Article

The Impact of Quantitative Easing on Inequality in Japan

U. Furkan Yuksel*

Abstract

This paper studies the distributional impact of unconventional monetary policy in Japan after the 2008 financial crisis. I use a structural vector autoregression model to estimate the impact of quantitative easing on income inequality. The results show that quantitative easing has increased inequality in Japan. However, the estimated magnitude of this effect greatly depends on which inequality variable is used.

Keywords: distribution, inequality, monetary policy

JEL Classification: D31, E52, E58

I. Introduction

After the 2008 financial crisis, central banks of the developed countries found themselves facing near-zero interest rates. They were unable to lower the interest rates further to stimulate the economy and hopefully end the crisis. Therefore, they resorted to unconventional monetary policies to achieve this. The most prominent of these is large-scale asset purchase programs, also known as quantitative easing.

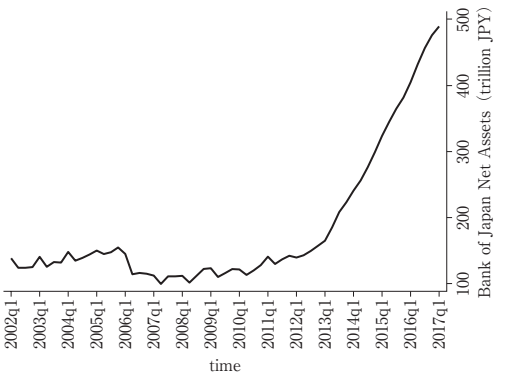
Quantitative easing differs from open market operations by its scope and scale. Instead of just buying short-term government bonds, central banks also buy long-term and riskier assets and even shares of private companies to increase economic activity.

We do not know how effective the quantitative easing has been, but there seems to be a consensus that the economies would have been in a worse state without it. However, quantitative easing might have come with a heavy price in the form of worsening inequality. The distributional impact of these policies is mostly ignored by central banks because their focus has been on stabilizing the economy.

Quantitative easing might increase inequality, because large-scale asset purchases cause

* PhD Student, Ritsumeikan University, Japan

Fig. 1. The Net Assets of Bank of Japan



Source: Bank of Japan

the asset prices to go up. These assets are mostly held by the wealthy, so, they benefit more than the rest of the population (portfolio channel).[1] And this results in higher inequality. In a 2012 report, the Bank of England revealed that 40% of the gains of its asset purchases went to the top 5 % of the population.

Coibion et al. (2012) find that contractionary monetary policy increases inequality in the US. However, their analysis ends before the FED started its quantitative easing policy. Also, their data does not include the top 1 % of the population. Davtyan (2017) uses a dataset that includes the top 1 % of the population in the US and finds that contractionary monetary policy decreases inequality.

Villareal (2014) also finds that contractionary monetary policy decreases inequality in Mexico.

Using a micro dataset on Italian households, Casiraghi et al. (2016) find that quantitative easing has benefited the rich through financial gains. However, it also benefited the poor by providing a more stable labour market. Overall, they conclude that the impact of quantitative easing on inequality has been negligible.

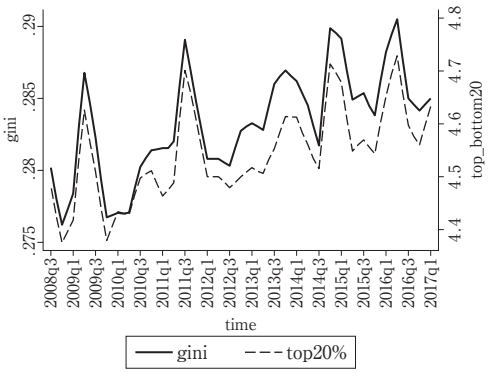
Saiki and Frost (2014) find that quantitative easing has increased inequality in Japan by benefiting the rich through financial gains. However, their study ends before capturing the effects of the asset purchases that started at 2013Q3 as part of Abe-nomics. This is important because the scale of these purchases was unprecedentedly high.

This paper follows Saiki and Frost (2014). By using a more recent dataset, I try to find a more complete image of the impact of quantitative easing on inequality in Japan.

