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Quantitative Easing and Inequality: QE impacts on wealth and income distribution in the United States after the Great Recession

Emily Davis

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Abstract

In response to Great Recession, the Federal Reserve implemented quantitative easing. Quantitative easing (QE) aided stabilization of the economy and reduction of the liquidity trap. This research evaluates the correlation between QE implementation and increased inequality through the recovery of the Great Recession. The paper begins with an evaluation of the literature focused on QE impacts on financial markets, wages, and debt. Then, the paper conducts an analysis of QE impacts on income, household wealth, corporations and the housing market. The analysis found that the changes in wealth distribution had a significant impact on increasing inequality. Changes in wages were not the prominent cause of changes in GINI post-recession so changes in existing wealth appeared to be a contributing factor. Researching the increases in inequality post-recession provide insight into negative impacts of QE and how to avoid these problems in the future.

Key words: Inequality, Great Recession, Quantitative Easing

Introduction

In a panel with teachers in Washington D.C, Jerome Powell stated "we [the Federal Reserve] have work to do to make sure that the prosperity that we do achieve is widely spread." (Smialek, 2019). The Federal Reserve's mandate of economic stability does not explicitly include economic equality, but Powell confirms its importance. As the economy recovered from the Great Recession, the rich became richer, while the poor remained at low levels of wealth which furthered economic inequality. In other words, the rising tide did not raise all ships. This research will address the impacts of the Federal Reserve's monetary policy on inequality in wake of the Great Recession in the United States. The paper will begin with a historical overview of inequality and recessions since the 1970s, including the tools of recessionary recovery, the causes of the recent Great Recession, and concluding with a discussion of the measures of inequality. After providing the background information, this paper evaluates the current state of the literature regarding inequality and monetary policy. This review is divided into sections how regrading inequality is impacted through financial markets, wages, and debt. Through an assessment of the current literature, there appears to be disagreement over impact of monetary policy on inequality in wake of the Great Recession. The purpose of this paper is to research if the unique conditions of monetary policy during the Great Recession contributed to recent increases in economic inequality.

Inequality is linked to significant detriments to society and understanding its causes can help reduce these negative impacts. For example, life expectancy and childhood education levels decrease as inequality increases. Additionally, incarceration, mental illness, infant mortality, obesity, and teenage pregnancy rates have a positive correlation with inequality ("Why is Income Inequality Bad). These negative impacts of inequality permeate all parts of society, regardless of

income level. Therefore, understanding how to avoid continued increases in inequality will help lift strain off of the United States' economy and quality of life.

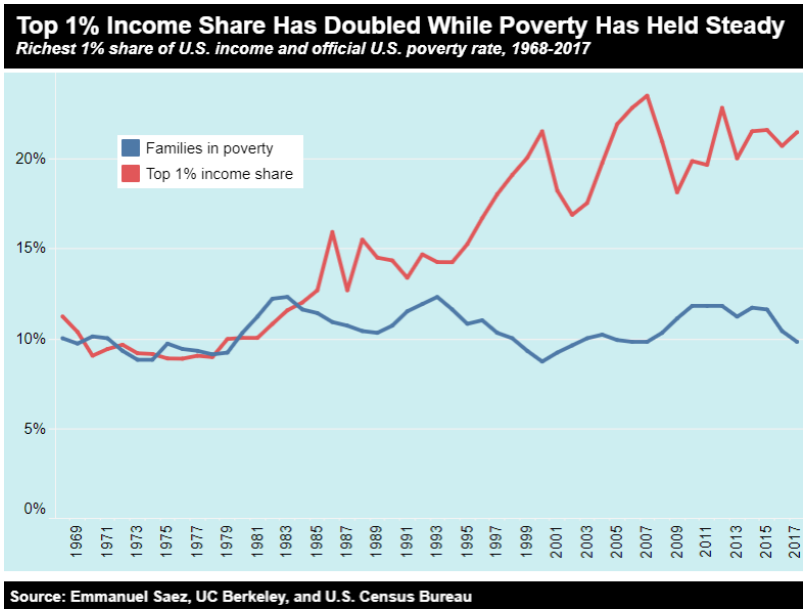
Background

The purpose of this section is to provide background information on changes of inequality since the 1970s. This section will cover the basics of monetary policy and how the Federal Reserve strives to maintain a healthy economy. After a discussion of monetary policy, the paper will provide background on the Great Recession and how it affected the economy. Then, the paper will transition to a discussion of methods of measuring inequality.

Inequality since the 1970s

Economic inequality has steadily increased since the early 1970s. Figure 1 shows the changes in income shares for those in the top 1% and those below the federal poverty line. Since the 1970s the top 1% has increased their share dramatically compared to those in poverty. Although income is only one component in measuring economic inequality, the results indicate a growing trajectory of inequality. As seen in figure 1, beginning in early 1970s those living in poverty held the same percentage share of income as the top 1%, approximately at a 10% share. This means that the top 1% held the same amount as the bottom estimated 40%. Starting from the 1970s, inequality started dramatically increasing and the gap between rich and poor continues to grow. Figure 1 indicates this change because in 2017 the top 1% held above 20% of shares while the bottom 40% still held less than 10%.

Figure 1



Monetary Policy

The Federal Reserve (Fed) conducts expansionary monetary policy during economic recessions. Through expansionary policy, the Fed reduces the Federal Funds rate, the rate at which banks borrow from one another through overnight loans. As banks borrow at lower rates, they can lend at lower rates and impact businesses and consumers. Lower interest rates stimulate the economy by increasing spending. When businesses borrow at a low rate, they invest in expansion. As a business grows and produces more goods, they require more labor and capital which provides stimulus to the economy. Similarly, when households borrow at a low rate, they have more disposable income to inject into the economy.

Increased inflation is another potential impact of expansionary policy. As the demand for goods increases (as described with increased spending) wages and other costs are higher which in turn leads to inflation. Inflation reduces debt services which aids individual consumer recovery, especially after a recession when debts likely increased. Individuals who hold high

levels of debt are expected to benefit the most from increased inflation. This impacts the level of wealth distribution and makes debtors better off than others during high periods of inflation.

