that that allocating one additional percentage point of GDP to public education decreases the Gini coefficient by 0.01. Importantly, Sylwester (2002) finds that the effects to be larger in higher income countries. Further, Hasanov and Izraeli (2011) find that policies supporting higher quality education are pivotal in promoting growth and improving income gains among the poor. Additionally, McMahon (2004) determines that a two percent increase in educational investments reduces the Gini coefficient by eight percent in developed nations.

Shugart II et al. (2003) find that in societies with higher average levels of educational attainment more income is distributed above the median income level. Income is more unevenly distributed to the upper class in these societies because the income earned for unskilled labor does not considerably differ between societies.

Moreover, it is interesting to note that other researchers find the effect of educational spending on income inequality to be nonlinear (Rehme, 2007; Hojo, 2009). Rehme (2007) finds that an increase in educational spending first increases, but subsequently decreases income inequality. Hojo (2009) adds to the literature by proposing that there are diminishing returns to educational spending in Japan.

There exist contradicting theories of the effect of relative age levels on inequality in recent economic literature (Martinson, 2012; Gunasekara et al., 2013; and Mather et al., 2014). Gunasekara et al. (2013) and Mather et al. (2014) conclude that income inequality is lower in areas with younger populations and higher in areas with older populations. Specifically, Gunasekara et al. (2013) find a causal relationship between younger age groups and lower income inequality in Australia and New Zealand. However, Martinson (2012) states that income inequality does not differ among relative age groups in the United States.

Income inequality has also been found to vary based upon racial characteristics. Societies with higher minority populations have higher income inequality (Van der Berg, 2014; and Wilkinson and Pickett, 2009). In Van der Berg's (2014) study of inequality in South Africa the author finds that income inequality is highest in predominately black communities and lowest in predominately white communities. In the United States, income inequality is closely related to the proportion of African-Americans in the state's population (Wilkinson and Pickett, 2009).

Two important socioeconomic characteristics that affect income inequality are employment levels and the availability of fringe benefits. Higher unemployment levels increase income inequality (Apergis et al., 2010; and Wolff, 2015). Apergis et al. (2010) conclude that legislation with the intent of decreasing the unemployment rate will also decrease income inequality. Wolff (2015) provides additional evidence that higher unemployment rates lead to more wealth held by those in the highest income bracket.

Additionally, the lack of employer-provided fringe benefits such as health insurance leads to higher income inequality (Pierce, 2001; and Chung, 2003). Chung (2003) finds that the lack of benefits for less-skilled workers contributed to the rise in income inequality from 1987 – 1994. Pierce (2001) finds that in societies in which lower income workers do not receive fringe benefits income inequality is greater than in societies where low income earners receive these additional forms of compensation. Further, Pierce (2001) highlights the importance of considering fringe benefits when studying inequality.

Additional environmental, social, and cultural factors influencing income inequality include: teen pregnancy, crime, obesity, and political affiliation. Societies with more teenage pregnancies have higher levels of income inequality (Wilkinson and Pickett, 2009; and Kearny and Levine, 2014). Wilkinson and Pickett (2009) find a significant and positive correlation between teen birth rates and inequality, while Kearny and Levine (2014) suggest reverse or simultaneous causality between teen birth rates and income inequality.

Wilkinson and Pickett (2009) find a significant and positive correlation between homicides and income inequality, while Hsieh and Pugh (1993) find that violent crime has a significant and positive effect on income inequality in the United States. Patterson (1991) finds that crime rates have a significant and positive effect on poverty and inequality, which suggests that legislation fighting both poverty and inequality may lead to lower crime rates.

Unhealthy societies also have higher levels of income inequality (Gates et al. 2008; Wilkinson and Pickett, 2009; and Lunborg et al. 2014). Wilkinson and Pickett (2009) find a significant and positive relationship between obesity rates and income inequality. This link could be related to the findings of Gates et al. (2008), who determine that higher obesity rates lead to lower productivity. Individuals who are not obese are more productive on average and earn more than those who are obese; thus, increasing income inequality. There is a significant and negative relationship between obesity and annual earnings (Lunborg et al., 2014).

Finally, there is an established link between politics and income inequality (Muller, 1985; and Hayashi et al. 2014). Specifically, how and where political figures allocate funds affects income inequality (Hayashi et al., 2014). Historically, the two parties in the American political system allocate funds in drastically different ways. Further, countries with increased spending on legislation for educational funding experience lower income inequality (Hayahi et al., 2014).

