



The Japanese Yen Interest Rate Swap Market in the Time of COVID-19¹

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Abstract

Interest rate swaps (IRS) are a type of derivatives transactions used for a wide range of purposes such as hedges against interest rate risks and alternative investment vehicles to bonds. Given its close link with other interest rate markets such as bond markets, the IRS market is important in the context of the financial market monitoring. During the market turmoil triggered by the COVID-19 pandemic in March 2020, there were distinctive developments in the Japanese yen (JPY) IRS market including large fluctuations in swap rates. To ascertain the detailed structure of the market during the turmoil, this study aggregates and analyzes the granular data of JPY IRS transactions. This paper describes developments in the JPY IRS market in the time of COVID-19 and data cleansing procedures.

Keywords

Interest rate swap; Granular data; Market liquidity; COVID-19

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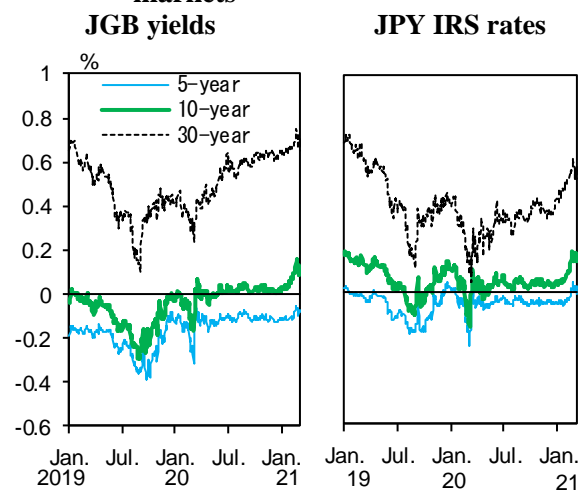
1. Introduction

Interest rate swaps (IRS) are a type of over-the-counter (OTC) derivatives transactions that exchange different interest payments over a period of time. By turnover (notional amounts), their share is the highest among OTC derivatives transactions (at 60 percent as of end-June 2020)². IRS are used for a wider range of purposes such as hedges against interest rate risks, alternative investment vehicles to bonds. Given the nature of the transactions that are often carried out together with transactions in other markets, including the government bond market, IRS markets have close link with other financial markets and are crucial in the context of the financial market monitoring.

In March 2020, international financial markets were destabilized significantly, as COVID-19 spread. Yields on Japanese government bonds (JGBs) and swap rates on the Japanese yen (JPY) IRS also fluctuated considerably (Figure 1). It has been pointed out that the turmoil in the JGB market had been attributable to the distinctive behaviour of some market participants, and there is a possibility that similar developments had also taken place in the JPY IRS market. However, grasping detailed information for the JPY IRS market is not very easy as available statistics are limited.

Under such circumstances, this paper uses data that record detailed information on each OTC derivatives transaction (hereafter the granular data) to observe transactions by type of market participants, which could not be grasped using the existing statistics, and tries to get the picture about the actual conditions in the JPY IRS market during the COVID-19 pandemic. Although similar initiatives have been taken across countries and regions (e.g. HKMA, 2015; Abad et al., 2016; Boneva et al., 2019), there are not yet analyses that unveil effects of the pandemic on the IRS market. This paper pays particular attention to and outlines transactions by type of market participants during the COVID-19 pandemic. It also describes efforts in data processing when grasping certain developments in the market from the granular data.

Figure 1: Developments in Japan's financial markets



Note: Swap rates vs 6M LIBOR are shown.

Source: Bloomberg.

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² BIS OTC derivatives statistics.

