

Liquidity Indicators in the JGB Markets*

Indicators in the JGB Futures Market

Chart 1: Transaction Volume and Trade Size

Chart 2: Bid-ask Spreads

Chart 3: Volume of Limit Orders at the Best-ask Price (Market Depth)

Chart 4: Price Impact

Indicators in the JGB Cash Market

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Chart 9: Best-worst Quote Spreads by Residual Maturity

Indicators in the SC Repo Market

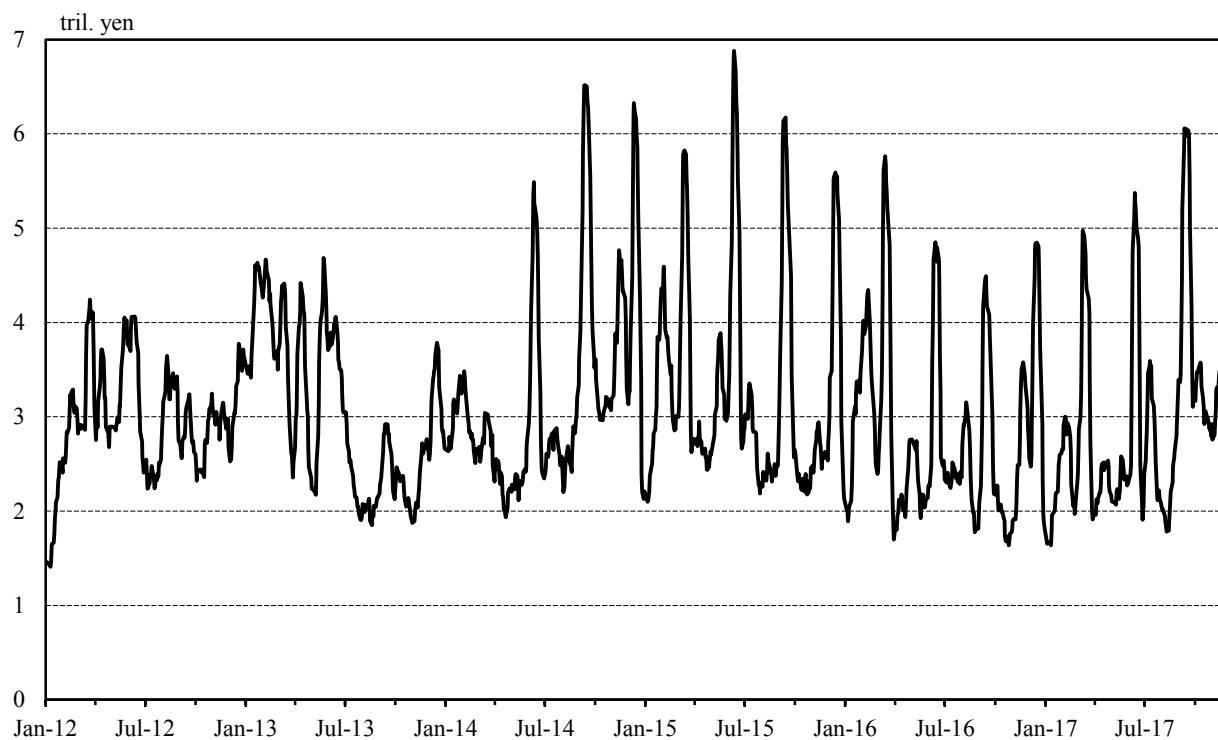
Chart 10: GC-SC Repo Rate Spreads

Chart 11: SC Repo Rates

* As for the definition of each indicator, refer to Kurosaki, Kumano, Okabe, and Nagano [2015] "Liquidity in JGB Markets: An Evaluation from Transaction Data," *Bank of Japan Working Paper Series*, No.15-E-2, May 2015.

