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Japan's Unconventional Monetary Policy and Income Distribution: Revisited

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Abstract

This is a revaluation of our study which we published in 2014 (Saiki and Frost, 2014) The study found that Japan's unconventional monetary policy (UMP) had widened income inequality in Japan. Since then, the Bank of Japan (BOJ) has further increased the monetary base and inflation has been low (headline inflation is about 1% as of this writing) but positive. We revisit the relationship between Japan's quantitative and qualitative easing (QQE) and find further evidence for our conjecture. The impact of UMP on income distribution may differ in Japan and other countries for various reasons, including differences in household balance sheets and the flexibility of labor markets.

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Japan's unconventional monetary policy and income distribution: revisited

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Abstract

In 2014, we published a study that found that Japan's unconventional monetary policy (UMP) had widened income inequality in Japan. Since then, the Bank of Japan (BoJ) has further increased the monetary base and inflation has been low but positive. We revisit the relationship between Japan's quantitative and qualitative easing (QQE) and find further evidence for our conjecture. The impact of UMP on income distribution may differ in Japan and other countries for various reasons, including differences in household balance sheets and the flexibility of labor markets.

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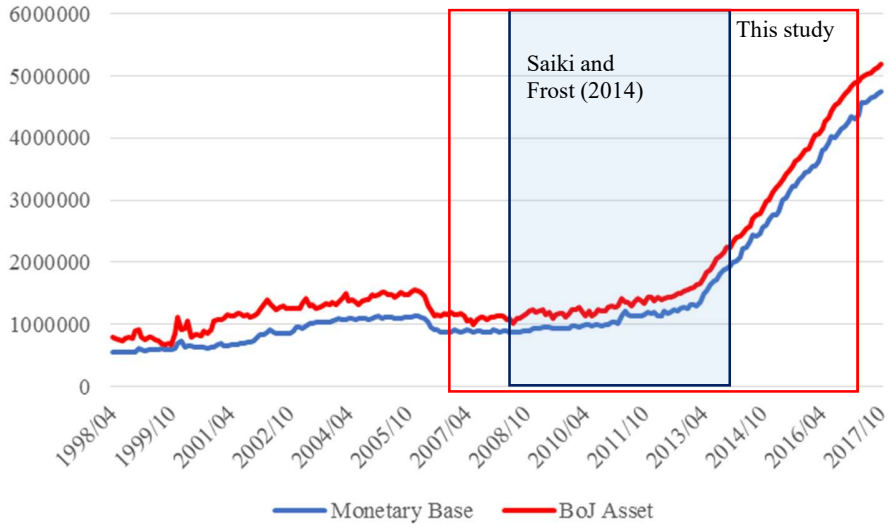
1. Introduction

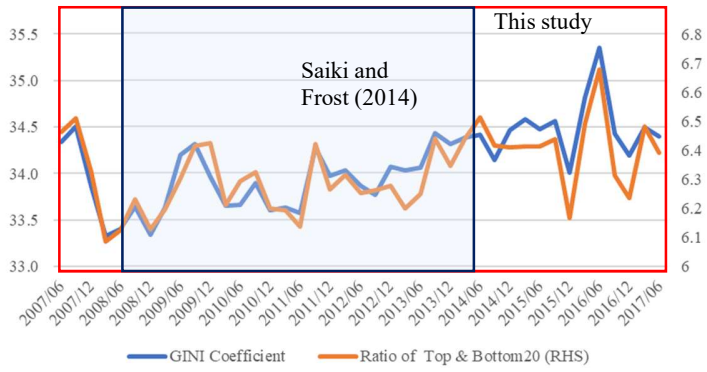
Abenomics is a policy for Japan's economic "revival" (*saisei*) introduced by Prime Minister Shinzo Abe, who returned to office five years ago. The first notable development was the large monetary stimulus, dubbed quantitative and qualitative easing (QQE), orchestrated by the Bank of Japan under Governor Haruhiko Kuroda, who took office in March 2013. QQE followed on an earlier period of comprehensive monetary easing (CME), which began in late 2008, and it was accompanied by a surge in equity prices. In Saiki and Frost (2014), we used data between 2008Q3 to 2014Q1, and found that CME and QQE had widened inequality in income (including capital gains) in that period. Yet QQE is still ongoing, and both the monetary base and the BoJ's balance sheet have been increasing at an even faster pace since then (figure 1). Meanwhile, available inequality measures (the Gini coefficient and the income ratio of top 20% to bottom 20%) have also increased (figure 2). These developments merit revisiting our earlier analysis.

Figure 1: BoJ's asset and monetary base (100 million yen, not seasonally adjusted)



Source: Bank of Japan

Figure 2: Inequality indicators of Japan since 2007 Q2



Note: Calculation by authors based on Household Survey Data.

The pernicious effects of inequality on macroeconomic outcomes have been documented in numerous studies (for example, Ostry et al., 2014; Stiglitz, 2012; Rajan, 2010; Perugini et al. 2015). While income inequality is not a policy objective of central banks, it may affect growth, inflation and societal trust. More generally, advancing equal opportunity is a key element for sustainable growth.