Ⅱ. Data

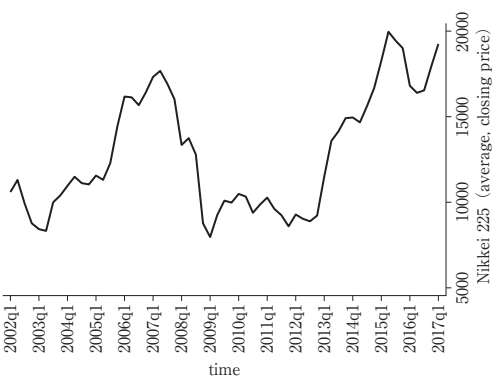
I use data from the 'Savings and Liabilities Survey' of the Japanese Cabinet Office to cal-

Fig. 2. Timeline of Inequality Measures, 2008q3-2017q1 (Gini Coefficient and the Ratio of the Top 20% to the Bottom 20%)



Source: Author's calculation using 'Savings and Liabilities Survey'.

Fig. 3. Timeline of the Nikkei 225 Index



Source: Yahoo Finance

Table 1. Descriptive Statistics of the Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Real GDP (in trillions of Yen)	35	501.75	15.82	463.74	525.93
Inflation (YoY CPI Headline)	35	0.25	1.31	−2.2	3.56
BoJ Assets (divided by nominal GDP)	35	0.43	0.22	0.21	0.9
Monetary Base (divided by nominal GDP)	35	0.37	0.2	0.17	0.8
Stock Prices	35	12935.01	3898.61	7924.66	20058.13
Gini	35	0.28	0.003	0.27	0.29
Top_Bottom 20%	35	4.54	0.09	4.37	4.73

Note: As a proxy for quantitative easing, I use Bank of Japan Assets and Monetary Base (both divided by nominal GDP). My inequality variables are Gini coefficient and the ratio of the top 20% to the bottom 20%.

culate income inequality. Around 7,000 households covering all of Japan are surveyed monthly, but the results are reported quarterly. Therefore, I use quarterly data. Each household is surveyed for six months and then replaced.

Following Saiki and Frost (2014), I start my sample period from 2008Q3. This is roughly the beginning of the second phase of quantitative easing in Japan. The first phase was between 2001 and 2006, but the purchases in this phase have mostly been reversed.

Ⅲ. Empirical Analysis

I use the following structural VAR model to see the impact of quantitative easing on income inequality.

$$Y_t = [GDP_t, inf_t, M_t, S_t, ineq_t]$$

where

GDP_t = Real GDP in yen, seasonally adjusted (source: Japanese Cabinet Office)
Inf_t = Year-over-year CPI headline inflation (source: Statistics Bureau of Japan)
M_t = Net assets held by Bank of Japan, seasonally adjusted and divided by nominal GDP (source: Bank of Japan)
S_t = Nikkei 225 Index (source: Yahoo Finance)
$Ineq_t$ = The ratio of the top 20% of the population to the bottom 20% (source: Author's calculation using 'Savings and Liabilities' survey)

I take the first difference of natural logs of GDP, monetary policy (M) and stock prices (S). I also take the first difference of YOY inflation. After these transformations, all variables are stationary at the 5% level of significance. The sample period is from 2008Q3 to 2017Q1. I use 4 lags based on the Akaike and Hannan-Quinn information criterions.

Lastly, following Saiki and Frost (2014), I use two exogenous dummy variables to capture the effects of 'the Great Earthquake' of 2011 and the following income transfer responses, because these had an important impact on inequality. 'eq' takes the value of 1 in 2011Q2 and 2011Q3 to capture the impact of the earthquake and 'eqres' takes the value of 1 in 2011Q4 and 2012Q1 to capture the responses. Both take the value of 0 otherwise.

To obtain the pure monetary policy shock, I need to place some identifying restrictions.[2] For this, I make use of a recursive short-run matrix to place restrictions on the contemporaneous effects among variables. This causes each variable to not be contemporaneously affected by the variables that come after them in the VAR framework. For example, monetary policy (M) contemporaneously affects stock prices (S) and inequality, but it does not have any contemporaneous effect on GDP and inflation.

