Research on Abnormal Volatility in The Japanese Government Bond Futures Markets—Policy based on yield curve control

Xiao Zhu1,*

1Business School, Soochow University, Su Zhou, China

Abstract. Historically, central banks in the United States, the United Kingdom, Australia and Japan have implemented Yield Curve Control (hereinafter referred to as YCC), and Japan is currently the only country in the world that is still pushing ahead with YCC. However, given that the implementation and implementation of the YCC showed more defects than profits, on June 15, 2022, there was an unusual fluctuation in the Japanese government bond futures market, Japan's 10-year government bond future contracts fell by 2.01 yen, touching the melting point in the plate, the largest single-day drop in 2013. This article introduces the basic framework of the yield rate curve and its way of buying bonds, then elaborates on the operation of the Central Bank of Japan to buy bonds in 2022, analyses the abnormal fluctuations in the Japanese government bond futures market in 2022 and identifies the contradictions and limitations of the government bond market as the root cause of the fluctuation.

1 Introduction

The reason for the unusual volatility of the Japanese government bond futures markets is the fact that the Federal Reserve will hold its interest-rate meeting on June 15th and the Central Bank of Japan will hold a monetary policy conference on June 17th. Japan's deviation from the US monetary policy orientation has led foreign investors to concentrate on empty Japanese government bond futures markets, increasing financial market volatility [1, 2, 3]. The core reason for the depreciation of the yen is that the increase in the return on investment in the dollar assets forms a pressure on the yen assets. Under the YCC policy of the Japanese central bank, the yields of Japanese government bonds were relatively stable, investors purchased and sold Japanese bonds at a relatively small price gap, and Japanese state bonds became relatively “risk-free” assets. At a time when the Fed's interest rate increases rapidly and the return on US bonds rises, investment returns on US dollar assets climb, and investors are motivated to sell yen assets and hold more US dollars assets to increase the combined return. The relative difference between US-Japanese economic growth and Japanese inflation has led to an increase in the differentiation in Japanese monetary policy to the extent that the U.S.-Yuan interest rate gap continues to expand, leading Japan to face large-scale capital outflow pressure, triggering a large depreciation of the yen.

The area of operations of the Central Bank of Japan and the United States has been for a long time, and why it is generated on June 15, 2022, this paper is therefore under further investigation.

State bond futures service cash, State bond cash is the basis for the operation of the State bond market futures. There are two kinds of interactions, one is the direct transmission of this role and effect to the hedge holders, and the other is the indirect transmission through the futures speculators. The latter method determines the prices of futures, but the former method plays an important role in the price of cash. The prices of cash are determined by the dominance of the holders in the current market and by the speculators in the futures market.

The Japanese government bond market has performed abnormally since the beginning of 2022, and the Central Bank of Japan is also the most important player in the Japanese public bond market, and its debt-purchase operations have had a significant impact on the functioning of the national bond market. The Bank of Germany has warned that its debt-purchase policy to the YCC target could lead to “dramatic, unpredictable non-linear” fluctuations in financial markets, and the yen’s loss of fundamental valuation margins, leading to a systemic collapse of the Japanese financial market [3].

From the perspective of the monetary policy operation of the central bank of Japan, this paper analyses the causes of the current abnormal volatility of the Japanese government bond market, summarizes the historical experience of yield curve control, understands the profound contradictions in the current bond market operation and outlines and analyses the three major contradiction and its impact on the government bonds market in Japan.

2 Methods

2.1 Basic framework for controlling the yield curve of the Central Bank of Japan
Fixed-interest unlimited debt purchase operations are the core policy of the Central Bank of Japan to implement yield-rate curve control and stem from the quantitative easing policy (QQE) launched by the Japanese Central Bank in April 2013. In September 2016, the Central Bank of Japan updated its monetary policy framework, announcing a quantitative easing policy using yield curve controls. Its operational framework is as follows: first, the setting of policy interest rate targets, setting the short-term interest rate target at 0.1 per cent, the long-term (ten-year) interest rate goal at 0 per cent and the upward and downward variability of about 10BP, thus forming the lower limit on the "interest rate corridor" [4]. The second is the inflation target commitment, that is, the commitment to sustained easing until inflation stabilizes to more than 2 per cent. Thirdly, when the interest rate of the central bank is higher than the market interest rate, no financial institutions bid, and they do not need to buy the government bond from the secondary market; when the Central Bank of Japan buys the debt interest rate below the market rate, finance institutions participate in the bidding, and central banks buy government bonds from the Secondary Market, thereby adjusting the market's interest rate to the target range.

2.2 The Central Bank of Japan's approach to debt purchases based on yield curve control

In order to implement the yield curve control, the Central Bank of Japan will purchase government bonds from secondary markets, operating as a regular auction and a fixed-rate auction [5].