The Bank of Japan (2016) has argued that the QQE program works primarily by easing financial conditions and lowering interest rates on both bank loans and bond market financing. In addition to increasing the volume of assets purchased, the BoJ is now purchasing not only Japanese government bonds (JGBs), but also exchange-traded funds (ETFs), Japan real estate investment trusts (J-REITs), and corporate commercial paper (CP). Since the JGB yield is near zero or negative, and QQE has further reduced the amount of JGBs in circulation, it is expected that portfolio rebalancing will occur and stimulate the general risk appetite in financial markets. Indirectly, the increased price of bonds and equities may support the capital adequacy of commercial banks, which should increase lending and thus investment. Lower yields on CP should make it easier for corporations to secure funds, which should pass through to more investment. Yet as we show later, the most visible effects have been in equity markets. This benefited those households that already held equities, which tend to have higher incomes to start with. In our earlier study (Saiki and Frost, 2014), we showed that the BoJ's QQE increased equity prices benefited higher-income households through the portfolio channel. Now five years after QQE started, these effects can be further tested. The Nikkei 225 has more than doubled since January 2013. The Gini coefficient, while volatile, has increased by about one percentage point since 2008. In this paper, we seek to test whether the two phenomena are related.

2. Literature and comparison with other economies

In 2014, there was a limited number of studies on the distributional impact of monetary policy, especially unconventional policies, as Japan was the first and only major economy until the global financial crisis to implement unconventional monetary policy (UMP). However, with the global financial crisis and the subsequent actions of governments, along with the increased attention to inequality after Piketty (2013), some studies have been conducted since around 2014 on the distributional impact of the macroeconomic policy. While the distributional impact of fiscal policy is fairly straightforward, the impact of monetary policy is less clear-cut. For the distribution effects of conventional monetary policy, Coibion et al. (2017) find that contractionary monetary policy widens income inequality in the US over the period 1980-2008. Yet the effect is mainly driven by the early part of their sample period and does not cover the period of UMP. Saiki and Frost (2014) have, to the best of our knowledge, the first study to look at the impact of unconventional monetary policy on income distribution, using semi-aggregated household survey data published by Statistics Japan. Since then, a number of studies examined the impact of unconventional monetary policy on income distribution. A working paper by BoJ researchers (Inui et al.,2017) uses the shadow interest rate as a policy shock. They conclude that the impact of contractionary monetary shocks on income and consumption inequality is positive in the period before the 2000's. For the more recent period, the effects are not statistically significant – i.e., there is no support for the hypothesis of increased income inequality due to the BoJ's QQE. This is also consistent with remarks by the BoJ that inequality has not increased in Japan.[1] However, one crucial caveat is that the sample period of their micro-level data ended in 2008. Also, calculating the shadow interest rate requires a number of assumptions, and this definition of monetary shocks is up to debate.[2]

It is also important to keep in mind that the effect of QQE on income (and wealth) distribution depends on different factors thus different among countries. A study by the Doepke et al. (2015) showed that unconventional monetary policy in the US had benefited middle-class borrowers with mortgages while hurting wealthy retirees with nominal savings. A simulation by Domanski et al. (2016) of six advanced economies finds a positive impact of unconventional monetary policies on *wealth* inequality, as the rise in equity prices has had a greater impact on wealth distribution (benefiting the wealthy) than the rise in house prices (which benefits a broader segment of societies). Monnin (2017) finds that expansionary monetary policy, both conventional and unconventional, appears to *decrease* income inequality, mainly through its impact on the labor market.[3] Among those that find that UMP amplifies income inequality are: Montecino

[1] In June 2016, Governor Kuroda noted at Keio University "it is my understanding that inequality has *not* risen in Japan."
[2] Inui et al. also replicate our study for the period 2008Q4 to 2016Q2, and find that the results are of a similar magnitude, but not (quite) statistically significant. Notably, this does not control for the consumption tax increase in April 2014 (see below).
[3] At the same time, he finds that expansionary monetary policy increases the wealth inequality.

and Epstein (2017) for the US, Mumtaz and Konstantinos (2016) for the UK, and Saiki and Frost (2014) for Japan. Among the studies that find that UMP dampens income inequality are: Casiraghi et al. (2017), Guerello (2018) and ECB (2017) for the Euro area, Bank of England (2012) for the UK, and Bivens (2015) for the US. Notably, Casiraghi et al. (2017) used Italian household dataset and found that UMP benefit was captured by the lower income households via employment. Regarding wealth inequality, Adam and Tzamourani (2016) find that wealth inequality has widened in the euro area with UMP. Guerello (2018) finds there is significant heterogeneity in the impact of monetary policy on distribution across countries. Finally, there is a separate literature on the relationship between macroprudential policy and income inequality, including Frost and van Stralen (2018), who find a positive association between some policies and market or net income inequality.