Through a thorough review of the current economic literature surrounding income inequality we identify age, ethnicity, and education as demographic characteristics that affect income inequality; fringe benefits and employment as socioeconomic characteristics that affect income inequality; and teenage pregnancy rates, crime, obesity, and political affiliation as societal conditions and cultural norms that affect inequality. We use these aforementioned characteristics as control variables in our model as to not overestimate the effect of the ACA on income inequality.

3. *Data*

We use a state-level panel data set from 2007 through 2013 to capture a symmetrical data set surrounding the first year of implementation of the ACA, 2010. We include data from 49 states[3], and use the American Community Survey to capture our two dependent variables: the Gini coefficient and percent of income earned by the highest income quintile.

The Gini coefficient is a measure of the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. The coefficient is measured on a zero to one scale in which a Gini coefficient of zero denotes perfect income equality and a Gini coefficient of one denotes perfect income inequality. For example, if the Gini coefficient of New Jersey in a given year is one, then all of the income in New Jersey is earned by one individual. If the Gini coefficient of New Jersey in a given year is zero, then every income earner in New Jersey earns the exact same income in that given year. Some advantages of using the Gini coefficient as a measure of inequality are the accessibility of the data, its widespread use in current literature regarding inequality, and its ease of interpretation (Wilkinson and Pickett, 2009).

However, there are limitations to using the Gini coefficient as the only measure of inequality. Specifically, it is possible that two different income distributions can have the same Gini coefficient. Additionally, the Gini

[3] We exclude Hawaii due to missing data.

coefficient cannot differentiate between a person who has negative income because they are a full time college student, and a person who has negative income because they are unemployed and not seeking employment.

For these reasons, we use an additional outcome variable, the percent of total gross income earned by the top twenty percent of income earners. This variable provides an alternative measure of income inequality based on direct income distribution. This value increases as more income is redistributed from the bottom 80 percent of income earners to the top 20 percent of income earners, depicting a more unequal distribution of wealth, and higher income inequality.

Our analysis focuses on one variable of interest, the implementation of the ACA. The ACA variable is a binary indicator set to zero for each state from 2007 through 2009, and one for each state from 2010 through 2013.

We use the American Community Survey to capture the data for eight independent variables. These state-level variables are: four levels of education, median age, median age squared, race, and health insurance coverage. We use the highest academic degree obtained by individuals aged 25 or older to represent the effect of education on income inequality in our models. We separate educational attainment into four categories: less than high school degree, high school degree or equivalent, some college or associate's degree, and bachelor's degree or higher.

We include median age to control for age variations in each state, which could be related to levels of income inequality (Gunasekara et al., 2013; and Mather et al., 2014). We also add median age squared to the models to control for a diminishing effect of age on inequality. Further, we include three racial categories that represent a percent of the total state population for a given year[4] because we know there exists a relationship between race and inequality (Van der Berg, 2014; and Wilkinson and Pickett, 2009).

We use the percentage of persons per state who do not have health insurance coverage as a proxy to capture the effect of fringe benefits on income inequality.[5] The mean rate of those without health insurance coverage over the entirety of the

[4] The Census Bureau data is based on self-identification. They disclose that people may choose to report more than one race group. People of any race may be of any ethnic origin.

[5] The Census Bureau does not provide state-level health insurance coverage data for the year 2007. For that reason we include a value of 0 for all 49 states represented in 2007. Therefore, the values will not be represented in the regression, and the coefficient will only represent the effect of health coverage on inequality from 2008 through 2013. Our time fixed effects for 2007 capture the fact that this variable is missing during 2007.

sample is 21.20 percent. Note that in 2010, the year the ACA was implemented, the mean uninsured rate of the sample increases from the year before implementation. This is not surprising as we expect the effects ACA to be gradual as we do not expect all qualified individuals will take advantage of a new piece of legislation at the time of implementation. We recognize that it may take time to educate the public on the new methods of accessing health insurance, and we expect to see the greatest decrease in the uninsured rate the years following 2010. This is reflected in our data in the decrease in the uninsured rate from 2011 to 2013. In 2013 we recognize the lowest level of uninsured Americans in our sample being 20.80 percent.[6]

We obtain crime statistics from the website of the Federal Bureau of Investigation (FBI), which provides national and state-level data on the number of arrests each year beginning in 1985. This data includes different arrest categories such as violent crime, rape, property crime, robbery, and total arrests. We choose to use total arrests as a percent of the state population as the control variable to represent crime in our models.