Figure 2: Effective Federal Funds Rate

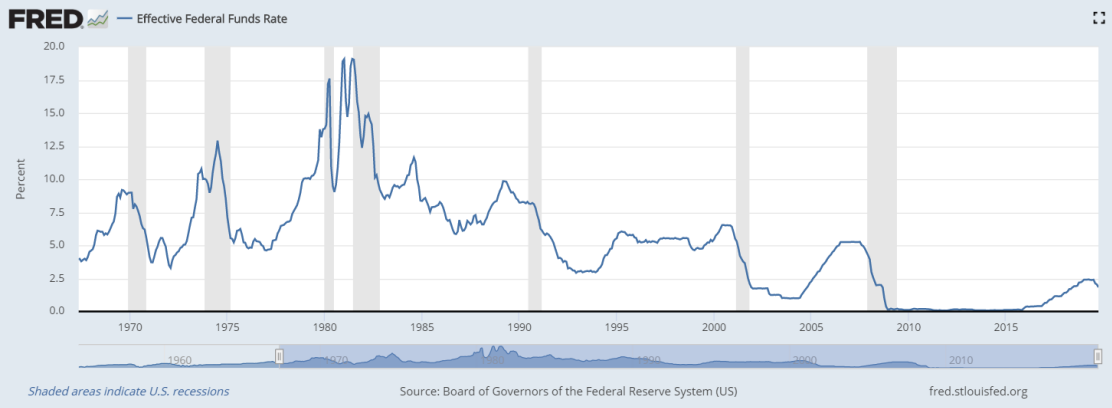


Figure 2 shows the Fed's attempts to regulate the economy through the federal funds rate. During every recession (marked with grey bars) the Fed has reduced interest rates. The interest rate was effectively zero during the Great Recession. This incredibly low interest rate is far less than any other policy response and stayed low much longer than other monetary policy implementation. The extremely low interest rates are one of the reasons the Fed's responses to the Great Recession was unique compared to other recessions. During this period of nearly zero interest rates, the economy did not grow as the Fed intended. This created a problem for the Fed because they could not continue to lower interest rates to stimulate the economy.

The Great Recession

For the purpose of this discussion, we will focus on the farthest right grey section – the Great Recession. From 2007-2009 the United States suffered from the Great Recession and recovered with the aid of expansionary monetary policy (and fiscal). In the figure below, the grey bars indicate recessionary period. The recession was, in part, caused by the government's faulty attempt at bolstering the housing market (Horwitz, 2012). The government's failure to regulate

the housing market led to the subprime mortgage crises which derailed the stability of US main banks and financial institutions. Banks became dangerously reliable on derivative assets of risky mortgage backed securities (MBS). When the MBS market crashed insurers did not have the capital to protect the Credit Default Swap (CDS) holders. As a result, the seemingly "too big to fail" institutions failed and were bailed out by the US government (Amadeo, 2019a). During this recessionary period, RGDP decreased by 3.4% and unemployment rate nearly doubled from 5.5% to 10% (Figure 3). As discussed prior, in response to the recession, the Federal Reserve preformed expansionary monetary policy by significantly lowering interest rates. During the recession, the Fed Funds rate dropped from 5% (2007-11-01) to 0.5% (2009-06-01). As expected, the monetary policy boosted the macro economy and sustained the stability of US markets.

Figure 3: Civilian Unemployment Rate and Real Gross Domestic Product

In response the severe economic downturn and liquidity trap, the Fed also conducted quantitative easing (QE) in conjunction with low interest rates. The implementation of QE differentiates the Fed's recessionary response from other recessions. Quantitative easing stimulates the economy by purchasing mortgage backed securities (MBS) and US Government

Treasuries. By purchasing the securities, the Fed stimulates the economy through increasing bank liquidity which increases investment spending. QE worked in conjunction with low interest rate to aid the recession's recovery. During the recession, the Fed undertook a series of four security purchases. The first session, QE1, consisted of a $800 billion bank debt buyback. In 2010 for QE2, the Fed bought $175 million in subprime MBS. Purchasing sub-prime securities bailed out the colossal banks with effort to minimize bank failure. In 2012 (QE3) the Fed purchased $40 billion in MBS and in 2013 (QE4) the Fed intended to purchase $85 billion in both long-term treasuries and MBS. QE4 marks the end of the QE efforts to recover from the recession. (Amadeo Sept. 2019b).

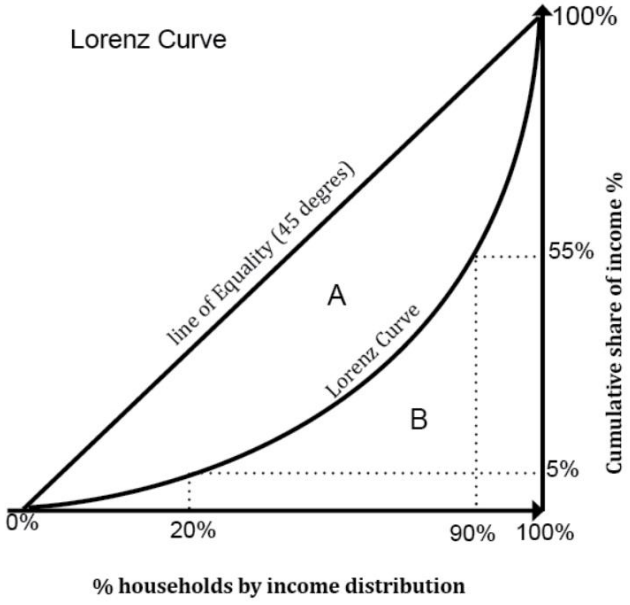
Methods and tools to measure inequality

The purpose of this section is to discuss the various methods and tools used to measure inequality. Inequality is predominantly measured through the GINI coefficient, income quintiles, and wealth shares. While each of these methods demonstrates inequality, they show different extents and channels of inequality. Understanding the differences of these methods is crucial in accurately portraying inequality through statistical biases. This section will cover the theory for measurement tools and the paper will cover the data of these tools during the Analysis section.