One might wonder why Japan's income inequality has risen in response to unconventional monetary policies, while the result is mixed with other countries. The most plausible explanation is that, in comparison with other countries, the growth in wages and housing prices has been more muted in Japan (see section 5). Also, the interest rate has been virtually zero when UMP started, whereas for other countries interest rate was cut down while UMP was implemented, so the interest rate channel of reducing inequality via lower interest rate (debtors' gains) was absent for Japan. Aging also plays a substantial role. Imam (2013) documents that aging dampens the effect of monetary policy: among five different transmission channels of monetary policies (interest rates, credit, wealth effects, risk-taking, expectations), three channels (interest rates, credit, risk-taking) are less effective in aging societies as older cohorts do not need to borrow, and are more risk-averse. Therefore, a central bank's effort to expand credit to stimulate the demand is not likely to bring the desired result, but only increases the wealth of older asset-holders, who are unlikely to spend out of their increased wealth (Tobin, 1967, as well as many other succeeding studies). To prepare for life after retirement, more people are investing in investment trusts and equities. In a survey by a private company of 583 people of ages 20-60, 86.8% responded that they worry about the sustainability of the pension system, and 30% don't know how much their pension payout will be.[4] Thus, demography and labor market developments may have an impact on transmission.

3. Data and empirical strategy

[4] The survey was conducted by Crowdport in November 2017. https://news.biglobe.ne.jp/topics/trend/1028/84532.html

We updated the data up to 2017, following Saiki and Frost (2014). Our sample period is now 2007Q4 to 2017Q1. For the measure of inequality, we use the Gini coefficient. (Later we also use the top quintile to bottom quintile income ratio as a robustness check). We use GDP quarterly growth (seasonally adjusted), core CPI inflation (the BoJ's target inflation rate; we take the first difference due to the unit root problem), the monetary base of the BoJ,[5] percentage change of the Nikkei 225 index, and the Gini coefficient, calculated based on the income by deciles.[6] The source of income data is the Family Income and Expenditure Survey (FIES) of Statistics Japan. GDP and CPI data are from the IMF International Financial Statistics, the Nikkei 225 index is from Yahoo Finance, and the monetary base is from BoJ statistics website.

The major economic policy events since then are the great Tohoku earthquake in April 2011 and consumption tax rise in April 2014, which dented GDP growth substantially. (Japan had two quarters of negative quarter-on-quarter GDP growth, while inflation has gone up because of the consumption tax). The descriptive statistics of variables are listed in Table 2. The data on income (pre-tax but including transfer income and capital gains) was taken from the FIES ("income over the last 12 months," in the saving/liability section of the survey, for all households; sample size is about 6,000). We took the income by deciles and calculated the Gini coefficient accordingly. The data are at quarterly frequency.

Table 2: Descriptive Statistics of variables in the analysis

	GDP Quarterly Change (Seasonally Adjusted)	Core inflation (first difference)	% Change Nikkei 225 Index	% Change Monetary Base	Gini Coeff
Mean	0.10	0.01	0.71	4.26	34.08
Median	0.21	0.03	1.50	4.61	34.06
Maximum	2.30	1.99	22.07	14.94	35.35
Minimum	-4.83	-1.99	-22.92	-1.64	33.33
Std. Dev.	1.26	0.70	10.34	3.95	0.44
Observations	40	40	40	40	40
Unit Root (P-value)+	0.00	0.00	0.00	0.10	0.08

+Augmented Dickey-Fuller Test Equation

3.1. Baseline model

We use a vector autoregression (VAR) framework as a baseline model, namely:

[5] In the earlier version, we used monetary base divided by GDP. However, this may overestimate the increase of GDP especially in times of contraction. We thank Prof. Hoshi (Stanford) for pointing this to the authors.
[6] Wealth by decile is available, but only with annual frequency.

$$\boldsymbol{Y_t} = \boldsymbol{\alpha} + \sum_{\boldsymbol{j=1}}^{\boldsymbol{p}} \boldsymbol{\beta_{t-j} Y_{t-j}} + \boldsymbol{C X_t} + \boldsymbol{\varepsilon_t}$$

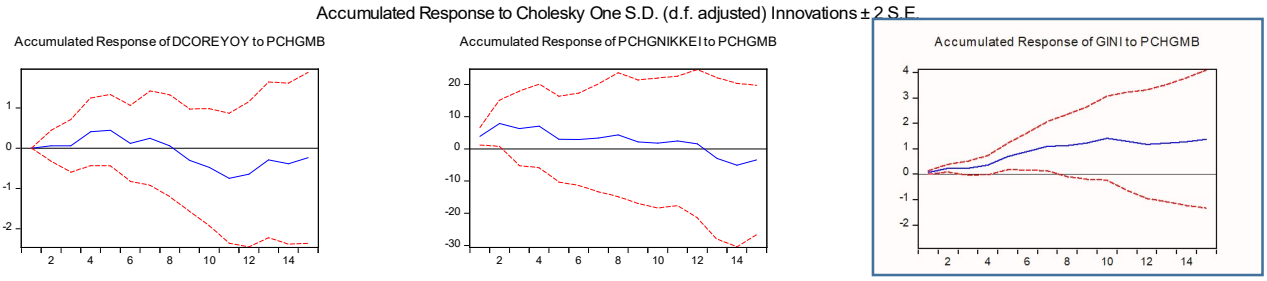
$$\boldsymbol{Y} = [GDP\ Growth, d(\pi^{core}), d(logMB), d(\log Nikkei), Gini]' \quad (1)$$

$$\boldsymbol{X} = \left[D_t^{EQ}, D_t^{CS}\right] \quad (2)$$

The endogenous variables are seasonally adjusted quarterly GDP growth (**Y**), the first difference of annual core inflation, the percentage change of the BoJ's monetary base, the percentage change of Nikkei 225 Index and Gini coefficient. In addition, we include exogenous dummy variables to control for the effects of the Great Tohoku Earthquake of 11 March 2011 (a dummy that takes a value of one between Q2 2011 and Q2 2012), and the consumption tax hike effect of April 2014 (a dummy that is one during the period of Q2 2014 to Q2 2015). Table 2 gives descriptive statistics. The unit root hypothesis for all variables is rejected at 10% significance level or lower. We choose the number of lags to be four quarters, based on the Akaike information criterion and Schwarz information criterion.