2. Methodology

2-1. Data

The granular data used in the analysis for this paper include detailed information of each IRS transaction such as the volume (notional amount), entity names of the counterparties, types of the reference rates, and residual maturity. Based on the lessons learned from the Global Financial Crisis, the collection of such data was decided at the G20 Pittsburgh Summit as part of the efforts to improve transparency of the OTC derivatives market. In Japan, the Financial Services Agency (JFSA) has been collecting the reports from financial institutions since 2013. Although transactions are only reported from Japanese financial institutions or foreign financial institutions based in Japan, it is possible to guess the behavior of foreign investors by analyzing transactions conducted between Japanese and foreign entities. In this paper, changes in the market structure over time are grasped by aggregating the monthly turnover by type of market participants and by the payer/receiver of fixed rates, after the pre-processing of data described in Section 2-2.

2-2. Pre-processing of data

2-2-1. Aggregation of entity names

To analyze the data accurately, it was necessary to eliminate the variation in notations of entity names. In the data, the entity name of a counterparty can be written in several ways using natural languages and specific identification codes. For example, the same "AA bank" can be registered as "AA Bank," "AA BK," or in its Business Identifier Code (BIC) or Legal Entity Identifier (LEI), depending on who reports the transactions. To unify the variants, the codes were substituted with their corresponding entity names in natural languages, then converted to numerical vectors, and aggregated using a clustering algorithm based on the cosine similarity.

2-2-2. Elimination of double-counted transactions

It was necessary to eliminate the double-counting brought about by the transactions between Japanese financial institutions or foreign financial institutions based in Japan being reported from both counterparties.

3. Results

3-1. Market structure before the COVID-19 pandemic

This section outlines the characteristics of the JPY IRS market such as turnovers and transactions by type of market participants before the COVID-19 pandemic, or up to end-2019, as benchmarks for the characteristics of the market in the time of COVID-19.

3-1-1. Turnover

Figure 2 shows that the monthly turnover in new JPY IRS transactions conducted by entities in Japan have been about 50-100 trillion yen. The number of transactions has been about 5,000 to 10,000. The volume of transactions conducted by foreign banks and securities companies (hereafter the "FBSs"), Japanese securities companies (hereafter the "JSs"), and Japanese major banks (hereafter the "JMBs") had constituted most of the turnovers. As market makers, these entities conduct receiver transactions with their clients — they receive fixed rates from and pay floating rates to their clients — to satisfy their clients' hedging needs against interest rate risks and carry out the opposite contracts with other entities to offset the risks they take from their clients. This leads to a massive amount of transactions and is reflected in their large market shares.

3-1-2. Net position

To overview the transaction relationships between participants in IRS markets, it is beneficial to place a focus on the subtraction of the volume of new payer transactions from that of new receiver ones, or the *net position*, of each entity or type of market participants. In general, one gains/loses from its receiver contracts when the interest rate goes down/up, and vice versa for payer contracts. Therefore, one's net position is likely to reflect its view on interest rate paths or its incentive regarding which of risks against the rise or fall of interest rates it aims to hedge. Using the granular data, it is possible to determine the entities on both of payer and receiver side in each IRS transaction and analyze the net positions.

According to the net positions based on the data up to end-2019 (Figure 3), non-financial corporations (hereafter the "NFCs") were the largest net payers and the FBSs were the largest net receivers. Looking at the net positions between different counterparties, it is possible to

say that the JMBs mainly take the NFCs' risks against the rise in interest rates by being the receivers, which are subsequently transferred to the FBSs either directly or via the JSs.

Moreover, positions taken by the FBSs as market makers are considered to be further transferred to other foreign investors via transactions among nonresidents that cannot be grasped by the data used in this analysis.