The United States census defines the GINI Index as a summary measure of inequality. Using income distribution, the GINI coefficient is a single number signifying the spread of income across a population. A coefficient of 0 represents perfect equality where every person receives an equal share of the income distribution. On the other end, a coefficient of 1 indicates perfect inequality where only one person receives all income from the population. Either score is highly unlikely as no economy is "perfect" in either direction. The GINI coefficient is created from the Lorenz curve shown in the figure below. The Lorenz curve shows the aggregate share

of income from different sections of the population. For example, the figure below shows a hypothetical economy where the bottom 20th percentile of income earners holds 5% of the share of income. Alternatively, the 90th percentile holds a 55% share of the income. The line of equality shows the 1:1 ratio that would occur in a perfectly equal economy. (Pettinger)

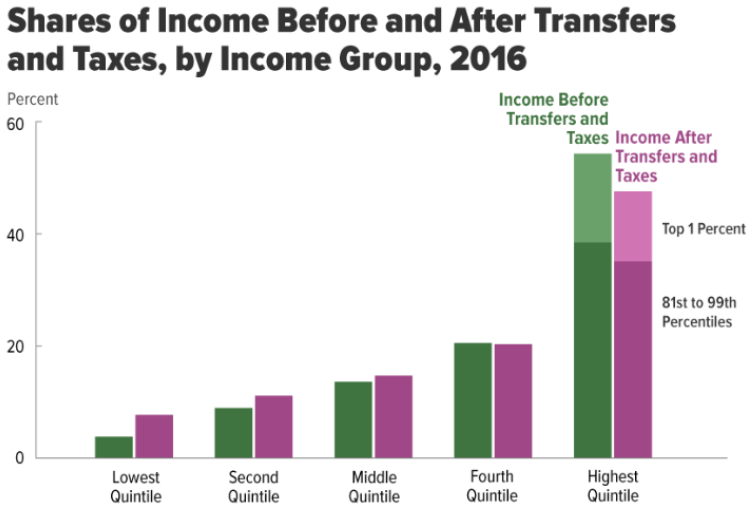
Figure 4



Gini = *A/(A+B)*

Another method to measure inequality is to compare income quintiles. Income data is gathered through personal income taxes, Social Security, union dues, and Medicare deductions. (Pew Research Center). Income quintiles are created by dividing a population into five sections from lowest to highest income level. The first quintile is the bottom 20% and the fifth quintile is the top 20% of income. Income quintiles demonstrate the share various groups hold in the economy and provide a platform to analyze how income is distributed, not necessarily how much each quintile holds. Figure 5 shows an example of the Congressional Budget Office's use of income quintiles to demonstrate distribution in 2018.

Figure 5: Income Quintiles



As income measures money coming in, wealth is measured as the difference between the value of assets and value of liabilities. Assets include the value of homes, businesses, financial accounts, stocks, bonds, retirement plans/accounts and other personal properties. Liabilities include forms of debt like mortgages, credit cards, loans, and business debt (Pew Research Center).

Measuring economic inequality through a wealth lens is more reliable than income for the purposes of this study. Income data only measures the money coming into an individual or household while wealth measures the money that already exists. Many extremely wealthy individuals do not have a salary but live off the interest of their assets which is not consistently accounted on tax statements. Many people find routes to bypass many taxes, so their full income is not accounted for each year. Researching inequality through wealth mitigates these issues by evaluating the economic status of a person through the entirety of their holdings. However, not enough data exists to conduct a robust study of inequality using only wealth measures. More data

exist for information regarding income levels and shares. Thus, this paper will use both information from income and wealth data to best represent the state of inequality.

Literature Review

The following literature review is divided by four sections. The first discusses the existing research examining changes and causes of inequality over time. Second, this section addresses the research regarding monetary policy impacts on the stock market. Next, it will discuss the impacts of monetary policy on wages and income. Finally, the review presents the effects of monetary policy on household debt. The prementioned factors relate to inequality, especially through quantitative easing in wake of the Great Recession. The literature presented in this paper specifically focuses on the research pertaining to this project.

Inequality Over Time

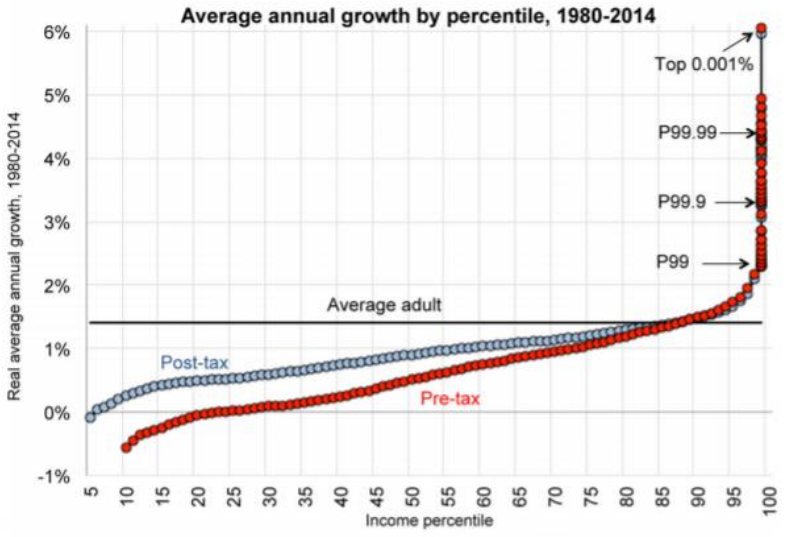
Saez and Zucman jointly research the change in U.S. inequality since 1913 using income tax data. Saez and Zucman evaluate the last century and this paper will evaluate more recent changes in inequality. Their research concludes that the top 0.1% share has increased from 7% in the late 1970s to 22% in 2012. Additionally, the middle-class wealth exhibits an inverted-U curve over the course of the twentieth century – indicating that the middle class is not better-off today than they were in the 1940s. Through their statistical analysis, Saez and Zucman suggest that this growing economic inequality in the past century is the product of saving rate inequality.

Narrowing the focus to the Great Recession, Saez examines average income during the recession (Saez, 2013). He asserts that during the Great Recession average income declined by 17.4%. Saez then splits this value into two sections: top 1% and bottom 99%. The top 1% fell by 36.3% and the bottom 99% percent fell by 11.6% indicating that the rich were proportionally damaged more during the recession. Based on this information, all else equal, inequality should

have decreased because the rich were proportionally losing more than the poor – narrowing the income gap. From 2009 to 2012 the top 1% incomes grew by 31.4% while the bottom 99% incomes only grew by 0.4%. Saez claims that top 1% grew fast and then stagnated at a healthy level, while the bottom 99% incomes have hardly started to recover. Thus, the recovery of the Great Recession benefited the rich and exacerbated inequality.