Fig. 4. Impulse responses of inequality (the top 20% to the bottom 20%), structural decomposition, two standard deviation confidence intervals

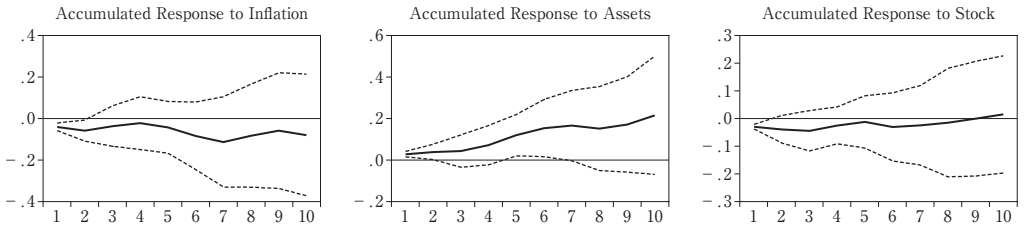
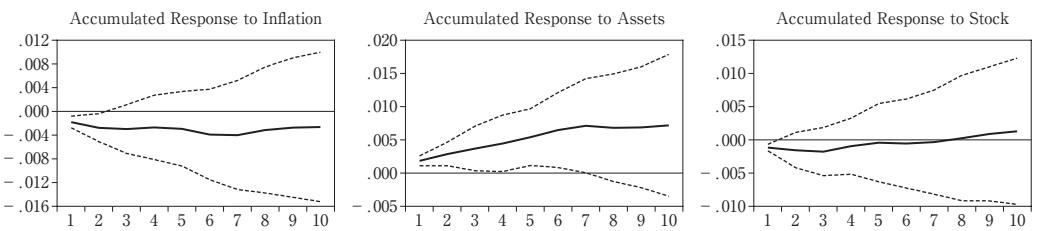


Fig. 5. Impulse responses of inequality (Gini coefficient), structural decomposition, two standard deviation confidence intervals



Estimation Results

Fig. 4. shows the impulse response functions for the main model. A positive one-standard-deviation shock to assets held by Bank of Japan increases income inequality by 0.2 percentage points, which is twice the effect found by Saiki and Frost (2014). This is not surprising, because their study ends just two quarters after quantitative easing had started in an unprecedented scale at 2013Q3, before capturing its full effect.

However, when I change the inequality measure from *the ratio of the top 20% to the bottom 20%* to *the Gini coefficient,* the impact of quantitative easing on inequality becomes extremely small. (Fig. 5.)

Changing the decomposition method from structural decomposition to generalized impulse responses gives very similar results for the impact of quantitative easing on inequality. (Fig. 6.)

Lastly, changing the measure for quantitative easing from *Bank of Japan assets* to the *monetary base* (divided by nominal GDP) does not affect the impact of quantitative easing on inequality. This suggests that my results do not depend on the choice of variable for quantitative easing. (Fig. 7.)

The impact of inflation and stock prices on inequality stays mostly insignificant in all the estimations. The inflation has a statistically significant negative effect for the first two periods in Fig. 4. and Fig. 5. And the stock prices have a statistically significant negative effect for the first period only in Fig. 4. and Fig. 5. However, even when they are significant, all these effects are negligibly small. Overall, my results do not support the *savings redistribu-*

Fig. 6. Generalized impulse responses of inequality (the top 20% to the bottom 20%), two standard deviation confidence intervals

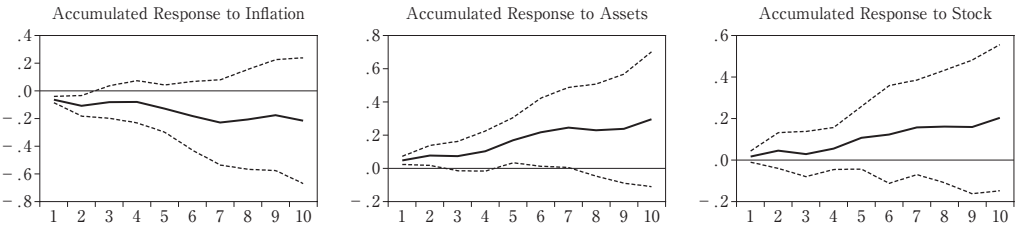
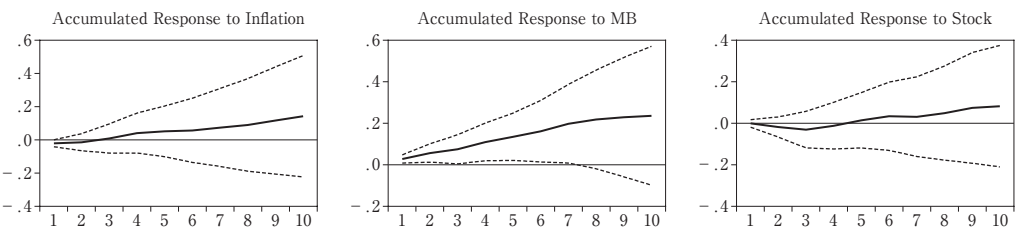