Indicators in the JGB Futures Market: Transaction Volume and Trade Size

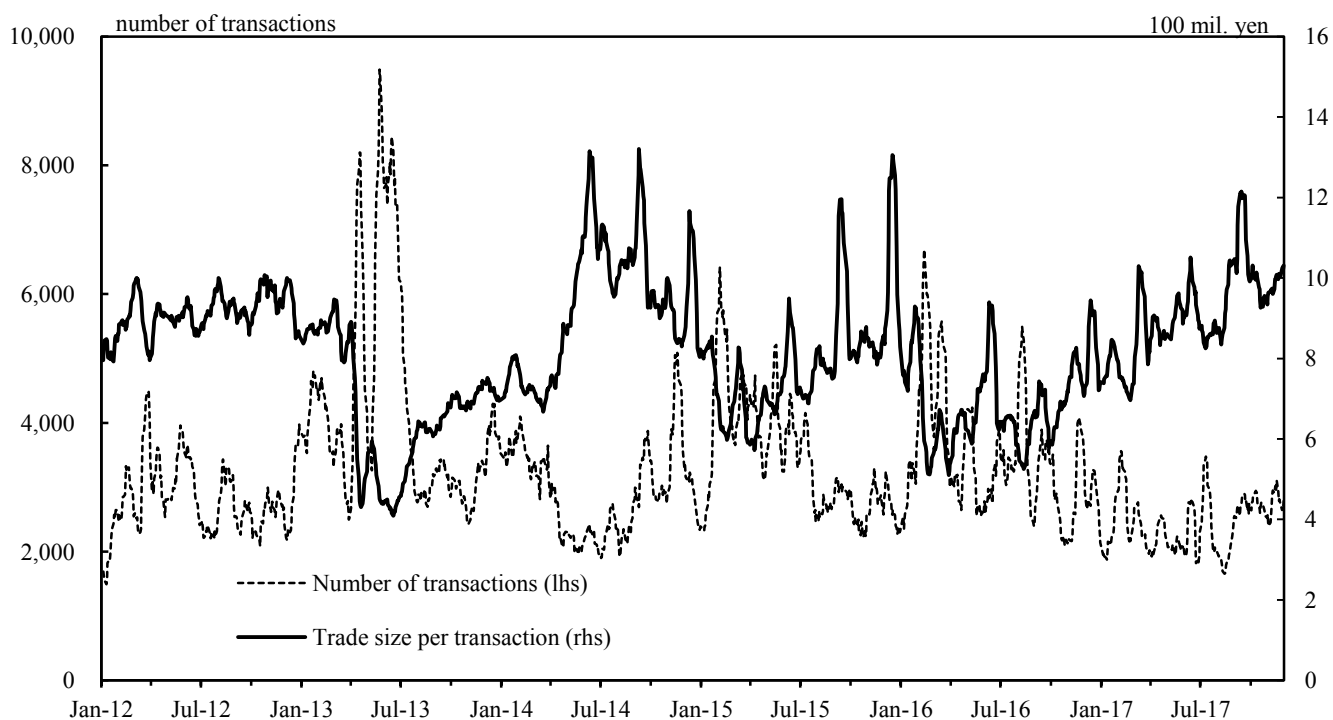
(1) Transaction Volume of JGB Futures



Note: 10-day backward moving average. Latest data as at end-November 2017.

Sources: QUICK; Osaka Exchange, Inc.