Figure 3 shows the results. The impulse response (accumulated) shows that to an even greater extent than in Saiki and Frost (2014), the effect of BoJ asset level on Gini coefficient is statistically significant (right panel). In the 8 quarters after a one-standard deviation increaes in the monetary base, income inequality is about 1.1 percentage points higher than it would be in the absence of the monetary shock. Also, the results show that the increase in BoJ assets does not have a statistically significant impact on core inflation (the left panel), but does have a short-lived positive impact on the Nikkei 225 (middle panel). The results indicate that, at least during our sample period, BoJ's monetary base increase do not seem to push up inflation, but are followed by higher asset prices. This seems to confirm the importance of the portfolio channel. It is notable that with three years of additional data, the results are even stronger and more statistically significant than the previous study, in which the accumulated impulse response of inequality measure (top 20% / bottom 20% income ratio) became insignificant after four quarters.

Figure 3: Impulse Response of selected variables, VAR



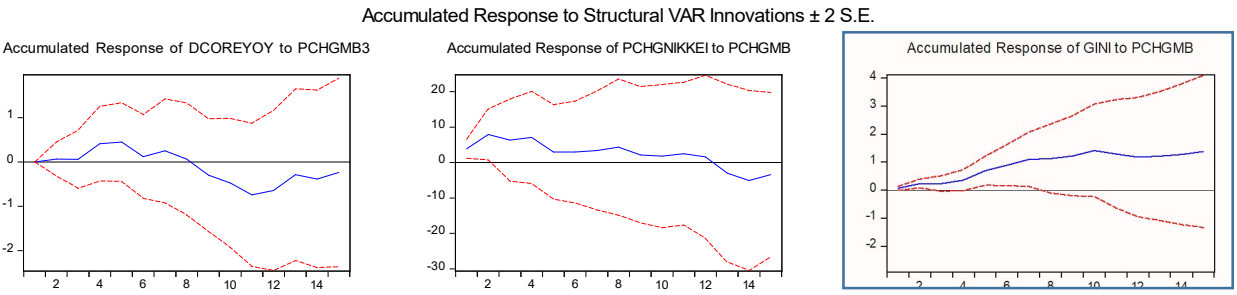
Note: See appendix for the complete set of IRF.

4. Robustness checks

4.1. SVAR

So far, we used a standard Cholesky decomposition. Now we add one structural restriction: the Gini coefficient only affects itself in the short-run. We impose restrictions on the short-run impulse response that the shock to Gini coefficient only affects itself in the short-run, which is a more realistic assumption. The results of this structural VAR (SVAR) model are essentially the same as the one we saw in the baseline model.

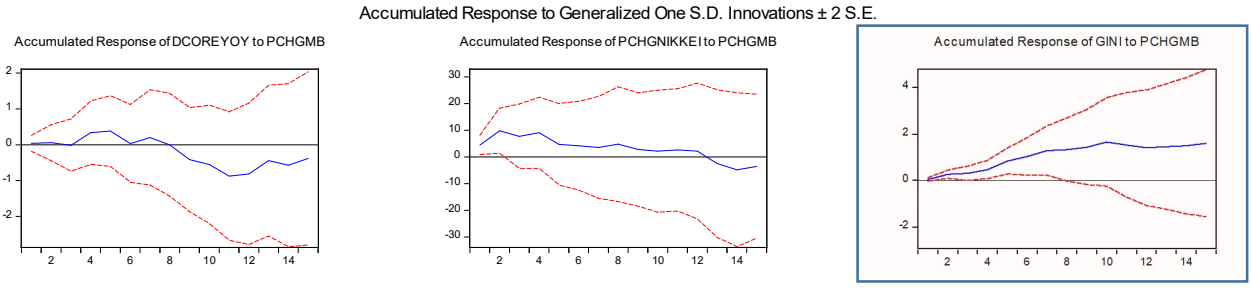
Figure 4: Impulse Response of selected variables, SVAR



4.2. Generalized impulse response functions

One issue with using Cholesky decomposition or SVAR is that we force the assumption of the propagation of underlying shocks. To see how our VAR is robust to different ordering, below we show the generalized IRF (Pesaran and Shin, 1998). Again, we find statistically significant results of a similar magnitude.