Obesity and teen birth rate statistics are from the website of the Center for Disease Control and Prevention (CDC), which reports national and state level obesity rates each year for both adults and teenagers aged 18 and younger, as a percentage of the total state population. The CDC defines obesity as having a body mass index (BMI) greater than 30.0. The BMI statistics are calculated from self-reported weight and height.[7] We capture the effect of teen birth rates we observe the number of births per 1,000 teenage girls aged 15 through 19. We transform these values into percentages for ease of interpretation. For instance, in 2007 the mean births per 1000 girls are 40.9. Therefore, the calculated teen birth rate is 0.0409.[8]

We gather state level unemployment data directly from the regional and state unemployment news releases submitted by the Bureau of Labor Statistics (BLS). We use the December news releases from the years 2007 through 2013 for consistency. The unemployment rate is calculated as the total number of

[6] In 2014, now the most recent available data, the uninsured rate in America was 13.4%.

[7] The data is gathered from phone surveys given by The Behavioral Risk Factor Surveillance System (BRFSS) which is recognized as one of the nation's top systems of health-related telephone surveys.

[8] This value is calculated by dividing the mean births per 1000 girls (40.9) by 1000.

unemployed persons in the labor force divided by the total number of persons in the civilian labor force[9].

To capture the effect of politics on income inequality we include dummy variables representing the political party of the state governor for each given year of the sample. The three parties represented in the model are the Republican party, Democratic party, and Independent party.

Table 1 shows the summary statistics of our dependent variables overall, and Table 2 shows the summary statistics of our aforementioned control variables. There are some trends we observer over the time period of our study. First, there are increasing levels of educational attainment and obesity, and there are declining rates of arrest and teen pregnancy. Further, there is a consistent decline in the unemployment rate through 2013 where it reaches 6.31 percent.[10] As previously discussed, the percentage of the population without health insurance is steadily declining, over the course of the study. For the entirety of the sample 56.90 percent of the governors are members of the Republican party, 42.60 percent of the governors are members of the Democratic party, and 0.60 percent of the governors are independent.

Table 1:

Dependent Variables	**Mean**	**Std. Deviation**
Mean and Median Income Variation ($100,000's)	0.1669	0.0337
Gini Coefficient	0.4529	0.0192
Percent of Income Held by Highest Quintile	0.4905	0.0171
Percent of Income by Top 5% Earners	0.2123	0.0134
Number of Observations	343	

[9] The Bureau of Labor Statistics (2008) classifies the civilian labor force as all persons in the civilian noninstitutionalized population that are either employed or unemployed but have been willing and able to work during a period of four weeks.

[10] According to the Bureau of Labor Statistics most recent report on February 5, 2016 the US unemployment rate currently resides 4.9 percent.

Table 2:

Independent Variables:	**Mean**	**Std. Deviation**
No High School Degree	0.1350	0.0352
High School Degree or Equivalent	0.3020	0.0397
Some College or Associates Degree	0.2916	0.0372
Bachelors Degree or Higher	0.2714	0.0479
Median Age	37.5035	2.3212
Median Age Squared	1411.8848	171.3636
Male Population Rate	0.4934	0.0076
Unemployment Rate	0.0716	0.0218
Teen Birth Rate	0.0343	0.0117
Percent of Population with Health Coverage	0.0021	0.0001
Total Arrest Rate	0.0449	0.0116
Drug Related Arrest Rate	0.0051	0.0022
U.S. Citizen Population Rate	0.9047	0.0641
Obesity Rate	0.2766	0.0325
White Population Rate	0.7938	0.1020
Black Population Rate	0.1038	0.0948
All Other Race Population Rate	0.1025	0.0664
Democratic State	0.5685	0.4960
Republican State	0.4257	0.4952
Independent State	0.0058	0.0762
Number of Observations	343	

4. *Econometric Methods*

We use an OLS model with both state and time fixed effects to determine the effect of the ACA on income inequality. Our most robust specification is as follows:

$$Y_{st} = \beta_0 + \beta_1 ACA_{st} + \beta_2 \boldsymbol{X}_{st} + \alpha_1 State_s + \alpha_2 Time_t + u_{st} \quad (1)$$

where Y_{st} represents the measure of inequality for state, *s*, in year, *t*. ACA_{st} is our variable of interest, which represents the binary variable indicating the presence of the ACA. $\boldsymbol{X}_{st}$ is a vector of covariates containing the control variables identified in Table 2. We also include state and time fixed effects and an idiosyncratic error term.

