

**Portfolio Rebalancing Following the Bank of Japan's  
Government Bond Purchases:  
A Fact Finding Analysis Using the Flow of Funds Accounts Statistics**

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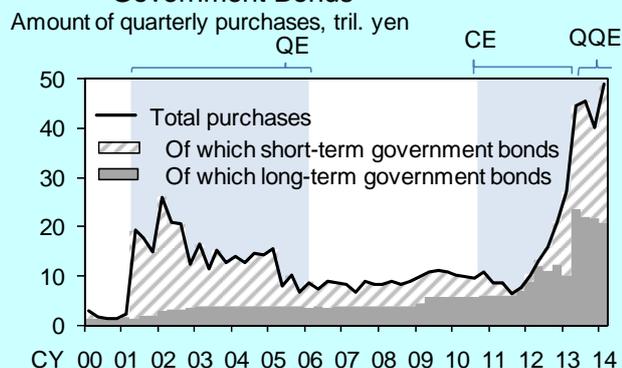
After the Bank of Japan (BOJ) introduced Quantitative and Qualitative Monetary Easing in April 2013, the BOJ's government bond purchases increased by a large amount, and entities other than the BOJ, as a group, increased loans and investment in equities, mutual funds, and corporate bonds, while reducing their holdings of government bonds. The extent of portfolio rebalancing differs across entities: we observe rebalancing for domestic banks and the overseas sector; in contrast, so far no rebalancing for insurance companies, corporate pension funds, and public pensions can be observed. In addition to changes in the balance sheet conditions of domestic banks and loan demand faced by domestic banks, purchases of government bonds with a longer remaining maturity by the BOJ likely have played a role in the increase in bank loans by domestic banks.

**Introduction**

After the Bank of Japan (BOJ) introduced Quantitative and Qualitative Monetary Easing (QQE), government bond purchases by the BOJ, mainly purchases of long-term government bonds, increased by a large amount (Chart 1).<sup>1</sup> One of the transmission mechanisms of central bank government bond purchases is portfolio rebalancing.

We have seen portfolio rebalancing in various forms since the beginning of 2013. Specifically, entities other than the BOJ, as a group, have reduced their holdings of government bonds and have increased loans as well as investment in equities, mutual funds, and corporate bonds (Chart 2).

**[Chart 1] Bank of Japan's Purchases of Government Bonds**

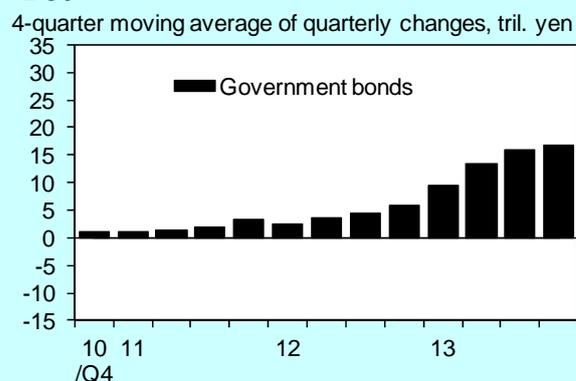


Note: Short-term bonds consist of treasury bills (TBs) and financing bills (FBs) before January 2009, and treasury discount bills after February 2009.

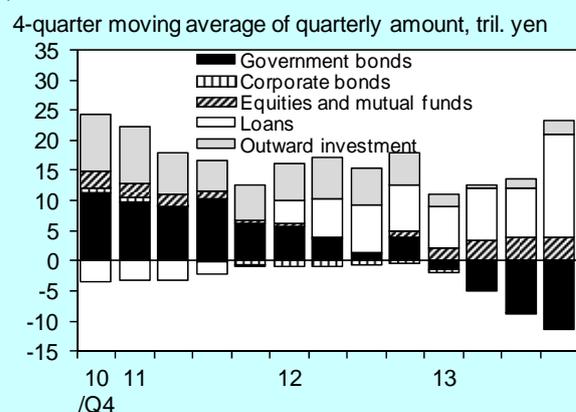
Source: Bank of Japan, "Monetary Base and the Bank of Japan's Transactions."