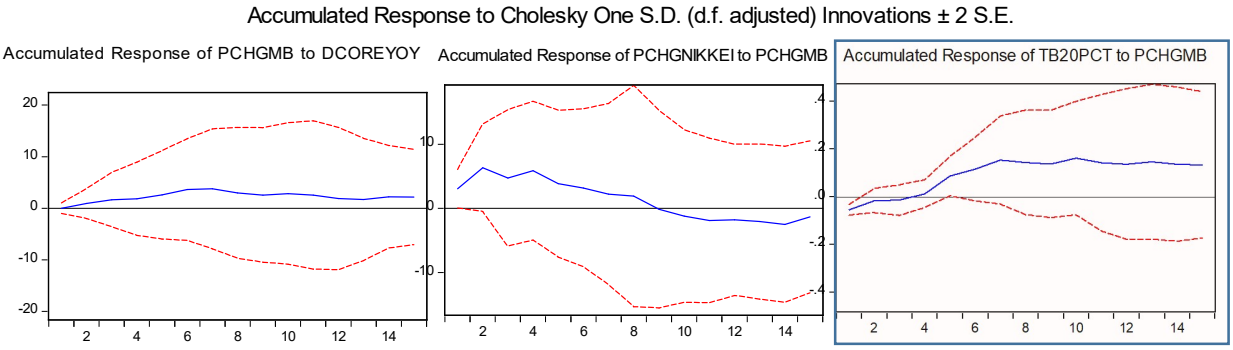
Figure 5: Generalized impulse response functions



4.3. Different measures of inequality

The Gini coefficient is the most common measure of inequality, yet there are a number of further measures in use. One is the top-to-bottom-quintile ratio, or the ratio of the income of the top 20% of the population by income divided by the income of the bottom 20%. This ratio focuses on the degree of disparity of top income earners and bottom income earners, and thus ignores the income inequality of middle-income earners. We used this ratio instead as a robustness check. Once again, we find similar results, but the statistical significance of the impact of monetary base on 20/20 ratio is weaker. One interpretation of the reduction of income for the middle-class household, probably due to the population aging and retirement. The positive effect of the percentage change of monetary base is statistically significant after 6 quarters. Although our earlier study used the same ratio and statistical significance was a little stronger, that may be explained by the fact that more people in the bottom quintile became employed as unemployment rate declined in the last few years.

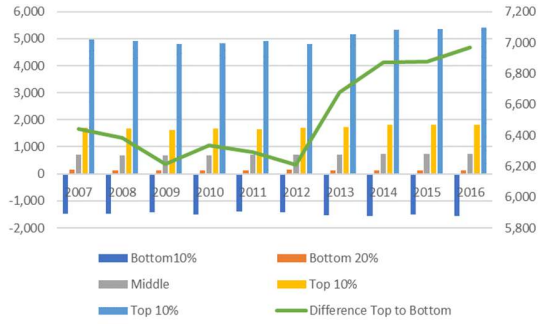
Figure 6. Impulse Response using 20/20 ratio, selected figures



4.4. Income vs. wealth inequality

One may argue that income inequality is temporary and any effects of QQE will be reversed when the policies are (eventually) phased out. Also, monetary policy has an impact on both income and wealth. So far, we have focused on income, rather than wealth. However, without a wage increase, accumulated differences in income derived from capital gains and dividends also lead to wealth inequality. Figure 7 shows the structure of net assets by wealth quantile (the data is available only annually). The gap of net saving by quantile (the difference between top 20% and bottom 20%) has been rising steadily since 2012. Where wealthier households have rebalanced their portfolios from safe assets to riskier asset including equities, they may retain the favorable effects of QQE. Those investors who bought equities later (such as lower-income households attracted by the recent positive performance) may be more hit by a future crash in equity prices. If central banks react to such a crash with further UMP, the distributional impact of the initial policies could be amplified. Unfortunately, wealth distribution data is only available on an annual basis in the household survey, but this remains a possible extension of our research.

Figure 7: Net savings by quantile



Calculation by the authors based on the household survey data from Ministry of Internal Affairs and Communications' household saving and liability survey. The numbers are in 10,000 yen (about US$100).

5. Differences with other countries

As we mentioned earlier, the income distribution effect of UMP seems to differ across countries, but for Japan, there is evidence that UMP has widened income inequality. Probably this stems from the lack of wage increases. As apparent from figure 8(a), Japanese wages kept falling in both in nominal and real terms,

while in the US, the UK and the Eurozone, there has been about a 10% wage increase since the crisis, in addition to a fall in unemployment. Since wages are the largest component of income for most people, especially the middle-class households, the increased income inequality from capital gain may have been offset by wage increase in many advanced countries. Also, GDP growth has been the lowest among these economies (figure 8d), in part due to aging.

Figure 8 (a): Average Annual Wages (2010=100)