An added complication to disentangling the effects of the ACA on income inequality is the individual states' decisions to expand Medicaid during this time period. We run an additional set of specifications in which we include the binary indicator for Medicaid expansion using the following model:

$$Y_{st} = \beta_0 + \beta_1 ACA_{st} + \beta_2 Medicaid_s + \beta_2 \boldsymbol{X}_{st} + \alpha_1 State_s + \alpha_2 Time_t + u_{st} \quad (2)$$

5. *Results*

5.1.Outcome Variable One: Gini Coefficient

The Results in Table 3 include estimated effects using equation (1). The dependent variable in all five columns is the Gini coefficient. In column one, our results indicate that the implementation of the ACA has a positive and statistically significant effect (at the one percent level) on the Gini coefficient. The results indicate that the implementation of the ACA accounts for a 0.006 unit increase in the Gini coefficient. Although the coefficient is highly significant, the results are not consistent with our hypothesis that the ACA would decrease income inequality. Instead the coefficient suggests the opposite. One reason for this may be because requiring low income workers to purchase health insurance on the open market has the potential to decrease their disposable after-tax income. Because the mandate aims to provide affordable care to low-income earners its effects may be relatively larger on low-income earners than high-income earners. This ultimately may lead to increased income inequality. However, as we mention in the literature review and data section, the ACA is not the only variable that

affects income inequality. Therefore, we recognize that this model suffers from omitted variable bias. Additionally, the R-Squared of the regression illustrates that the independent variable accounts for only 2.10 percent of the variation of the dependent variable.

Column two shows the results in which we add additional controls for the effect education on income inequality. Again, we observe a significant (at the one percent level) and positive effect of the ACA on the Gini coefficient. The results indicate that the ACA accounts for a 0.011 unit increase in inequality, as measured by the Gini coefficient. However, we know from our review of the economic literature that the ACA and education are not the only variables that affect our dependent variable (Muller, 1985; Patterson, 1991; Hsieh and Pugh, 1993; Pierce, 2001; Chung, 2003; Wilkinson and Pickett, 2009; Apergis et al. 2010; Martinson, 2012; Gunasekara et al. 2013; Kearny and Levine, 2014; Lunborg et al. 2014; Mather et al. 2014; Hayashi et al. 2014; Van der Berg, 2014; and Wolff, 2015). We recognize that this model also suffers from omitted variable bias. However, we notice that the addition of the education variables to our specification lead to a significantly increased R-squared; our independent variables now account for 67.50 percent of the variation in the dependent variable.

Column three shows the results in which we include additional control variables for age, employment, teen birth rate, insurance coverage, crime, obesity, race, and political affiliation. It is imperative that we include all of these variables in the model to insure an unbiased estimate of the effect of the ACA on the dependent variable because, as previously discussed, all of these variables have been identified as contributors to given levels of inequality (Muller, 1985; Patterson, 1991; Hsieh and Pugh, 1993; Pierce, 2001; Sylwester, 2002; Chung, 2003; Shugart II et al. 2003; McMahon 2004; Rehme, 2007; Hojo, 2009; Wilkinson and Pickett, 2009; Apergis et al. 2010; Hasanov and Izraeli 2011; Martinson, 2012; Gunasekara et al. 2013; Kearny and Levine, 2014; Lunborg et al. 2014; Mather et al. 2014; Hayashi et al. 2014; Van der Berg, 2014; and Wolff, 2015). When we include all observable characteristics, we continue to observe a positive relationship between the passage of the ACA and the Gini coefficient that is statistically significant, although at a slightly reduced significance level of five percent. These results indicate that the implementation of the ACA accounts for a 0.005 unit increase in the Gini coefficient, which is a 1.32 percent increase when compared to the mean of the sample. With the inclusion of all observable control variables, our linear model accounts for 73.20 percent of the variation in the dependent variable.

State fixed effects control for the variation in the dependent variable that can be explained by characteristics or changes that are specific to each state in the

model while holding all else constant. Time fixed effects capture the variation in the dependent variable that is explained by changes that are specific to each year in the model.

Column four shows the results, which include state fixed effects and column five shows the results, which include both state and time fixed effects. When controlling for state fixed effects, we observe a negative and statistically significant (at the one percent level) effect of the ACA on the Gini Coefficient. This result holds when additionally controlling for time fixed effects. The results for both equations indicate that the implementation of the ACA accounts for a 0.003 unit (or a 0.67 percent when compared to the mean) decrease in the Gini coefficient. Our fourth and fifth linear models account for 98.3 and 98.4 percent of the variation in the dependent variable, respectively.