(2) Number of Transactions and Trade Size per Transaction

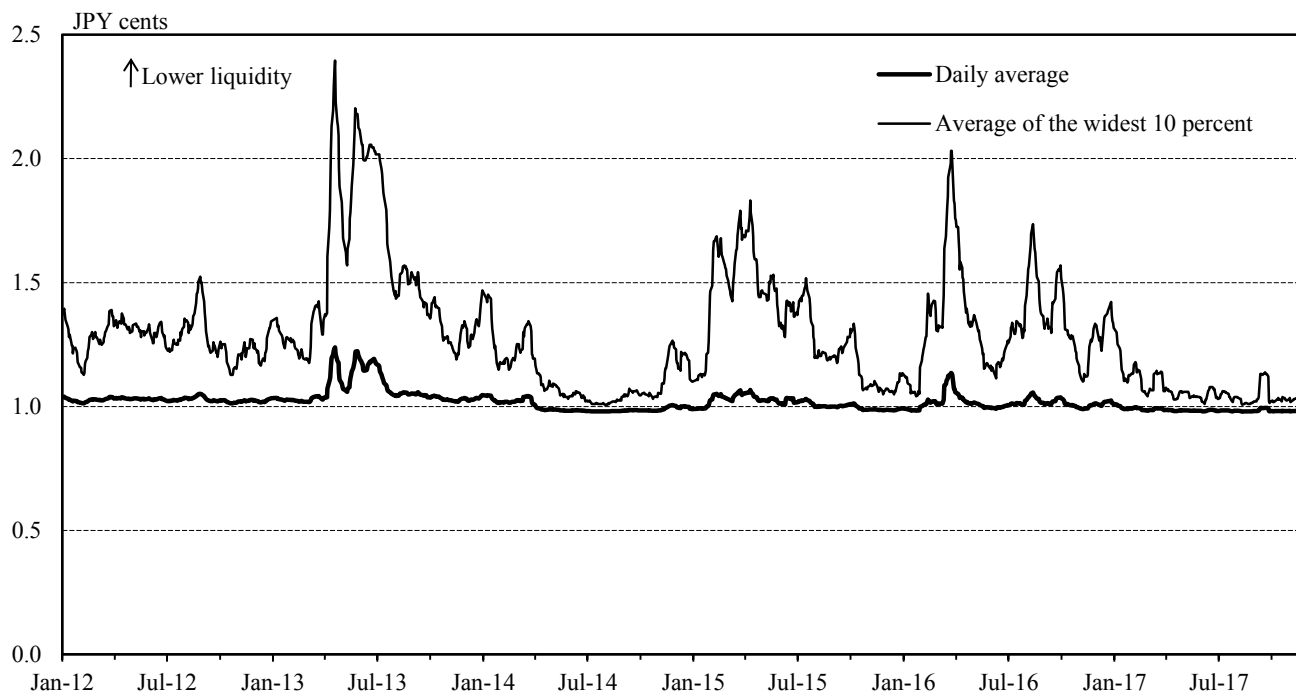


Note: 10-day backward moving average. Latest data as at end-November 2017.

Source: Nikkei Inc., "NEEDS."

Indicators in the JGB Futures Market: Bid-ask Spreads

(1) Bid-ask Spreads (Daily Average and Average of the Widest 10 percent)



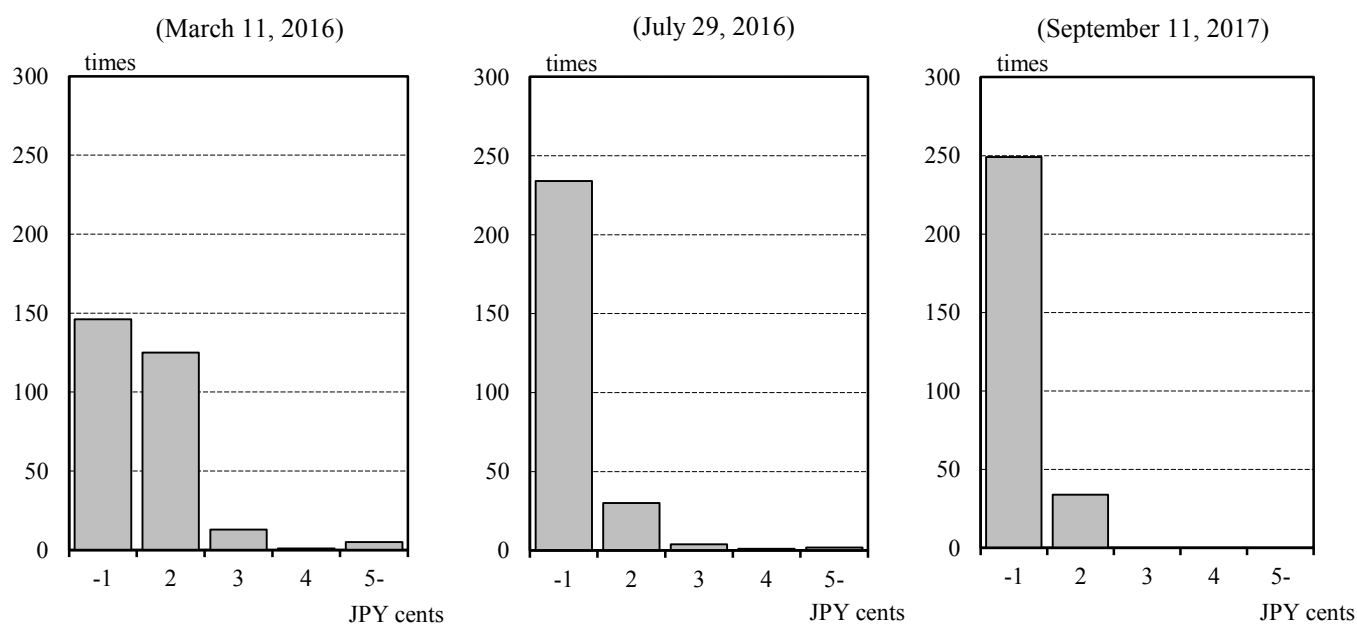
Notes: 1. Latest data as at end-November 2017.