Fig. 7. Impulse responses of inequality (the top 20% to bottom 20%), structural decomposition, two standard deviation confidence intervals, different variable for quantitative easing (monetary base)



tion channel[3] nor the *portfolio channel* through which quantitative easing is expected to affect inequality. This suggests that quantitative easing affects inequality in Japan in a more complex way.

Ⅳ. Conclusion

I use a structural VAR model to estimate the impact of quantitative easing policies on income inequality in Japan. My results suggest that quantitative easing has increased income inequality. One standard deviation upward innovation in monetary policy increases inequality by 0.2 percentage points. This effect is robust to the monetary policy variable and to the decomposition method used. However, changing the inequality variable from the ratio of *the top 20% to the bottom 20%* to *the Gini coefficient* dramatically reduces the estimated magnitude of this effect, although the effect stays statistically significant. As stated by Saiki and Frost (2014), this is probably because the quantitative easing has widened the gap between the top and the bottom of the population by benefiting the rich more, rather than by affecting the whole income distribution.

Notes:

1) Coibion et al. (2012) classify five such channels by which monetary policy affects inequality.
2) For more details, please refer to Christiano et all. (1999)

3) This channel suggests that quantitative easing would hurt the savers by increasing the inflation. And the poor hold a greater share of their income as currency, making them more vulnerable to inflation.

References

Atkinson, A., Leigh, A. (2013) The distribution of top incomes in five Anglo-Saxon countries over the long run. Econ. Rec. 89, 31-47.

Bank of England (2012) The Distributional Effects of Asset Purchases. Quarterly Bulletin, 1-22.

Casiraghi, M., Gaiotti, E., Rodano, L., Secchi, A. (2017) A "reverse Robin Hood"? The distributional implications of non-standard monetary policy for Italian households. Bank of Italy Working Paper, 1077.

Christiano, L. J., Eichenbaum, M., Evans, C. L. (1999) Monetary policy shocks: what have we learned and to what end? in M. Woodford and J. Taylor, editors, Handbook of Macroeconomics, North-Holland, chapter 3.

Coibion, O., Gorodnichenko, Y., Kueng, L., Silvia, J. (2012) Innocent Bystanders? Monetary Policy and Inequality in the U. S. IMF Working Paper, 2012(199).

Davtyan, K. (2016) The Distributive Effects of Conventional and Unconventional Monetary Policies. Research Institute of Applied Economics, Working Paper, 2016(6).

Davtyan. K. (2017) The distributive effect of monetary policy: the top one percent makes the difference. Economic Modelling, 2017(65), 106-118.

Doepke, M., Schneider, M., Selezneva, V. (2015) Distributional Effects of Monetary Policy. Hutchins Center on Fiscal & Monetary policy at BROOKINGS, Working Paper, 14.

Ohtake, F. (2008) Inequality in Japan. Asian Economic Policy Review 2008(3), 87-109

Lütkepohl, H. (2005) New Introduction to Multiple Time Series Analysis. Springer.

Mumtaz, H., Theophilopoulou, A. (2016) The Impact of Monetary Policy on Inequality in the UK. An Empirical Analysis. Working Papers 783, Queen Mary University of London, School of Economics and Finance.

Saiki, A., Frost, J. (2014) Does unconventional monetary policy affect inequality? Evidence from Japan. Applied Economics, 46(36), 4445-4454.