**[Chart 2] Portfolio Rebalancing at the Macro Level**

**(a) Changes in Government Bond Holdings of the BOJ**



**(b) Investment Flows of Entities Other than the BOJ**



Notes: "Entities other than the BOJ" in (b) includes all entities covered by the Flow of Funds Accounts Statistics except for the Bank of Japan. Outward investment consists of outward securities investment and outward direct investment.

Source: Bank of Japan, "Flow of Funds Accounts Statistics."

This article reviews the mechanism and the characteristics of portfolio rebalancing following BOJ government bond purchases. To grasp rebalancing across assets in the economy as a whole, we use funds flow data, primarily from the Flow of Funds Accounts Statistics, instead of data on individual markets or specific financial products. Because our focus is on rebalancing from government bonds to other assets, we omit households and private nonfinancial corporations, which hold a relatively small amount of government bonds, from the analysis and focus on financial institutions and the overseas sector.

## The Mechanisms behind Portfolio Rebalancing

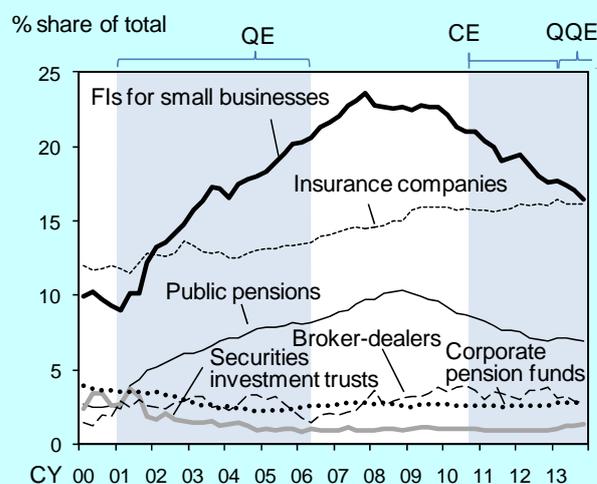
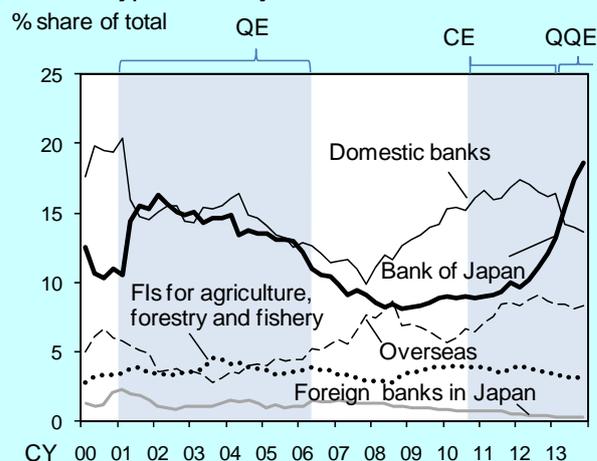
Portfolio rebalancing in the recent period likely has occurred mainly through the following two channels. First, the decline in long-term interest rates as a result of the BOJ's government bond purchases has left little room for a further decline in long-term interest rates, so that prospects for capital gains from holding long-term government bonds have also become limited. Under these circumstances, financial institutions and investors reduced their holdings of government bonds and increased investment in other assets that had higher expected returns. When long-term government bond rates decline to a sufficiently low level, entities that hold government bonds with the intention of holding them until maturity also lose the incentive to invest in government bonds and increase investment in other assets.

The second channel through which BOJ government bond purchases likely have contributed to portfolio rebalancing is the reduction in the amount of interest rate risk related to the holding of long-term government bonds. Holding long-term government bonds entails interest rate risk: investors suffer capital losses on government bonds when interest rates rise. Entities that reduced holdings of long-term government bonds due to the mechanism described in the preceding paragraph as a result had greater capacity to take on additional risk in their portfolio, allowing them to increase investment in assets other than government bonds. This channel is likely to have reinforced the first channel described above.