Figure 2: Characteristics of JPY IRS market

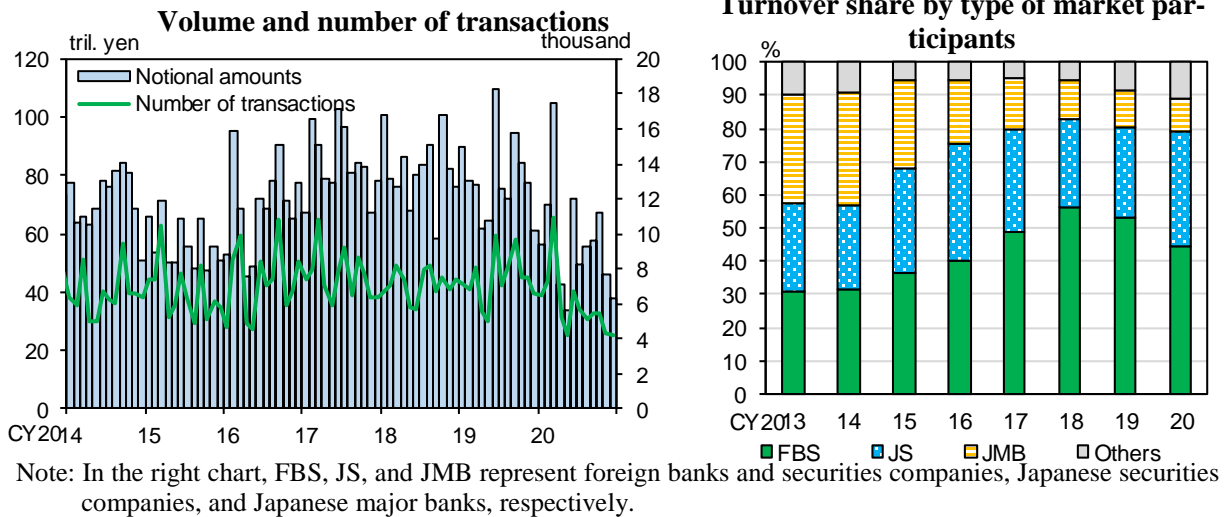
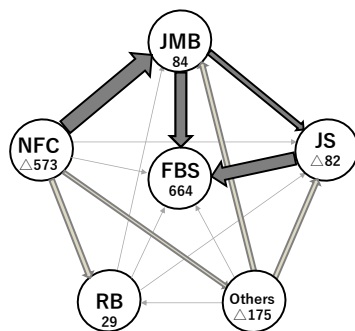


Figure 3: Network of net positions between types of market participants

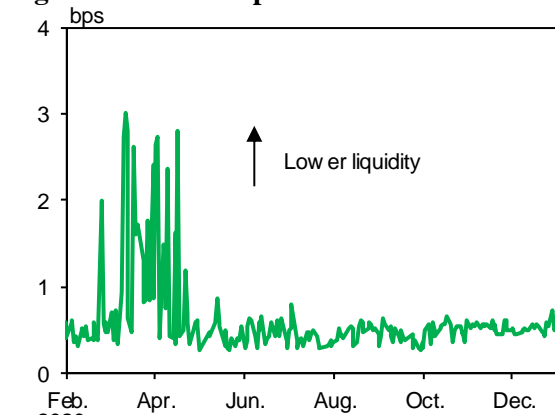


Note: Figures represent monthly averages of net positions from April 2013 to December 2019 (billion yen). Arrows indicate the direction of transfers of risks against the rise in interest rates (from net payers to net receivers). NFC and RB represent non-financial corporations and regional banks, respectively. The same rules as Figure 2 are applied to the three other abbreviations.

3-2. Market developments in the time of COVID-19

In March 2020, international financial markets were destabilized due to the impact of COVID-19 pandemic. The market liquidity and functioning of Japan's JPY IRS market was deteriorated as seen in the large swing in swap rates similarly to long-term Japanese government bond (JGB) yields (Figure 1) and widened bid-ask spread in the same period (Figure 4). In a global survey, it is reported that the one-sided transaction needs to close receiver positions in the whole market and the heightened volatility in this period had led to the lowering of the market liquidity.

Figure 4: Bid-ask spread on JPY IRS



Source: Bloomberg.