The results from these models are interesting in the fact that we observe a decrease in magnitude each time we add additional control variables, as well as a change in the sign of the coefficient when controlling for state and time fixed effects. The ACA coefficient transitions from having a significant and positive effect on inequality to having a negative effect that is still significant at the one percent level, as we add additional control variables for observable and unobservable characteristics affecting inequality. We determine that the fifth column represents our most robust specification as we control for the most significant observable characteristics affecting income inequality, in addition to controlling for unobservable characteristics at the year and state level. Based on our various specifications, we conclude that the implementation of the ACA has resulted in a 0.67 percent decrease in income inequality as measured by the Gini coefficient. In the next section we extend our results by using an alternative measure of inequality.

Table 3:

Gini Coefficient					
Variable	**OLS 1**	**OLS 2**	**OLS 3**	**OLS 4**	**OLS 5**
Affordable Care Act	0.006***	0.011***	0.004**	-0.003***	-0.003***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
High School Graduate		-0.428***	-0.428***	-0.212**	-0.126
		(0.024)	(0.038)	(0.085)	(0.085)
Associate's Degree		-0.539***	-0.441***	0.134*	0.115
		(0.021)	(0.030)	(0.072)	(0.070)
Bachelor's Degree		-0.284***	-0.252***	0.179**	0.211**
		(0.019)	(0.035)	(0.088)	(0.088)
Median Age			0.012***	0.007	0.011**
			(0.004)	(0.005)	(0.005)
Median Age Squared			-0.0001**	-0.00003	-0.0001
			(0.0001)	(0.0001)	(0.0001)
Unemployment Rate			-0.026	-0.025*	-0.082***
			(0.036)	(0.015)	(0.020)
Teen Birth Rate			0.245**	-0.199**	-0.284***
			(0.116)	(0.100)	(0.102)
Uninsured Rate			0.012	-0.002	-0.002
			(0.015)	(0.006)	(0.012)
Total Arrests as Percent of Population			-0.247***	-0.038	-0.031
			(0.062)	(0.047)	(0.046)
Obesity Rate			0.008	0.051***	0.043***
			(0.032)	(0.015)	(0.015)
Percent Black			0.026**	0.467***	0.476***
			(0.010)	(0.097)	(0.095)
Percent Other Race			0.008	0.003	-0.017
			(0.013)	(0.034)	(0.033)
Democratic Governor			0.001	0.001**	0.001**
			(0.001)	(0.0004)	(0.0004)
Independent Governor			-0.006	0.001	0.002
			(0.007)	(0.002)	(0.002)
Constant	0.450***	0.810***	0.512***	0.192	0.074
	(0.002)	(0.016)	(0.081)	(0.133)	(0.133)
State	No	No	No	Yes	Yes
Time	No	No	No	No	Yes
R	0.1430	0.8220	0.8570	0.9910	0.9920
R Square	0.0210	0.6750	0.7350	0.9830	0.9840
Adjusted R Square	0.0180	0.6710	0.7230	0.9790	0.9800
Std. Error of the Estimate	0.0191	0.0110	0.0101	0.0028	0.0027

Significance Levels:
0.01 level: ***
0.05 level: **
0.10 level: *

5.2. Outcome Variable Two: Top 20 Percent Income Earners

Similar to the results in Table 3, the results in Table 4 include estimated effects from multiple specifications of equation (1). However, the dependent variable is the percent of income earned by the highest quintile of income earners.

We find a similar pattern to our results in columns one through five, as with our previous dependent variable. The results in column one indicate that the implementation of the ACA accounts for a 0.5 percentage point increase in the percent of income earned by the highest quintile of income earners. When we add controls for education, shown in column two, we find that the ACA accounts for a 0.9 percentage point increase in the dependent variable. With additional controls for observable characteristics, column three shows that the implementation of the ACA results in a 0.4 percentage point increase in the dependent variable or a 0.82 percent increase when compared to the mean. The independent variables in this linear model account for 73.20 percent of the variation in the dependent variable.

Columns four and five show our results that are robust to unobservable characteristics at the state and year level. These results indicate that the implementation of the ACA accounts for a 0.3 percentage point decrease in the dependent variable, or a 0.67 percent decrease in the percent of income held by the top 20 percent of earners when compared to the mean of the sample. Our fourth and fifth linear models both account for 97 percent of the variation in the dependent variable, respectively.