## Portfolio Rebalancing by Type of Entity

Looking at portfolio rebalancing by type of entity shows that not all types engaged in rebalancing. Specifically, the share of government bonds held by domestic banks and the overseas sector (nonresidents)

[Chart 3] Developments in the Share of Government Bonds Held by Each Type of Entity

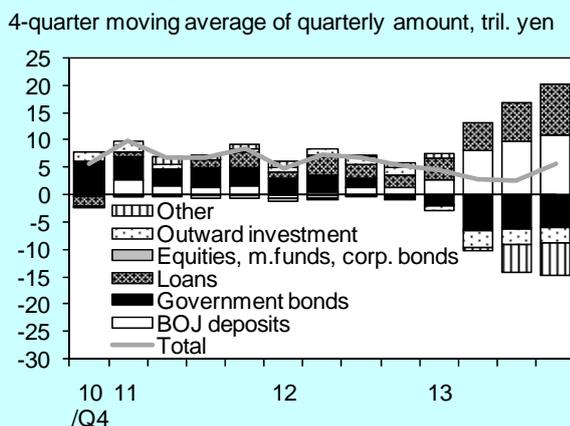


Source: Bank of Japan, "Flow of Funds Accounts Statistics."

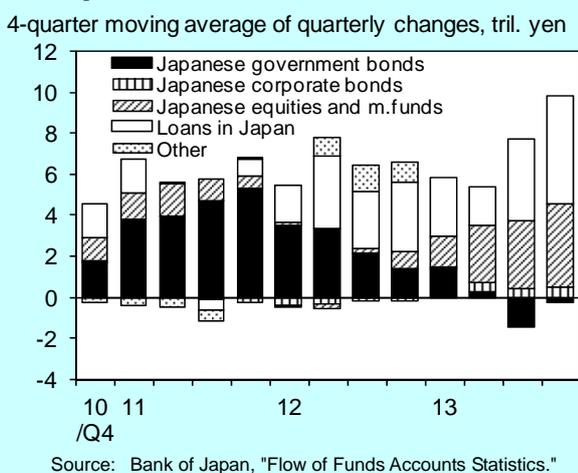
tended to decrease when the BOJ increased government bond purchases while the BOJ's share, naturally, increased (Chart 3). On the other hand, the share of government bonds held by insurance companies and corporate pension funds so far has not tended to decrease. Insurance companies and corporate pension funds have a liability structure which implies that payment flows will last for a long time into the future, meaning that these entities have a strong incentive to hold government bonds with a long maturity in order to match the duration of assets to the duration of liabilities. The share of government bonds held by public pensions and by financial institutions for small businesses (which include Japan Post Bank) has been steadily decreasing from around 2008. This decrease, however, is not directly related to the BOJ's government bond purchases, but instead reflect factors such as public pension funds' decumulation of assets to finance pension payments and a decrease in Japan Post Bank's assets as a result of a decrease in deposits. For this reason, we also omit these entities in our analysis below.

Next, we examine, for domestic banks and the overseas sector, in which asset they increased investment when they reduced government bond holdings. Domestic banks have not only increased deposits at the BOJ but also loans since 2013, when QQE was introduced (Chart 4). The overseas sector increased investment in equities and mutual funds in Japan, and to a lesser extent, Japanese corporate bonds (Chart 5).<sup>2</sup> The increase in loans and in investment in equities and corporate bonds at the aggregate level seen earlier is a reflection of this behavior of domestic banks and the overseas sector. It should be noted, however, that since changes in investors' attitudes toward risk taking in global financial markets likely play a role in the overseas sector's rebalancing, not all of this rebalancing can be attributed to portfolio rebalancing in response to BOJ government bond purchases.

[Chart 4] Changes in Assets of Domestic Banks



[Chart 5] Investment Flows of the Overseas Sector



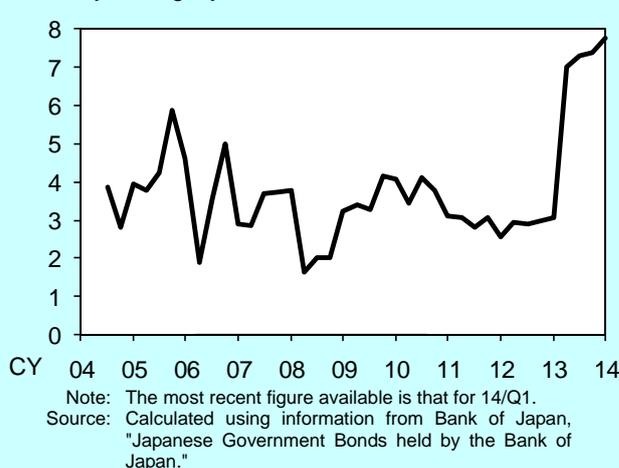
## Factors behind the Increase in Bank Loans

In addition to changes in financial and economic

conditions, such as the balance sheet conditions of domestic banks and the loan demand faced by domestic banks, BOJ purchases of government bonds with a longer remaining maturity likely have played a role in the increase in bank loans.