Continuing their research, Saez and Zucman join Piketty to examine methods of measuring changes in wealth distribution, computing the growth rates for each income quantile. From 1980-2014 real national income per adult increased by 60% but that growth did not apply to the bottom 50% whose income stagnated at slow growth rates. Their research shows high economic growth for those with high incomes (Figure 6) Piketty, Saez, and Zucman attribute the initial increase in inequality to disparities in labor income while the recent upswing in inequality is caused by capital income disparities. About 70% of national income is labor based while 30% of income derives from capital. Since the recent increase in inequality, the researchers claim that the government has only offset part of the inequality through monetary policy.

Figure 6



Roses' research argues against the previously discussed research. Rose counters the claims that economic growth from the Great Recession accrued to the top 1% economic bracket. According to Rose, Saez's methods are inaccurate. In their research, Saez and Zucman define income as the sum of all income components reported on tax returns. Their definition includes wages and salaries, pensions received, profits from businesses, capital income (such as dividends), interest, rents, and realized capital gain comprise the tax-based income. Excluded from Saez and Zucman's definition is government transfers such as social security, unemployment, and other welfare systems. Rose asserts that these programs constitute income and should be added to economic analysis. Including welfare income decreases the income gap and weakens Saez's research. Rose asserts that Saez's statistical results are based on the starting year after the recession. Instead, Rose suggests researching from the beginning of the recession in 2007. If inequality is measured from 2007 then the top 1% would be "losers" and responsible for a disproportional share of all income losses. Additionally, Rose claims that capital gains are an accumulation of several years of untaxed gain. During the recession the rich did not note their capital gains on their tax returns so they could maximize profit. Thus, much of the accumulated income (for the top 1%) during the recession was accounted for in a lump sum once the economy recovered. Due to the inaccurate methodology, Rose claims that his statistical analysis of inequality is more reliable that Saez's.

Rose's research asserts that the rich were hit the hardest during the recession. As stocks crashed, the top 1% lost 36% of income while average Americans fell by 12% (from 2007-2009). Also, Rose claims that his comprehensive definition of income (which includes welfare) demonstrates that the bottom 90% had a 41% gain in real income which more than the majority of the existing research suggests. Beyond market impacts on income, Rose claims that

government intervention benefited the poor and did little to aid the rich. The disposable income (defined as post-tax, post-transfer, post-benefit) of the top 1% was the same as the 27% loss in their market income. Thus, inequality did not increase after the recession. Instead, Rose claims that the top 5% and the top 1% had much larger losses than the other 95% or 99%. Rose's analysis of income produces less startling inequality results and shows that the recession did not immensely exacerbate the inequality.

Policy Impacts on Financial Markets

In his article, Cohan discusses the impacts of Bernanke's (the predecessor to Jerome Powell as chair of the FED) quantitative easing programs through the recovery of the financial crisis. Cohan states that quantitative easing contributes to inequality by increasing accessibility to cheap money for those with existing wealth than those without. During QE, banks borrowed money from the Fed for "free" and made money through trades and investments. Thus, bank profits soared, increasing shareholder profits. Shareholders and Wall Street investment bankers directly benefit from the Fed's purchases of high-priced securities. In fact, Cohan suggests that "the Fed might as well have been paying the traders' seven-figure bonuses directly" (Cohan, 2014). Cohan transitions his claim towards the low interest rates imposed by the Fed. Private equity firms and stockholders greatly benefited from low interest rates because they would receive profits from debt capital raises that boosted the stock market. Contrasting the rich investors who have ability to take economic risk, people with a fixed income cannot afford such risk. Because of the low rate environment, high risk investments are required generate a substantial profit from the stock market. Cohan asserts that low interest rates and QE aided large financial institutions and their major stockholders more than the poor through his evaluation of interest rate impacts on the stock market.

Shifting to a focus on bond markets, Montecino and Epstein find that QE aids employment and mortgage recovery equally, but equity price appreciation dramatically increases inequality. Increases in bond price proportionally impacted all income groups, but stocks play a large role in inequality. Stocks play a larger role in inequality because they are concentrated at the top income percentiles. Rich households are likely to have better access to stocks with higher returns than poor households because of the wealthy's financial literacy, ability to undergo risk, and existing funds. Montecino and Epstein align the growth of stock with the impacts of QE because the second round of QE took place in 2010 when the majority of stock price growth occurred. QE implementation correlates with increases in inequality, but Montecino and Epstein find that without QE, inequality would have increased even more during the recovery. Using hypothetical assumptions, they model the implications of a recovery without QE and conclude that the stock market would have distributed more money to the wealthy stockholders and less to the poor stockholders. Montecino and Epstein suggest that monetary policy after the recession increased wealth distribution of the stock market favorably to the wealthy, but other financial channels mitigated this impact.

Biven's refutes the claim that QE increased inequality through driving up stock and asset prices. Instead, Biven's claims that as the Fed conducted QE they reduced unemployment and reduced inequality. The 2010 fiscal deal (tax cuts, unemployment compensation, accelerated depreciation) produced the same positive effect on output and employment as QE, according to Bivens. For the middle-class, housing is a proportionally larger component of their assets than the wealthy. Wealthy people hold a larger proportion of their wealth in stock and bonds compared to the middle-class. Biven's asserts that QE boosted stock prices by 5% and housing

prices by 7%. Thus, increased housing prices offset the immense increase in stock prices reducing the impact of unequal wealth distribution.