2. "Daily average" is the average of the bid-ask spread data with a 1-minute frequency within each business day.

"Average of the widest 10 percent" is the average of the widest 10 percent of that data.

A 10-day backward moving average is then applied to both time-series.

(2) Histogram of the Bid-ask Spreads



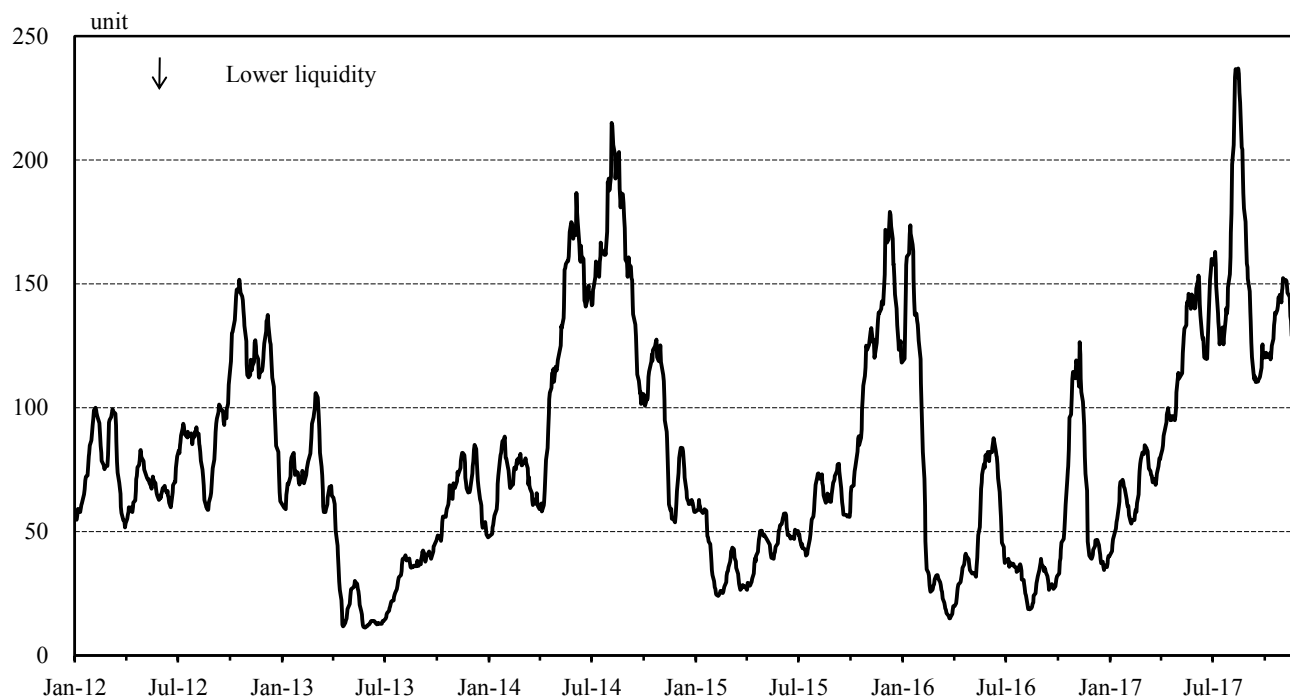
Notes: 1. Figures are calculated by summing up the appearance frequency of the bid-ask spread with a 1-minute frequency within each business day.