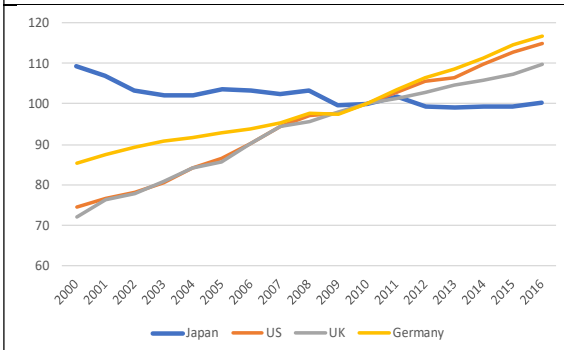


Figure 8 (b): Residential Price Index (2010=100), not seasonally adjusted

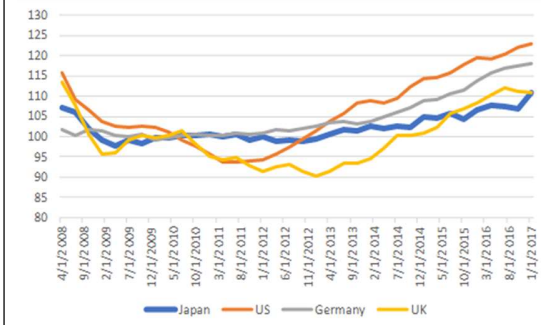


Figure 8 (c): Equity Price Index (2010=100), not seasonally adjusted

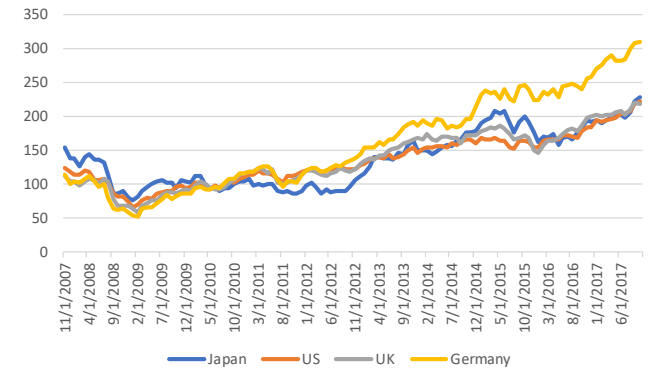
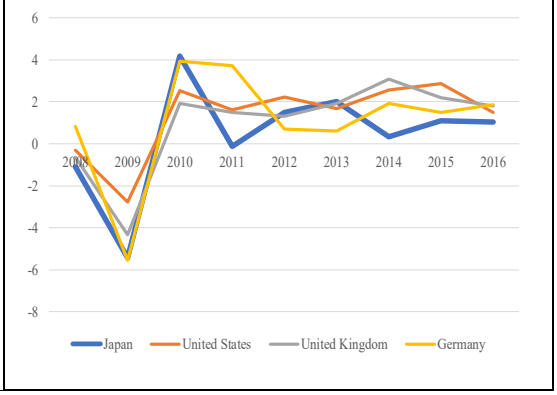


Figure 8 (d): Annual GDP growth



Sources:
Residential Price BIS Residential Property Price database, http://www.bis.org/statistics/pp.htm
Average annual wage: OECD https://stats.oecd.org/Index.aspx?DataSetCode=AV_AN_WAGE#
Equity price: Japan Nikkei 225 (Japan), Dow Jones (US), FTSE Russell 2000® Price Index (UK), MDAX (Germany)

Conclusion

Our study finds further evidence that UMP has been associated with wider income inequality in Japan in the last decade. Yet this effect may not be similarly strong across different countries. Much depends, as Monnin (2017) suggests, on how wages respond to expansionary monetary policy. As of writing, the wage increase in Japan is almost null despite the historically low unemployment rate. This is largely due to the seniority-based wage structure, labor market segmentation, and more demand for temporary and part-time jobs. Related to this, DSGE-based studies including Ko (2015) and Motta and Tireli (2014) with segmented labor markets demonstrate that without consideration for the labor market segmentation and inequality in labor income, central banks' optimal monetary causes can cause substantial welfare losses. These are particularly relevant for Japan.

It is also noteworthy that Japan's GDP growth has been substantially lower compared to other countries, even after the global financial crisis. This also relates to demographic factors, such as a shrinking population. It should be noted that our result only represents the short-term distributional effects of monetary policy. If, over the medium term, Japan achieves higher growth and wage levels, along with price stability, the current policy has the potential to have other effects on inequality. Yet these demographic factors may also result in intergenerational distribution effects, as different cohorts have a different distribution of asset holdings, financial liabilities and labor income. The effects are also a promising avenue of future research.