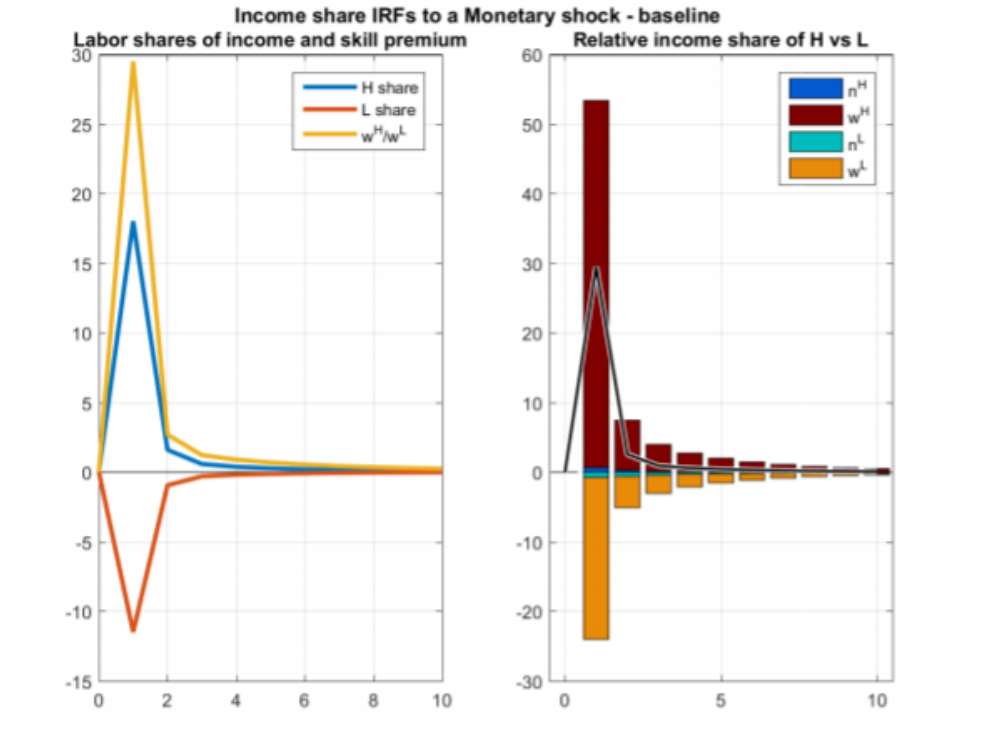
Policy Impacts on Wages

Biven's continues his argument that QE did not increase inequality through an evaluation of wages. Biven's claims that increases in employment for interest-sensitive industries will push employment for high-income jobs, but not greatly benefitting those in low income industries. However, Bivens suggests that this change is not large enough to increase inequality. Additionally, QE efforts stabilized the economy and maintained output which reduces unemployment. Reduction in unemployment benefits moderate to low wage-earning groups. The economic stimulus to low and moderate wage groups reduces inequality. Thus, through a chain reaction Bivens claims that QE reduced or did not impact inequality through wages.

Dolado, Maotyovskzi, and Pappa continue Biven's argument that monetary policy benefits wage groups differently. In the research, Dolado et al. evaluate the impact of monetary policy on relative wages and employment rate ratios for skilled and unskilled workers. Heterogeneity in labor markets through different production roles imply that low and high skill workers do not receive the same wage and employment rate increases. Through mathematical modeling, Dolado et al. find that expansionary policy creates an increase in the skill premium of 30% of high skilled workers at the cost of a decrease in low-skilled labor wages. Because the wage growth of the skilled workers is contingent on the reduction of low-skilled employees, economic growth is unevenly distributed. Figure 7 below shows the changes in high (H) and low (L) wages when changes in interest rate occurred. The graphs demonstrate a decrease in labor and income share for those in low-income jobs. However, Dolado et al.'s results were inconclusive on the cause of the unequal distribution of wages after expansionary policy. Their

research proves correlation, but not necessarily causation of monetary policy on wage distribution.

Figure 7



Bernanke connects the impacts of stock markets on changes in wages, specifically discussing the multiple impacts of unique monetary policy tools, including QE. Basing his argument on the notion that QE increases stock prices, Bernanke differentiates QE effects on income and wealth inequality. Given all else equal, QE increases stock prices which increases wealth inequality. However, the wage effects of QE mitigate the negative impacts of high stock prices on inequality. Income inequality decreases as QE boosts the economy and creates stronger long-term growth. Long term growth increases labor force participation and wages. Bernanke

claims that inequality, measured through income, decreases because of increased wages and reduces the impact of increased stock prices caused by QE.

Policy Impacts on Debt

Kaplan asserts that households are insensitive to small changes in interest rate because between 25-30% of households have no liquid assets and encounter high loan transaction costs. Using the Heterogeneous Agent New Keynesian (HANK) model, Kaplan finds that monetary policy increases consumption indirectly through increased labor demand. Kaplan does not specifically discuss quantitative easing, but we assume that his claims on monetary policy stimulating the economy apply to QE. Kaplan discusses the impacts of an indirect stimulus to labor demand that emerges from low interest rates. Indirect economic stimulus does not rely on the nuances of either low interest rates or quantitative easing, so Kaplan's argument applies to both monetary policy practices. Kaplan's finding that households are insensitive to small changes in interest rate, leads to the conclusion that consumption and debt are not impacted enough to alter wealth distribution.

Cloyne, Ferreira, and Surico claim that homeowner's consumption is more sensitive to contractionary policy than expansionary policy because mortgage payments are directly affected by increased interest rates. Cloyne et al. find that loan to income ratios decrease significantly during contraction which reduces household leverage. Their empirical analysis showed that all incomes decreased for all wealth levels during contractionary policy serving as a main cause of the decreased loan to income ratio. Debt plays a large role in determining wealth inequality changes rather than income inequality. However, the study fails to explain the impacts of household debt changes during expansionary periods.

Specifically focusing on mortgage debt, Montecino and Epstein demonstrate that mortgage refinancing benefits the wealthy more than the poor. As interest rates were lowered, mortgages were often refinanced with the attractive new rates. Although mortgage refinancing benefitted all income levels, those at the top income levels benefit most due to the favorable terms in mortgage agreements. These favorable terms encourage and increase access to refinancing for the wealthy while indirectly discouraging the poor. Therefore, the low interest rates reduced household debt, but reduced wealthy people's debt more than the poor.