The results from these models confirm our original findings that the ACA has a significant and negative effect on income inequality. According to the results of our models, the passage of the ACA resulted in a 0.67 percent decrease in the Gini coefficient (significant at the one percent level) and a 0.61 percent decrease in the percent of total income earned by America's top income quintile (significant at the five percent level). With these results we are able to estimate that roughly $12.9 billion[11] of wealth that was redistributed from the top 20 percent of income earners to the bottom 80 percent of income earners can be attributed to the implementation of the ACA. In the next section of this paper we extend our results by adding Medicaid expansion as an additional control variable.

[11] In 2013 the median annual income earned by the top 20 percent of household earners was $186,352. We multiply $186,532 by the coefficient -0.003 and determine that $560 is the average reduction in household earnings in the top 20 percent of income earners. We then multiply $560 by the number of 2013 households held by the top 20 percent (23,122,043 households). We determine that $12,948,344,192 is the total wealth redistributed from the top 20 percent of income earners to the bottom 80 percent.

Table 4:

Percent of Income held by Top Quintile					
Variable	**OLS 1**	**OLS 2**	**OLS 3**	**OLS 4**	**OLS 5**
Affordable Care Act	0.005***	0.009***	0.004**	-0.003**	-0.003**
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
High School Graduate		-0.365***	-0.388***	-0.040	-0.050
		(0.024)	(0.037)	(0.139)	(0.144)
Associate's Degree		-0.455***	-0.384***	0.230*	0.236**
		(0.020)	(0.029)	(0.118)	(0.119)
Bachelor's Degree		-0.232***	-0.230***	0.322**	0.326**
		(0.018)	(0.035)	(0.145)	(0.149)
Median Age			0.008*	0.012	0.011
			(0.004)	(0.009)	(0.009)
Median Age Squared			-0.0001	-0.0001	-0.0001
			(0.0001)	(0.0001)	(0.0001)
Unemployment Rate			-0.062*	-0.075***	-0.067**
			(0.035)	(0.024)	(0.034)
Teen Birth Rate			0.204*	-0.144	-0.144
			(0.115)	(0.164)	(0.173)
Uninsured Rate			0.011	-0.007	-0.002
			(0.015)	(0.009)	(0.020)
Total Arrests as Percent of Population			-0.203***	-0.059	0.059
			(0.061)	(0.078)	(0.078)
Obesity Rate			-0.013	0.040	0.041
			(0.031)	(0.025)	(0.025)
Percent Black			0.025**	0.309*	0.312*
			(0.010)	(0.159)	(0.161)
Percent Other Race			0.006	-0.003	0.001
			(0.013)	(0.055)	(0.056)
Democratic Governor			0.001	0.002**	0.002**
			(0.001)	(0.001)	(0.001)
Independent Governor			-0.012*	-0.004	-0.005
			(0.007)	(0.004)	(0.004)
Constant	0.488***	0.791***	0.612***	0.034	0.043
	(0.001)	(0.016)	(0.079)	(0.218)	(0.226)
State	No	No	No	Yes	Yes
Time	No	No	No	No	Yes
R	0.1460	0.7850	0.8210	0.9700	0.9700
R Square	0.0210	0.6160	0.6740	0.9410	0.9410
Adjusted R Square	0.0180	0.6120	0.6590	0.9270	0.9270
Std. Error of the Estimate	0.0169	0.0106	0.0100	0.0046	0.0046

Significance Levels:
0.01 level: ***
0.05 level: **
0.10 level: *

5.3.Inclusion of Medicaid Expansion Indicators

The results in Table 5 correspond with equations (2) in which we include the states' decisions to expand Medicaid as an additional control variable in order to capture any supplemental effect of the healthcare reform on inequality. The dependent variable in all five specifications is the Gini coefficient, and additional controls for observable and unobservable characteristics are sequentially added, as in the previous tables. In column one, we observe that the implementation of the ACA accounts for a 0.009 unit increase in the Gini coefficient. Although the coefficient is statistically significant at the one percent level, the corresponding sign does not match our hypothesis that the ACA decreases income inequality. However, as in our past discussions we recognize that this initial model suffers from omitted variable bias.

As we progress through our specifications when adding all additional observable regressors we note the continued decrease in the magnitude of the effects of the ACA on income inequality. In our preferred specification as modeled with all observable control variables and time and state fixed effects, represented in column five, we find that the ACA accounts for a 0.003 unit decrease in the Gini coefficient. This result is consistent with our initial estimated effect and shows the sustained effect of the ACA on income inequality, even when controlling for supplemental effects of the healthcare reform on inequality.