From the actual net positions of each type of market participants in March 2020 calculated using the granular data, it is indicated that FBSs were net payers in the month, which is totally different from the average market structure up to end-2019 outlined in the previous section (Figure 5). The net positions of FBSs different from normal states seem to have reflected the rapid unwinding of IRS positions by foreign investors behind FBSs motivated by their needs to reduce their interest rate risks on their portfolios due to the reduction in their risk tolerance and the increase in the amount of redemptions of their investment trusts. Meanwhile, JMBs increased re-

ceiver positions and seem to have taken on the interest rate risks that were transferred from FBSs.

It is pointed out that foreign investors also unwound their positions abruptly and Japanese banks and institutional investors bought on reaction in the cash JGB and JGB futures market. The developments in Japan's JPY IRS market could be understood as consistent with developments in other interest-related transactions.

The turnover in April and May 2020 decreased to a level around 60 % of that in the previous year, flipping the rapid increase in March (Figure 6). Several factors are pointed out to have lain in the background such as limits in transaction operations caused by the increase in work-from-home cases under the state of emergency and reduced trading capacities of some market participants due to the increase in required margins at the clearing house in response to heightened volatility in March. During this period, the bid-ask spread continued to be widened and the market liquidity seemed to have remained low (Figure 4).

On the other hand, from the net positions of each type of market participants calculated using the granular data, it is indicated that FBSs turned to net receivers and hence the unwinding of positions by foreign investors had stopped (Figure 5). The net positions have been coming closer to their average levels before the pandemic and the bid-ask spread has been narrowing since June, suggesting that conditions surrounding Japan's JPY IRS market have been improving in line with the recovery in the functioning of international financial markets (Figure 4,5).

Figure 5: Changes in net positions by type of market participants

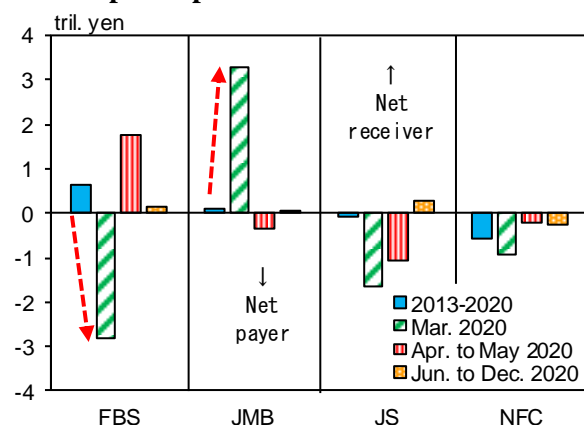
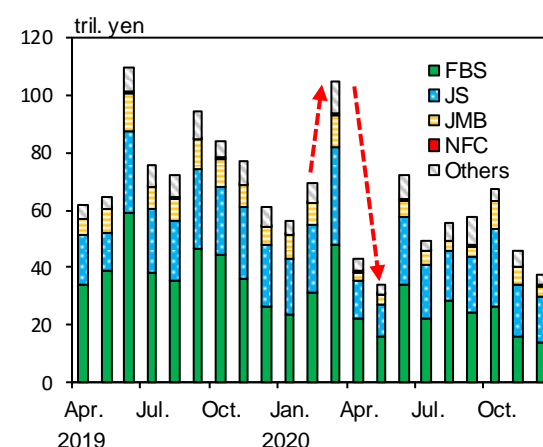


Figure 6: Developments in turnovers



Note: The rules for abbreviation applied in Figure 5 and 6 are the same as Figure 2 and 3.

4. Discussion and Conclusion

This paper outlined developments in the JPY IRS market which was destabilized in the time of COVID-19 since March 2020, using the granular data on transactions. There remains much more information that could be obtained from the granular data such as types of the reference rates and whether the transactions were centrally cleared. It would be important to continue utilizing the granular data to grasp detailed developments in the market with a view to monitoring the market functioning and liquidity more effectively.

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