The average remaining maturity of government bonds purchased by the BOJ became approximately twice as long as that prior to the introduction of QQE (Chart 6). In general, banks' interest rate risk on government bond holdings should decrease more the more banks reduce government bonds with longer time to maturity. A decrease in interest rate risk frees up risk taking capacity at the banks and therefore should result in an increase in bank lending.

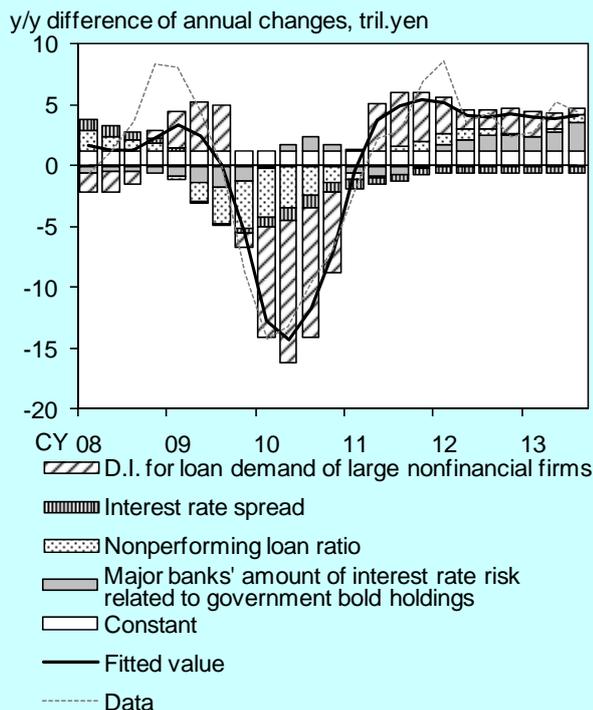
[Chart 6] Average Remaining Maturity of Long-Term Government Bonds Purchased by the Bank of Japan



The increase in bank lending may also be influenced by factors such as an increase in the demand for loans. To quantitatively examine the role of various factors in bank lending, we regressed bank lending on the following four variables: (i) the interest rate risk of banks on their government bond holdings, (ii) the spread between the lending rate on loans and the deposit rate, (iii) the diffusion index representing the loan demand of large nonfinancial firms, and (iv) the nonperforming loan ratio.<sup>3</sup> Here, we focus on the behavior of major banks that greatly reduced their holdings of long-term government bonds after the introduction of QQE.<sup>4</sup> We find that an increase in loan demand tends to have a positive impact on bank lending, while both a decrease in the interest rate spread and an increase in the nonperforming loan ratio tend to have a negative impact on bank lending. Further, even after taking into account the effect of these factors on bank lending, a decrease in the interest rate risk has a positive impact on bank lending. Using this

estimation result, Chart 7 shows the contribution of each of the four factors to changes in the amount of bank loans outstanding. The chart indicates that the decrease in interest rate risk related to government bond holdings resulting from the BOJ's purchases of long-term government bonds has made a positive contribution to bank lending.<sup>5</sup> On the other hand, the narrowing of the interest rate spread has continued to work to reduce bank lending.