The results in Table 6 show the effects of the ACA on the income inequality, as measured by the share of income held by the top income quintile using equation (2). We find a similar trend in our coefficient estimates as with the estimated effects of the ACA in Tables 3 through 5. The results in column five are of our preferred specification as modeled by equation (2) and indicate that the ACA accounts for a 0.2 percentage point decrease in the dependent variable.

These additional estimated effects on our two measures of income inequality support our initial findings that the ACA decreases income inequality. We note that when additionally controlling for the effects of Medicaid expansion there is no loss in significance or magnitude of the ACA when using the Gini coefficient as the dependent variable. We observe a decrease of 0.1 percentage points in the estimated coefficient of the ACA when using the percent of income held by the top income quintile as the dependent variable, but this effect remains statistically significant at the five percent level. These results provide additional confidence to our original conclusion that the ACA does decrease income inequality.

Table 5:

Gini Coefficient					
Variable	**OLS 1**	**OLS 2**	**OLS 3**	**OLS 4**	**OLS 5**
Affordable Care Act	0.009***	0.009***	0.003**	-0.003***	-0.003***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
Medicaid Expansion Year	0.014***	0.010***	0.008***	0.002***	0.002***
	(0.004)	(0.002)	(0.002)	(0.001)	(0.001)
High School Graduate		-0.424***	-0.421***	-0.205**	-0.118
		(0.024)	(0.029)	(0.083)	(0.083)
Associate's Degree		-0.532***	-0.438***	0.158**	0.138**
		(0.020)	(0.029)	(0.071)	(0.069)
Bachelor's Degree		-0.291***	-0.260***	0.112	0.139
		(0.019)	(0.034)	(0.089)	(0.088)
Median Age			0.013***	0.007	0.012**
			(0.004)	(0.005)	(0.005)
Median Age Squared			-0.0001***	-0.00004	-0.0001
			(0.0001)	(0.0001)	(0.0001)
Unemployment Rate			-0.024	-0.021	-0.079***
			(0.035)	(0.015)	(0.020)
Teen Birth Rate			0.201*	-0.203**	-0.285***
			(0.115)	(0.098)	(0.100)
Uninsured Rate			0.016	-0.001	-0.003
			(0.015)	(0.005)	(0.011)
Total Arrests as Percent of Population			-0.233***	-0.027	-0.021
			(0.061)	(0.047)	(0.045)
Obesity Rate			0.001	0.044***	0.035**
			(0.032)	(0.096)	(0.015)
Percent Black			0.027***	0.444***	0.452***
			(0.010)	(0.096)	(0.093)
Percent Other Race			0.004	0.004	-0.017
			(0.013)	(0.033)	(0.033)
Republican Governor			0.0001	0.001**	0.001*
			(0.001)	(0.0004)	(0.0004)
Independent Governor			-0.005	0.002	0.002
			(0.007)	(0.002)	(0.002)
Constant	0.809***	0.809***	0.498***	0.194	0.077
	(0.016)	(0.016)	(0.079)	(0.130)	(0.131)
State	No	No	No	Yes	Yes
Time	No	No	No	No	Yes
R	0.2380	0.8320	0.8570	0.9920	0.9920
R Square	0.0560	0.6920	0.7350	0.9830	0.9810
Adjusted R Square	0.0510	0.6880	0.7230	0.9790	0.9810
Std. Error of the Estimate	0.0187	0.0107	0.0101	0.0028	0.0027

Significance Levels:
0.01 level: ***
0.05 level: **
0.10 level: *

Table 6:

Percent of Income held by Top Quintile					
Variable	**OLS 1**	**OLS 2**	**OLS 3**	**OLS 4**	**OLS 5**
Affordable Care Act	0.003*	0.008***	0.003**	-0.002**	-0.002**
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Medicaid Expansion Year	0.014***	0.010***	0.008***	0.002*	0.002*
	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)
High School Graduate		-0.361***	-0.381***	-0.033	-0.043
		(0.023)	(0.037)	(0.139)	(0.144)
Associate's Degree		-0.448***	-0.381***	0.252**	0.256**
		(0.019)	(0.029)	(0.118)	(0.119)
Bachelor's Degree		-0.239***	-0.238***	0.260*	0.262*
		(0.018)	(0.034)	(0.148)	(0.152)
Median Age			0.009**	0.012	0.012
			(0.004)	(0.009)	(0.009)
Median Age Squared			-0.0001***	0.0001	0.0001
			(0.0001)	(0.0001)	(0.0001)
Unemployment Rate			-0.060*	-0.071***	-0.064*
			(0.035)	(0.024)	(0.034)
Teen Birth Rate			0.160	-0.148	-0.145
			(0.113)	(0.163)	(0.173)
Uninsured Rate			0.015	-0.006	-0.003
			(0.014)	(0.009)	(0.020)
Total Arrests as Percent of Population			-0.188***	0.068	0.068
			(0.060)	(0.078)	(0.078)
Obesity Rate			-0.020	0.033	0.034
			(0.030)	(0.025)	(0.026)
Percent Black			0.027***	0.288*	0.290*
			(0.010)	(0.159)	(0.161)
Percent Other Race			0.002	-0.003	0.001
			(0.012)	(0.055)	(0.056)
Republican Governor			-0.001	0.002**	0.002**
			(0.001)	(0.001)	(0.001)
Independent Governor			-0.012	-0.005	-0.006
			(0.007)	(0.004)	(0.004)
Constant	0.488***	0.790***	0.599***	0.037	0.037
	(0.001)	(0.015)	(0.078)	(0.217)	(0.217)
State	No	No	No	Yes	Yes
Time	No	No	No	No	Yes
R	0.2540	0.7990	0.8300	0.9700	0.9700
R Square	0.0640	0.6390	0.6890	0.9410	0.9410
Adjusted R Square	0.0590	0.6330	0.6730	0.9280	0.9270
Std. Error of the Estimate	0.0165	0.0103	0.0097	0.0046	0.0046

Significance Levels:
0.01 level: ***
0.05 level: **
0.10 level: *

6. *Conclusion*

We find that the implementation of the ACA has a significant and negative effect on income inequality. In this paper we focus on two measures of inequality: The Gini coefficient and the percent of wealth held by the highest income quintile. We estimate that the ACA decreases the Gini coefficient by 0.67 percent and decreases the percent of wealth held by the highest income quintile by 0.61 percent. Furthermore, this indicates that the ACA accounts for a redistribution of approximately $13 billion from the top 20 percent of income earners to the bottom 80 percent of income earners.

We control for the effects of education, age, employment, teen pregnancy, insurance coverage, crime, obesity, race, and politics to provide an un-biased estimate of the effect of the ACA on either of our dependent variables. Additionally, we control for both state and time fixed effects in our most robust specifications, which account for more than 99 percent of the variation in the Gini coefficient, and 97 percent of the variation in the percent of income held by the highest income quintile. Furthermore, the causal relationship holds true when controlling for the supplemental effect of healthcare reform measured by Medicaid expansion.

We also recognize the limitations of our model. Because our variable of interest, the ACA is a binary variable, these results indicate the effect of the ACA as linear and do not account for possible diminishing effects over time. Additionally, if we depend solely on the results of our OLS model, we still risk the possibility of having biased estimates of the effect of the ACA on inequality due to possible endogeneity issues such as omitted variable bias and/or simultaneous causality. Furthermore, even if we are to account for all required control variables the linear specifications of OLS could be incorrect (Reynolds and DesJardius, 2009). By depending solely on OLS specifications, even if we account for all necessary control variables in this model we may overestimate the effect of the variable of interest by saying that the ACA has a linear relationship with inequality. However, we feel that we have identified a robust model that captures the effect of the ACA on income inequality.

These results, showing the effect the ACA has on income inequality, have important policy implications. Specifically, that legislation supporting additional healthcare reform can assist in the fight against income inequality. We are able to add to the ongoing discussion of income inequality in the economic literature. Moreover, this paper is seminal work in studying the implications of the ACA and its effect on income inequality. In subsequent analysis we suggest testing additional dependent variables to support our findings. We also suggest using a

continuous variable as the variable of interest, such as the percent of the population without health insurance. Furthermore, we believe our results may prove to be conservative estimates of the actual effects of the ACA on inequality. The effect of the individual mandate would be captured when including data from succeeding years in the dataset.[12] If so, the increased magnitude of the coefficient would only further support our findings that effective healthcare legislation can aid in the fight against income inequality.

[12] Effective January 1, 2014: under the law, most individuals who can afford it are required to obtain basic health insurance coverage or pay a fee to help offset the costs of caring for uninsured Americans. If affordable coverage is not available to an individual, he or she is eligible for an exemption (ASPA, 2015).

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