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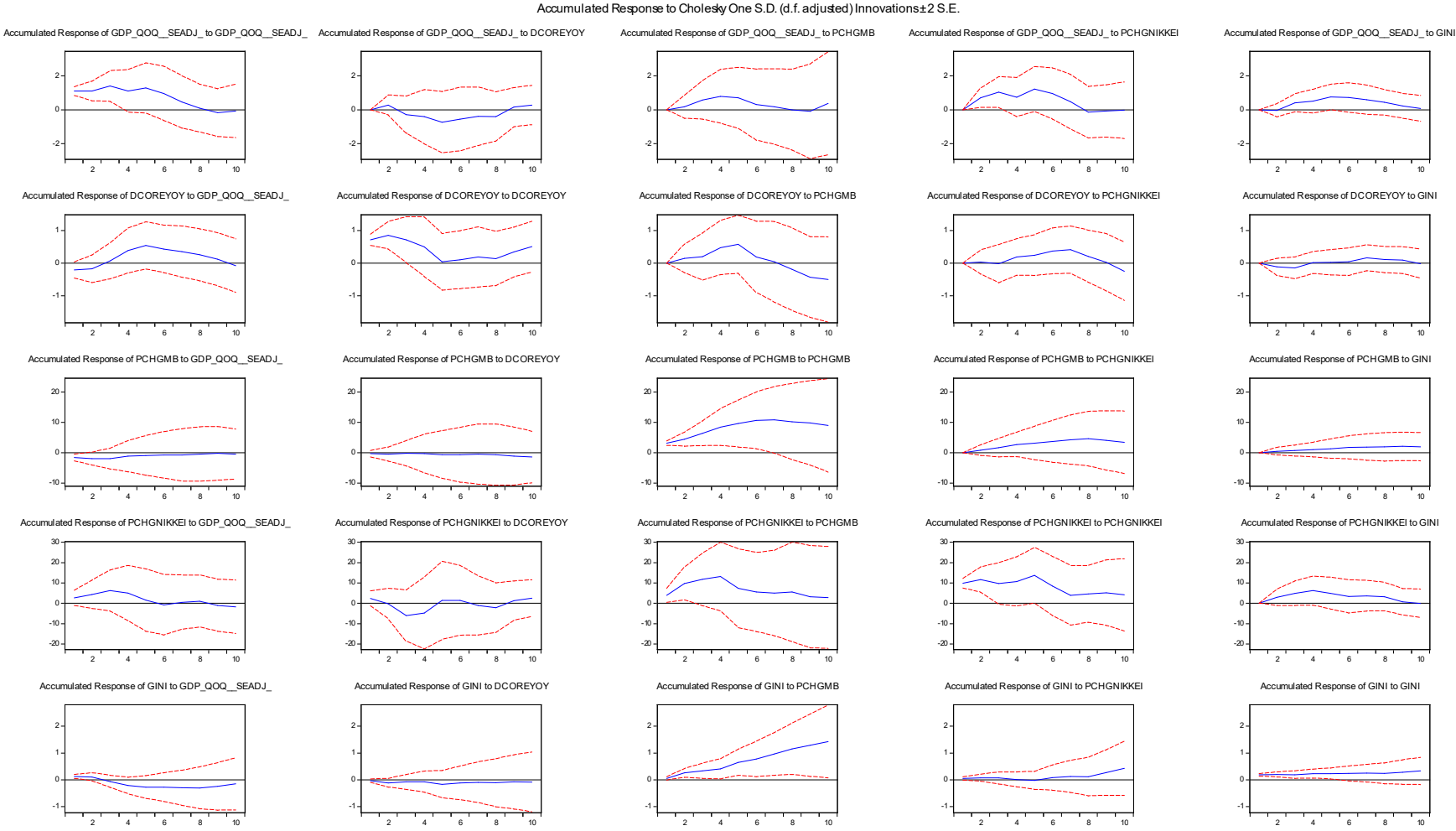
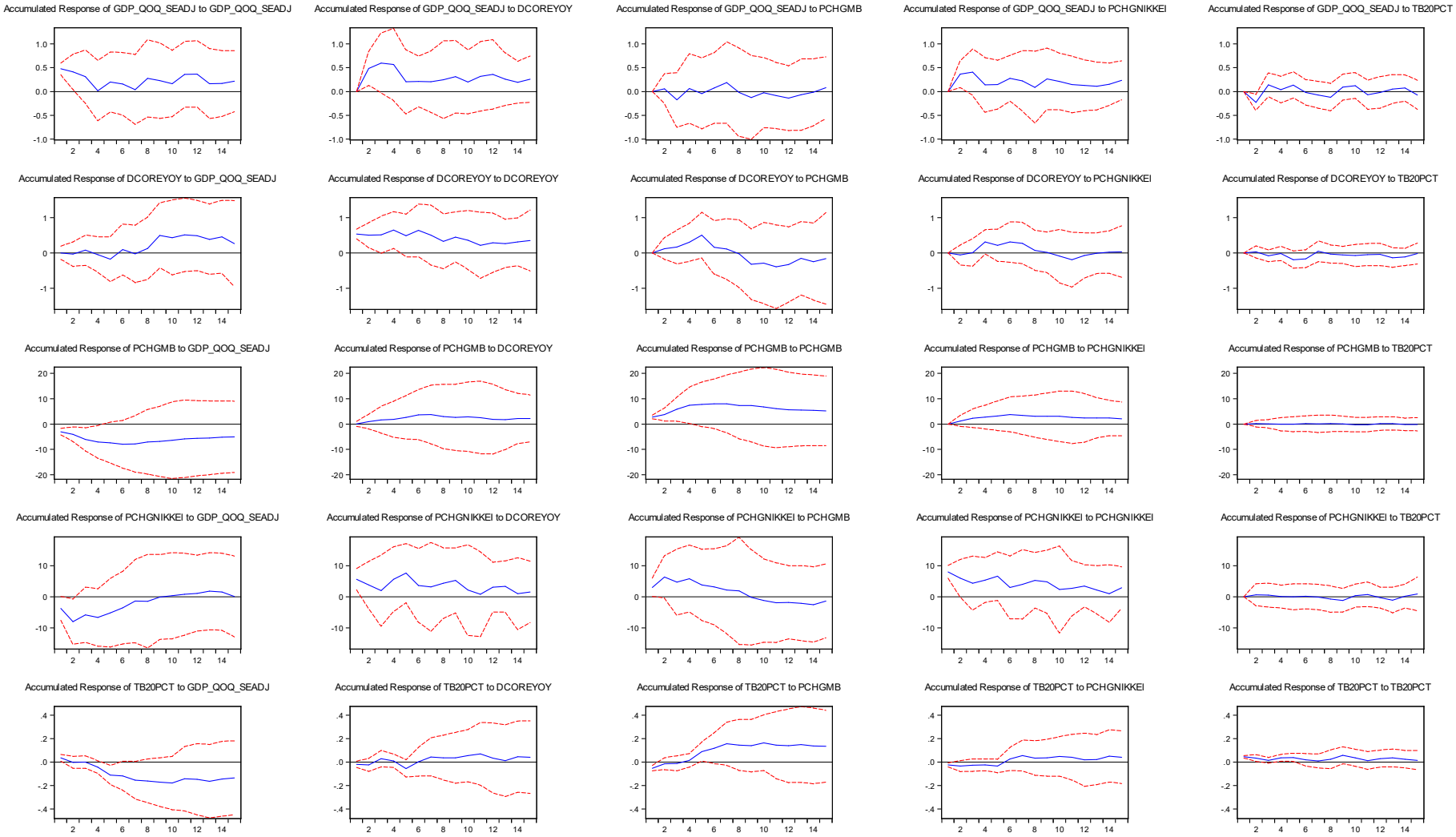
Appendix I: Impulse Response Function – Base results