[Chart 7] Decomposition of the Factors Behind Bank Lending



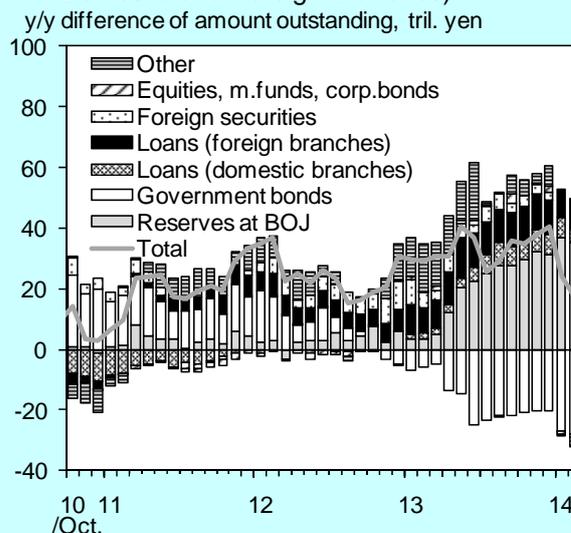
Our analysis so far has been mainly concerned with loans made by domestic branches of domestic banks. When we look at loans made by foreign branches to nonresidents separately from loans made by domestic branches, loans by foreign branches have been increasing at a faster pace than loans by domestic branches (Chart 8(a)). The increase in loans made by foreign branches is not only financed by the local funding of foreign branches (deposits and CDs) but also by loans made by domestic branches to foreign branches (interoffice accounts) (Chart 8(b)). This suggests that the portfolio rebalancing following BOJ government bond purchases may be also contributing to the increase in outward loans, in addition to the increase in domestic loans seen earlier.

### Rebalancing across Maturities

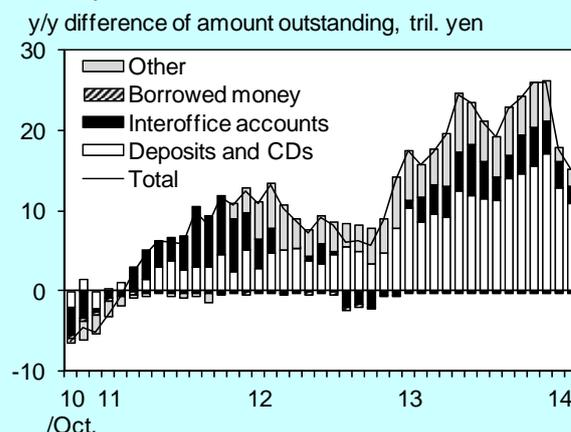
Portfolio rebalancing may also have been taking place across different maturities within the same asset category. The maturity of newly issued corporate

[Chart 8] Change in Assets and Liabilities of City Banks

(a) Change in Assets of City Banks (Total of Domestic and Foreign Branches)



(b) Change in Liabilities of Foreign Branches of City Banks



Notes: Assets of city banks do not include interoffice accounts of domestic branches.

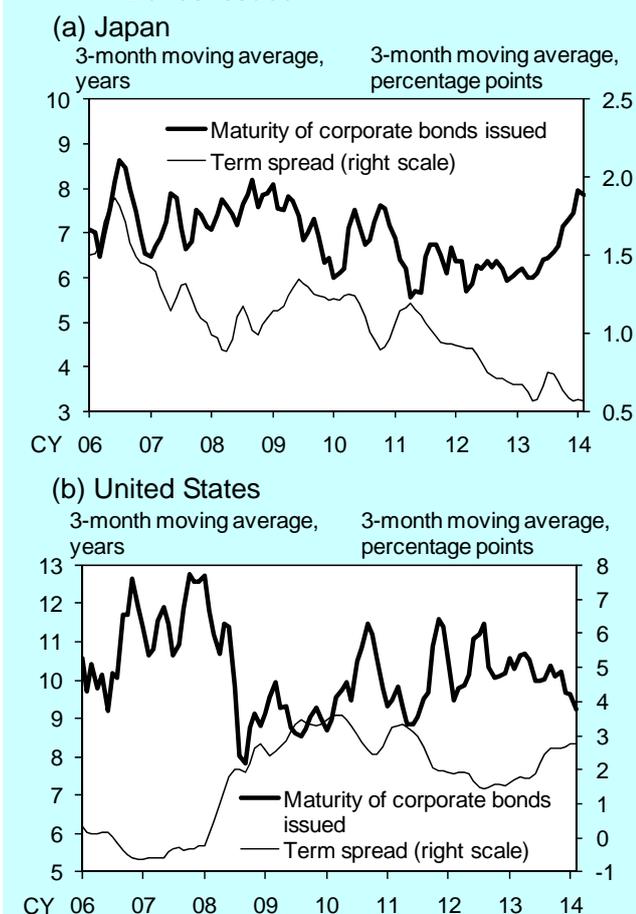
In panel (a), the data for "mutual funds" are calculated by subtracting central government bonds, local government bonds, short-term corporate securities, corporate bonds, stocks, foreign securities, and securities loaned from investment securities. Figures include changes in the amount outstanding due to valuation changes. "Loans (domestic branches)" include loans to financial institutions.