Shifting from the recession to general market conditions, O'Farrell and Rawdanowicz discuss the impacts of interest rates on assets and liabilities through modeling not specific to the recession or QE. The model concluded that inequality is reduced when assets are a larger proportion than liabilities and inequality increase when liabilities are sufficiently large relative to assets. After providing a theoretical approach, the article transitions to an empirical analysis comparing the United States, Canada and various European countries. O'Farrell and Rawdanowicz measure changes in the GINI coefficient for the income and net wealth distribution given a change in the interest rate. The study strives to only analyze the effects of income distribution through debt-servicing costs and returns on investment. The results indicate that one-percentage point lower interest rates reduce income inequality in the United States. In addition to their theoretical research, O'Farrell and Rawdanowicz conduct a quantitative analysis of changes in interest rate on the GINI Coefficient (Figure 8). Focusing on the United States, their regression predicts that a 1p.p. drop or a 4p.p. drop-in interest rate decreases the GINI coefficient. Specifically, a 1p.p. decrease leads to a -.0015 difference in the GINI. A 4p.p. decrease in interest rate leads to a -.0037 change in interest rate.

Figure 8

Changes in Gini coefficients for the income distribution due to lower interest rates

	Gross income Gini	Changes in Gini with lower interest rates		Changes in market income Gini, 2007–2010
		By 1 p.p.	By 4 p.p.	
Austria	0.408	0.0004	0.0099	0.0100
Belgium	0.487	0.0039	0.0265	0.0090
Canada	0.447	−0.0001	0.0016	0.0110
Finland	0.381	0.0006	0.0030	0.0110
France	0.384	0.0007	0.0040	0.0221
Germany	0.429	0.0009	0.0046	−0.0020
Greece	0.403	−0.0003	−0.0006	0.0270
Italy	0.398	0.0000	0.0007	0.0210
Luxembourg	0.418	−0.0005	0.0004	0.0100
Netherlands	0.313	−0.0009	0.0017	−0.0085
Portugal	0.449	−0.0009	−0.0004	0.0060
Slovak Republic	0.358	−0.0003	−0.0006	0.0150
Slovenia	0.475	−0.0001	−0.0002	0.0300
Spain	0.416	−0.0002	0.0015	0.0560
United Kingdom	0.426	0.0010	0.0067	0.0190
United States	0.574	−0.0015	−0.0037	0.0132

Source: Authors' calculations and OECD Income Distribution and Poverty Database.

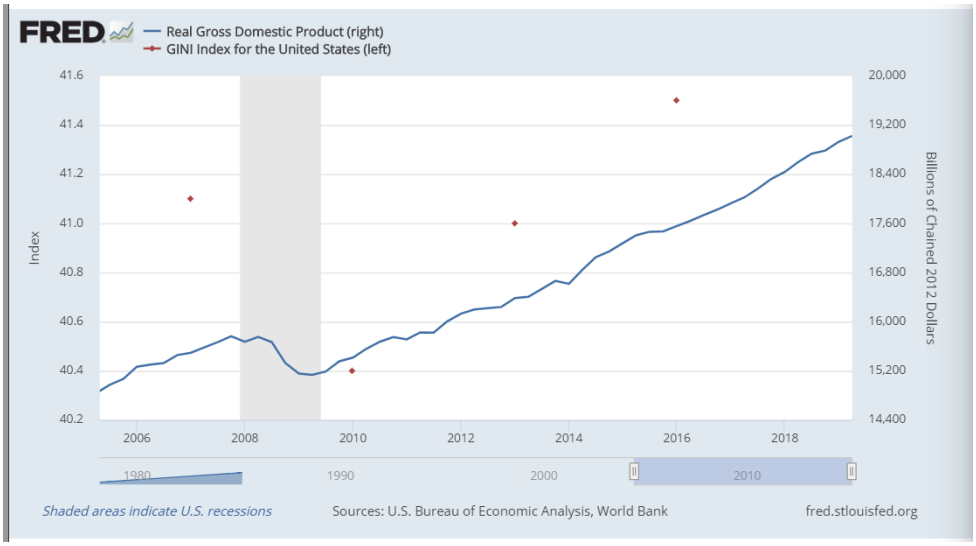
Analysis

This section will use information from the literature review to discuss the impacts of quantitative easing on inequality through the recovery of the Great Recession. This section will start with an analysis of inequality changes during the recession. Then the analysis will narrow focus to impacts on income, household wealth, corporations, and the housing market.

Inequality through the Great Recession

Figure 9 demonstrates the growing inequality measured by the GINI Coefficient. Through the Great Recession (marked with grey segment) inequality decreased as shown by the GINI coefficient dropping from 41.1 (2007) to 40.4 (2010). Despite the seemingly increase in equality through the recession, the recovery sparked an increase in inequality. The post-recession data demonstrates an increasing GINI coefficient coinciding with the increasing RGDP.

Figure 9: Real Gross Domestic Product [GDPC1] and GINI Index



Impacts of Quantitative Easing on Income

Figure 10 shows the sharp increase of wages/salaries during the Great Recession followed by a long period of wage/salary decrease. In recessions leading up to the Great Recession, wages returned the pre-recession or slightly higher level immediately following the recession. The Great Recession did return to its original level; however, the median wage level did not drastically drop. Therefore, wages were comparably high in the wake of the Great Recession compared to the other recessions. Figure 11 shows the number of financial quarters before the wages returned to similar levels. The wages during the Great Recession stayed high for 20 quarters, more than double any other recession since the 1980s.

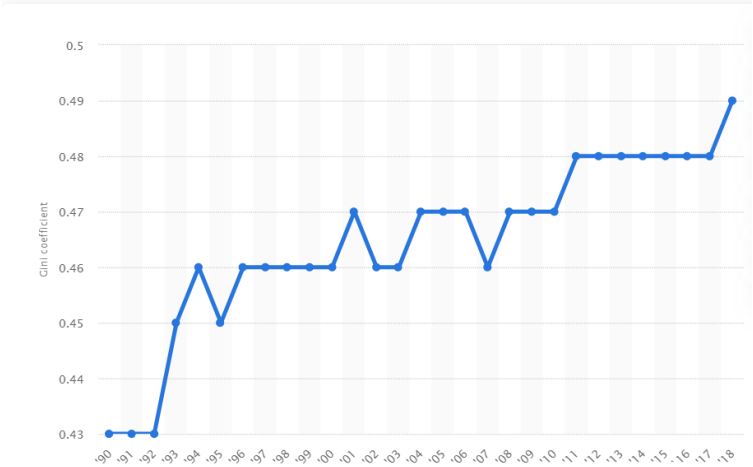
Figure 10: Employed full time: Median usual weekly real earnings

Figure 11: Financial Quarters until Wage Level Return

Year and quarter	Earnings in Adjusted CPI	Time difference
1980 Q1	321	
1980 Q3	319	**2 quarters**
1981 Q3	309	
1982 Q4	313	**5 quarters**
1990 Q3	313	
1991 Q2	312	**3 quarters**
2001 Q1	333	
2003 Q1	335	**8 quarters**
2007 Q4	332	
2013 Q1	331	**20 quarters**

The wealthiest percentiles rely more heavily on existing assets and financial market success over wages/salaries compared to poor populations. Therefore, changes in wages/salaries significantly impact middle/lower income percentiles more than the upper percentiles. If wages/salaries are comparatively high, then inequality is expected to decrease in wake of the Great Recession. The increase in wages for an extended period can be attributed to QE due to the chain reaction of economic stabilization and maintained output (Bivens, 2015).