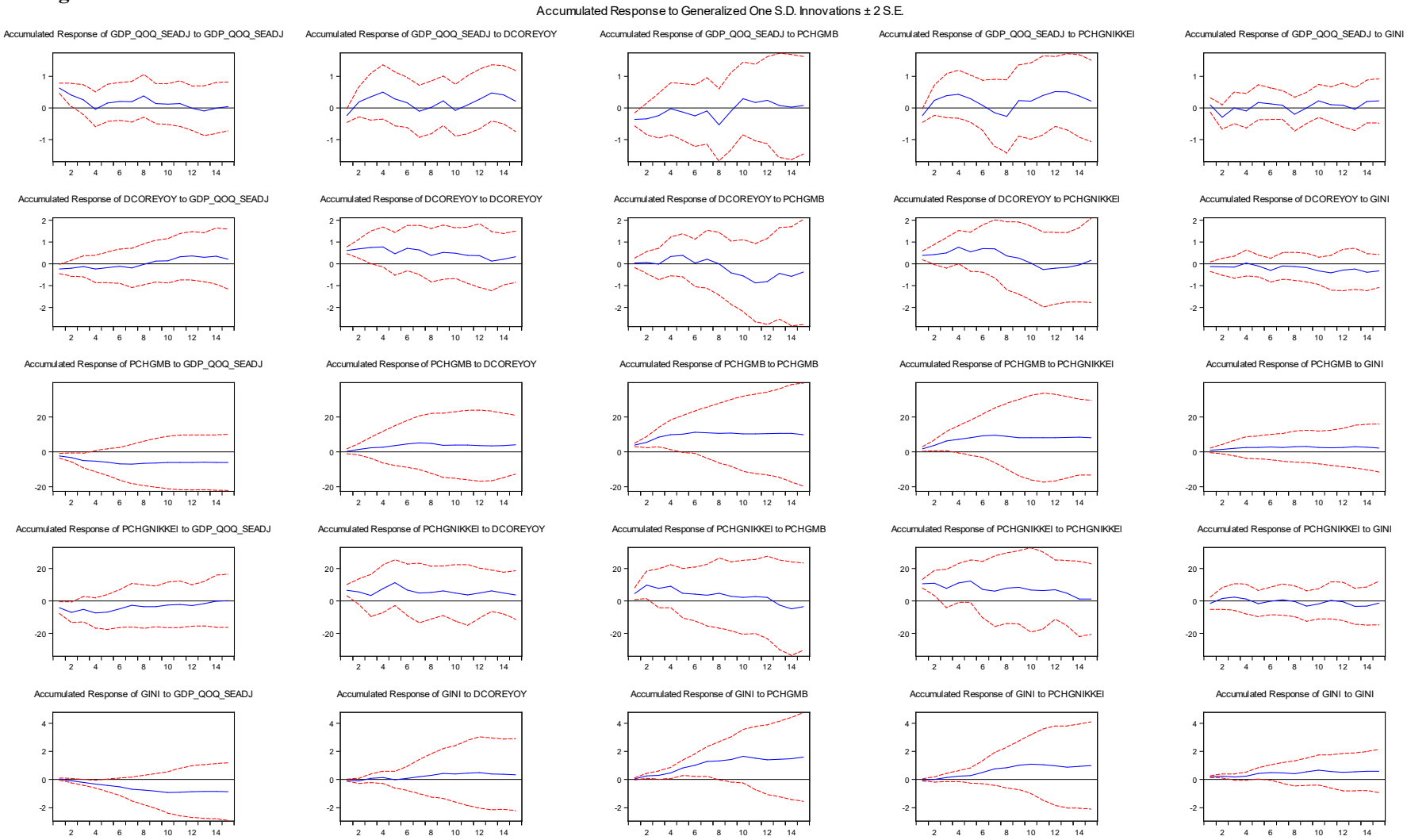


With SVAR (Robustness check)

Accumulated Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.



With generalized IRF



With alternative measure (income ratio of top/bottom 20%)