Sources: For "Reserves at BOJ" in panel (a): Bank of Japan, "BOJ Current Account Balances by Sector." All other data are from Bank of Japan, "Financial Institutions Accounts."

bonds tends to increase when the term spread decreases.<sup>6</sup> In Japan, this pattern can be clearly observed in the period since the introduction of QQE, and the same is true for the United States during the periods of increased asset purchases as part of the Federal Reserve's large scale asset purchase programs (Chart 9). It has been also pointed out that the share of fixed-rate mortgages tends to increase relative to that of adjustable-rate mortgages when the term spread decreases.<sup>7</sup>

From the perspective of asset holders or savers,

[Chart 9] Term Spread and Maturity of Corporate Bonds Issued



Notes: "Maturity of corporate bonds issued" is the simple average of the maturities of newly issued bonds within each month. "Term spread" is calculated as the difference between 10-year government bond yields for each country minus the call rate (uncollateralized) for Japan and the FF rate for the United States.

Sources: I-N Information Systems "Funding Eye," Dealogic, Bank of Japan, Bloomberg.

this implies that the maturity of their assets becomes longer; that is, they shift from assets with a short maturity to those with a long maturity; from the perspective of debtors, this indicates that they borrow for longer terms. In general, when borrowing is more long-term, financing is more stable in the sense that a rise in market interest rates will be more slowly reflected in actual interest payments.<sup>8</sup>

## Conclusions

Since the BOJ introduced QQE in April 2013, it has been increasing purchases of government bonds with a longer remaining maturity. In response, mainly domestic banks and the overseas sector have been reducing government bond holdings and increasing loans as well as investment in equities, mutual funds, and corporate bonds.

Our analysis attempted to capture portfolio rebalancing in response to BOJ government bond purchases. Part of the results presented in this article,

however, may also capture portfolio rebalancing arising from other sources. For example, factors such as an increase in inflation expectations, an increase in expectations of a currency depreciation, and an expected increase in stock prices may also lead investors to rebalance their portfolios from government bonds to other assets. These changes in expectations may arise from central bank government bond purchases, but may also arise from other factors such as an increase in the target level of inflation by the central bank.

<sup>1</sup> In this article, unless otherwise stated, we refer to treasury discount bills as short-term government bonds and to bonds issued domestically by the Japanese government excluding treasury discount bills as long-term government bonds.

<sup>2</sup> The Flow of Funds Accounts Statistics do not cover investment by the overseas sector outside Japan.

<sup>3</sup> For details of the analysis, see: Masashi Saito and Yoshihiko Hogen, "Portfolio Rebalancing Following the Bank of Japan's Government Bond Purchases: Empirical Analysis Using Data on Bank Loans and Investment Flows," BOJ Reports & Research Papers, June 2014.

<sup>4</sup> "Major banks" here consist of the following ten banks: five "city banks" as well as Mitsubishi UFJ Trust and Banking Corporation, Mizuho Trust and Banking Company, Sumitomo Mitsui Trust Bank, Shinsei Bank, and Aozora Bank.

<sup>5</sup> The specification here assumes that major banks' interest rate risk has a causal impact on bank lending. Causality, however, may run in the other direction. Refer to the study mentioned in footnote 3 on this point.

<sup>6</sup> See, for example, the following articles: Michael Barclay and Clifford Smith, "The Maturity Structure of Corporate Debt," *Journal of Finance*, 1995; Jose Guedes and Tim Opler, "The Determinants of the Maturity of Corporate Debt Issues," *Journal of Finance*, 1996.

<sup>7</sup> See the following articles on this point: Ralph Koijen, Otto van Hemert, and Stijn van Nieuwerburgh, "Mortgage Timing," *Journal of Financial Economics*, 2009; Emanuel Moench, James Vickery, and Diego Aragon, "Why is the Market Share of Adjustable Rate Mortgages So Low?" Federal Reserve Bank of New York, *Current Issues in Economics and Finance*, December 2010.

<sup>8</sup> See the following remarks, which mention this point: Jeremy Stein, "Evaluating Large-Scale Asset Purchases," Remarks at the Brookings Institution, October 11, 2012.

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