From the point of view of conventional debt purchase operations, starting in 2016, the Central Bank of Japan will generally announce its operational plan for the next month's purchase of government bonds at the end of the month. Starting in June 2021, the Central Bank of Japan will announce its operational plan for purchasing government bonds for the next quarter at the end of the quarter. In the second quarter of 2022, the Central Bank of Japan will undertake 55 regular debt purchase operations with a monthly operating scale of 6.36 trillion yen. Among these, the remaining five to ten-year bonds operated four times a month, with a scale of 50 billion yen per operation, and the expected monthly purchase scale was 2 trillion yen. Other bonds will be announced in advance, with the exception of government bonds and inflation index bonds with a remaining maturity of less than one year.

From the point of view of the fixed-interest purchase operation, there are two ways to operate: one is to adjust the lower upper limit of the purchase interest rate, thereby achieving the adjustment of the lower limit on the "interest corridor"; and the other is adjusting the actual buying interest rate [6]. On 28 April 2022, the Interest Meeting of the Central Bank of Japan decided to adjust the fixed-interest debt purchase operations accordingly. It was stated that, starting on 2 May 2022, the Central Bank of Japan would carry out daily purchases of 10-year government bonds exchanges, unless, owing to the fact that the purchase price of the bonds was lower than the market level and there was no institutional bidding, it would purchase the highest yield of the three newly issued 10-year state bonds at an unlimited rate of 0.25 per cent.

3 Results and Discussion

Treasury bond futures use physical delivery and nominal standard bonds, and qualifying treasury bonds can be used in this way. Due to the importance of spot arbitrage, physical delivery, and other processes, there is a close relationship between the spot market and treasury bond futures [7]. The root cause of the abnormal volatility of the Japanese government bond futures market is the long-term implementation of yield curve control by the Japanese government, which has produced three long-term contradictions in the market for Japanese government bonds. Inadequacies in the government bond futures market have also contributed to some degree to market volatility.

3.1 The price of the treasury bond market has been distorted

According to the structure of the interest rate, long-term interest rates should be the average of the current and future short-term rates plus a risk premium. Before the Central Bank of Japan introduced a policy of yield curve control, the yield of Japanese government bonds was steeped to a higher degree. Subsequently, due to the fixed target level of the yield rate of the long-term and two-term bonds, but other term bonds yields are unrestricted, resulting in an abnormal form of yield curve of the bonds [8].

First of all, the interest-rate gap between the 10- to 2-year periods rapidly narrows to less than 10BP, which basically matches the Japanese central bank's interest rate schedule, but the bank profit space has been compressed, narrowing the space for credit expansion, leading to a decline in the willingness of banks to hold debt [9].

Secondly, with the rapid rise in the yields of over-long-term government bonds, the 40-year-old-to-year-term interest gap began to rise steadily from the end of 2021 to remain above the historical average, and the market's expectations for the rise of the 10-year-long government bond yield continued to accumulate.

Finally, since the end of 2021, the yields of the seven-year, eight-year and ninth-year bonds have increased rapidly, with the interest gap narrowing with that of the 10-year bond yield, and beginning on 13 June closer or even higher than that of 10-year bonds. The State bond yields have begun to appear in the phenomenon of “back-up” and “dumping”.

2
3.2 The Expectation of The Central Bank of Japan to “Pull Down”

The central bank of Japan's debt acquisition operations based on yield curve control formed a "bottom" market expectation. As a result, markets will be traded through central bank debt purchases, eventually making the central bank the largest holder of government bonds. At the end of March 2022, Japan’s central bank holds government debt in the size of 500 trillion yen, accounting for 45 per cent, up five percentage points from the year 2016. In the same period, the size of the Japanese government bond market increased by 23.3 trillion yen, the central bank's holding of government bonds increased in size by 150 billion yen, and the Central Bank absorbed the entire market 63% of the increase in government debt. In accordance with the principle established by the Interest Assembly on April 28th, if the central banks carry out fixed-rate unlimited operating debt purchase of 10-year government debts, then the operating target would be 364, 365 and 366 periods only. As expected, the markets traded a lot and held the three newly issued 10-year bonds.

As shown in table 1, while central bank holdings accounted for almost 50 per cent of the total market share, the central bank's holdings in these three bonds were the lowest of the ten-year bonds, of which the 364th bonds held only 36 per cent.

Table 1. The Central Bank of Japan holds a statistical table of 10-year government bonds

<table>
<thead>
<tr>
<th>Batch</th>
<th>Issuance size (trillion yen)</th>
<th>Holdings of the Central Bank of Japan (trillion yen)</th>
<th>Share of holdings (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>361</td>
<td>8.29</td>
<td>4.53</td>
<td>54.69</td>
</tr>
<tr>
<td>362</td>
<td>8.26</td>
<td>5.36</td>
<td>64.84</td>
</tr>
<tr>
<td>363</td>
<td>8.27</td>
<td>3.74</td>
<td>45.19</td>
</tr>
<tr>
<td>364</td>
<td>8.12</td>
<td>2.89</td>
<td>35.54</td>
</tr>
<tr>
<td>365</td>
<td>8.29</td>
<td>3.90</td>
<td>47.00</td>
</tr>
<tr>
<td>366</td>
<td>8.33</td>
<td>3.71</td>
<td>44.57</td>
</tr>
</tbody>
</table>