Figure 12: GINI since 1990



As demonstrated in Figure 12, the GINI coefficient increases from 0.46 to 0.47 (2008-2009) then to 0.48 (2011-2012) with increases following 2012. However, these changes are not as stark as those seen in the early 1990s. As described prior, wage inequality was not a significant factor in the increase of inequality caused by QE after the Great Recession.

Thus, the question remains of what causes the increase of the GINI coefficient. Although income consists mostly of wages and salaries, a portion of income comes from dividends and realized capital gains. Therefore, the income received through assets and capital gains are the motivating factor behind the increase in the GINI coefficient post-recession. Because the GINI increased, but not by a significant amount, impacts of non-income wealth disparities are a significant factor in the changes in inequality.

Impacts of Quantitative Easing on Household Wealth

The increases of income through dividends and realized capital gains relates to the concept of wealth inequality rather than income inequality as discussed earlier. Components of wealth inequality are represented through the collection of money from dividend or capital gains

on tax statements. In order to fully evaluate the entirety of wealth inequality, this paper will analyze shares of wealth held by the American population.

Instead of using the GINI Coefficient, which focuses on income, analyzing wealth inequality is best conducted with percentiles holdings of wealth. As stated above, income through wages/salaries did not have a significant impact on inequality through QE. The figure below shows the changes in wealth holding through the recovery of the recession.

Figure 13: Share of Total Net Worth

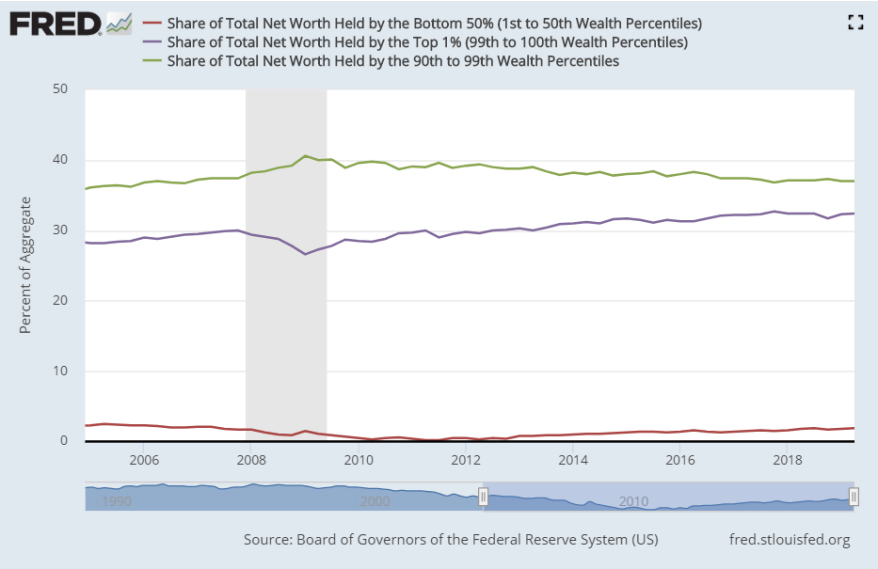


Figure 13 shows the wealth separated by the top 99th percentile, 90-99th percentile, and 1st-50th percentile, the total share of wealth decreased for the poorest half and richest 1% while total wealth shares increased for the 90th-99th percentile during the Great Recession. After the recession, wealth distribution for the top 1% increased to near pre-recession levels (1.6% less) and continued to grow to 37% share of wealth in 2019. Contrasting the wealthy population's growth, the middle class stagnates then slowly declines around 2012 at 39% share of wealth. The bottom 50% decreased wealth holdings during the recovery to below 1% share of wealth. and

slowly began increasing after 2012 to 1.5% share of wealth. Due to the increase in wealth holdings for the top 1% and decrease for bottom 50%, the data suggests that wealth was redistributed from the poor to the rich after the Great Recession given wealth data.

The Fed's response to the Great Recession focused on the stabilization and security of financial markets and escaping the liquidity trap more than other recessions. Therefore, the Fed implemented quantitative easing to overcome the challenges of the liquidity trap. As the Fed bought back faulty MBS, they stabilized banks and financial institutions which recovered the stock market and benefited those who hold significant stock in such institutions (stockholders, executives, investors, etc.). Therefore, the rich who hold more assets than the poor, benefited disproportionately more than the poor through quantitative easing.

Impacts of QE on corporations

As previously stated, the purpose of QE was to stabilize the economy though supporting financial institutions. The Fed's support of financial institutions directly assists corporations who rely on financial backing for investment and growth. QE benefited corporations indirectly and helped increase profits. However, these profits were not distributed evenly and contribute to wealth inequality.