3.3 The prevalence of interest-exchange transactions

Japanese financial institutions, represented by commercial banks, have had a long-term preference for government bonds, and the purpose of buying long-run bonds is to hold, not to trade, so they are not sensitive to changes in the yield rate of the Japanese government bond [10]. However, according to the study of the Central Bank of Japan, the central bank of Japan has imposed a negative interest rate, and because of the very limited interest rate income of holding Japanese state bonds the financial institution needs to trade profits through the state bond. In addition to the traditional "low-buy-high" to earn capital gain, a mainstream trading model is to conduct currency base swap trading: domestic investors finance the central banks with the government bond as a guarantee, after using currency swap to convert the yen to the dollar, and re-invest in markets such as the US government bond; foreign institutions will convert the currency held in the dollar to the yen by way of exchange currency, and buy the yen [11]. The institutions of the two sides are playing around the Japanese-USD trend and are highly sensitive to market interest rate movements.

3.4 Japanese government bond futures market constraints aggravate market volatility

There is insufficient participation of financial institutions in the State bond futures market, and there is an imbalance in the power of the future market in State bonds.

Restricted on financial regulation, Japanese financial institutions participate in the future markets of government bonds on a limited scale, and foreign institutions are the main participants in the market. In transactions such as exchange of currency base, Japanese financial institutions and foreign institutions are trading counterparts, in the opposite direction, thus determined that in the Japanese national bond futures market is also a counterpart, in which the domestic financial institution is to do multi-country debt futures mainly, and the foreign financial institution to do air debt Futures main. With the rise of the yield rate of Japanese government bonds and the fall of the price of the country bonds futures, domestic institutions have been withdrawing from the country debt market, only overseas institutions to participate in the market of State bonds Futures, resulting in much imbalance of power of the market for state bonds. Japanese government bonds are under pressure from the futures market.

4 Conclusion

The over-anticipated operation of the Japanese central bank in the context of the above-mentioned three-party contradictions in the government bond market has resulted in market competitive 10-year government bond sale, inhibiting the rise in the yield rate of the seven-year state bond.

On June 10, 2022, the Central Bank of Japan announced that the unlimited purchase of the 356th bond,
instead of the three most recent 10-year bonds expected by the market, would lead to the market’s competitive dumping of 10-year government bonds, inhibiting the rise in the yield rate of the seven-year bond. The size of the 364, 365 and 366 bonds held by the Japanese Central Bank has reached 10.49 trillion yen, up from the 500 billion yen at the end of May. According to the conventional operating plan, on June 15, the central bank will carry out a five-to-ten-year government bond purchase operation, with a planned purchase size of 50 billion yen, to meet the normal dumping demand of market institutions, which can basically maintain a stable 10-year yield. But due to the lack of expectations for the unlimited debt purchase operation, the market competitively sells the 10-year state debt. The market's actual holdings for the three creditors amount to 14.24 trillion yen, which means that once the market fails to expect the central bank's unlimited debt purchases, there will be a "debt-debt" demand of 4 trillion of yen, and the conventional operating size of 50 billion yen is just a cup-and-a-cup salary.

The State bond yield curve is more influenced by anticipated and deadline premiums. The key about long-term interest rates at a lower level is to stabilize short-term rates and inflation expectations at a low level. By adjusting short-run interest rates to influence long-run rates, interest rates can be driven through bond markets to better maintain the flexibility and liquidity of the bond market and play a decisive role in the allocation of financial resources. To this goal, a sound base interest rate and marketed interest rate system is required, and it is necessary to gradually explore the establishment of interest-rate policy rules that are appropriate to the national conditions and contribute to economic growth and price stability. At the same time, communication with the markets must be strengthened, market expectations effectively guided, and self-determination of market decision-making is avoided. Furthermore, attention should be paid to the conducting mechanisms for diverting short-term interest rates from long-term to allow that it possible for changes in monetary policy to be made smoothly, improving financial stability and better fostering economic growth.

On the one hand, the State bond futures generally use a physical delivery mechanism, the deliverable State bonds are linked to the state bond current market, the central bank in the process of implementing the purchase of State bond operations, the need to pay high attention to the changes in the can be delivered State bond, to prevent the risk of delivery; on the other hand, in the course of reverse regulation, the Central Bank needs to strengthen market communication, guide market expectations, avoid the market to concentrate on the air debt futures, enhance the stability of the State debt market futures.

Inflation targets and economic growth targets need to be achieved both through monetary policy and through synergy with other policies. The situation in Japan has shown that dependence on monetary policy alone cannot inflation and economic growth, and monetary policies need to be combined with fiscal and industrial policies to enhance the inherent driving force of the economy.

References
1. X. Zong, J. Min, H. J. Li. IER, 137(05), 91-103+6 (2018).
8. X. Li, Y. Wang. IER, (03), 91-110+6-7 (2017).