Figure 14: Corporate profits compared to net worth of top 1% and bottom 50%

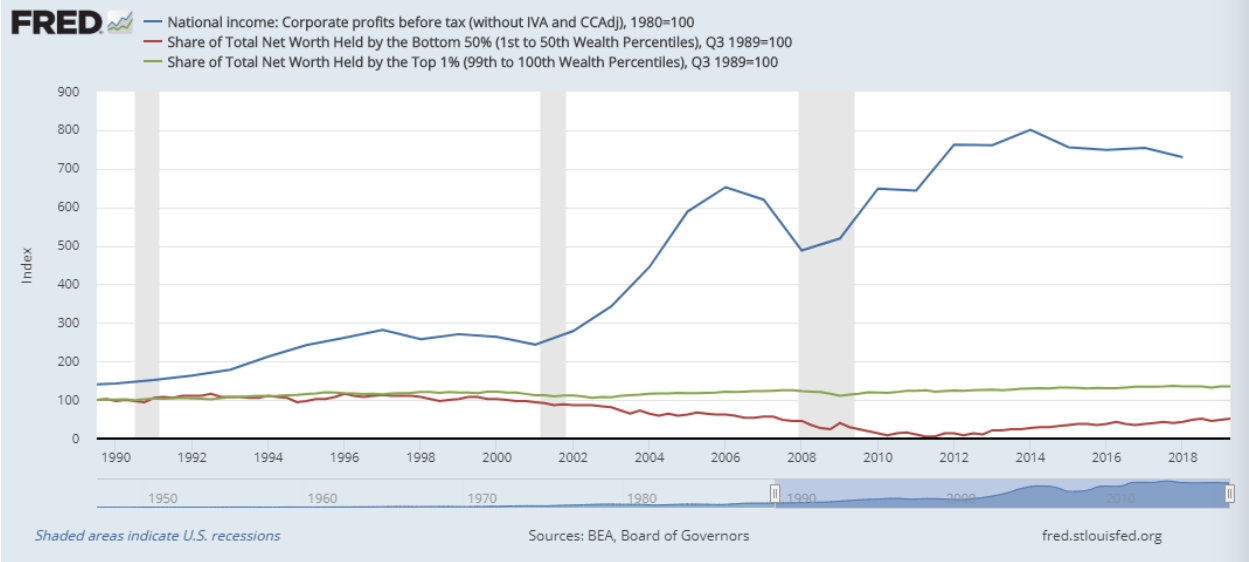


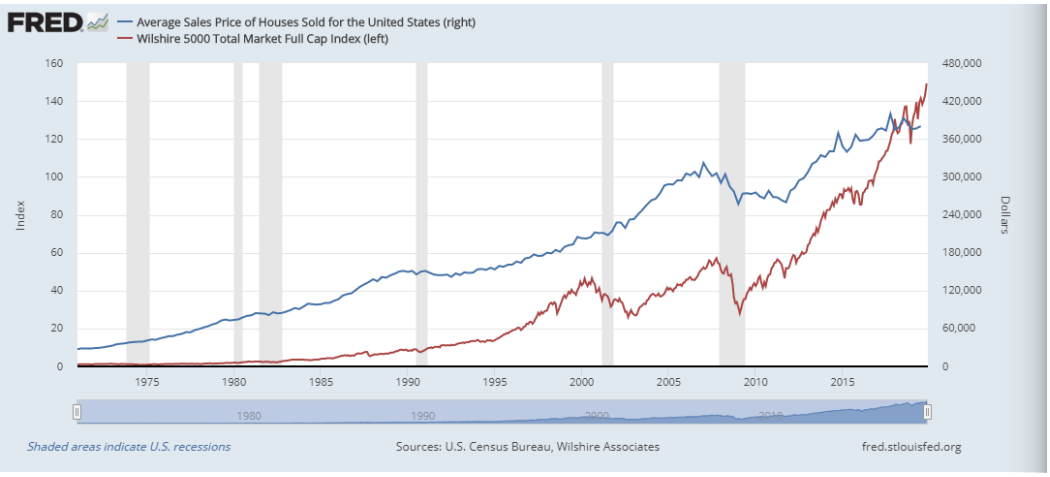
Figure 14 above, shows the increases in corporate profits through and after the recession compared to changes in net worth for the top 1% and bottom 50 % of wealth holding. As corporations increased profits, the wealthy slightly increased wealth holdings while the poor significantly dropped. This is because the benefits of the stabilized corporations benefited the stockholders and executives, not the employees. Instead of increasing wages, corporations use the income generated from QE (directly or indirectly) to benefit the wealthy.

Impacts on Housing Market

Bivens discusses the wealthy's high level of stock holding compared to the lower/middle classes reliance housing prices for assets. Bivens claims that housing prices increased more than stock prices but fails account for disproportional impact in the change of prices. As QE steadied the economy, both the stock market and housing market stabilized. However, the recovery of the stock market was much stronger than the housing market given the initial level of decrease and rate of recovery. After Great Recession, the stock market quickly began to rise while the housing market stagnated. QE contributed to the rapid growth of the stock market while the housing

market did not equally increase. The impact of QE on the housing market increased inequality by benefiting those who hold stock (wealthy) more than those holding a majority of their assets in housing (middle/lower class).

Figure 15: Stock vs. House market



Conclusion

Limitations

Analyzing the impacts of quantitative easing on inequality presents challenges and limitations for accurate evaluation. First, this research does not control for only the effects of quantitative easing. This paper uses income, wealth and profit data to find correlations between the implementation of quantitative easing and inequality. Other factors contribute to the rise in inequality. Thus, this paper looks at how QE contributed to inequality but cannot confirm if QE is the direct cause of inequality. Additionally, looking at the correlation between more than two variables can lead to false assumptions if two variables correlate for non-related factors. Another limitation is the lack of data for the GINI coefficient. The data presented in this research does not cover data before 1990. Without extensive data from previous recessions, it is difficult to analyze the changes and trends of GINI through recessions.

Additional Research

Through an analysis of the existing literature and analysis of data from the Great Recession, I conclude that quantitative easing played a role in the increasing inequality. I recommend further research in two main areas. First, I recommend collecting data and regressing the changes in QE on inequality to provide insights into the relationship of QE and inequality. This analysis would find a correlation between QE implementation and changes in inequality. Second, I recommend researching the implications if QE was not implemented. Although this paper examines how QE contributed to inequality, additional research examining how QE prevented an increase in inequality should be conducted.

Final Thoughts

Recessions are bound to occur again and destabilize the economy. The Federal Reserve's response to economic crisis has a ripple effect on society. Understanding the implications of policy, specially QE, provides insight into how to best respond to recessionary crises and re-stabilize the economy. Inequality continues to grow in the United States and the Fed's response to the next recession will either exacerbate or reduce inequality. Inequality places immense strain on society by lowering quality and length of life. Although the Fed is not mandated with the responsibility of reducing inequality, their efforts to implement policy that fairly distributes wealth would greatly benefit society. Jerome Powell's, chair of the Federal Reserve statement that the Fed must work to increase wealth distribution is an initial step towards equality after the Great Recession.

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