2. Figures indicate, from left to right, the day on which "average of the widest 10 percent" is the largest during FY 2015, FY 2016 and FY 2017, respectively.

Source: Nikkei Inc., "NEEDS."

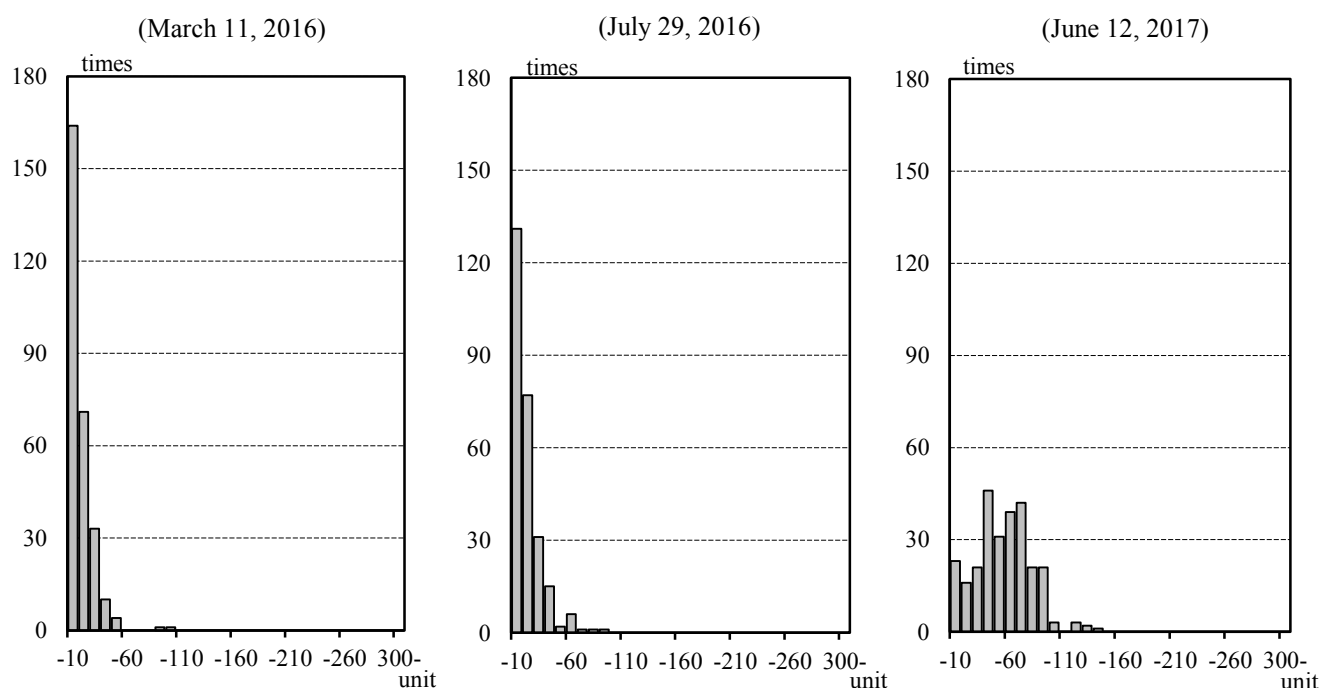
Indicators in the JGB Futures Market: Volume of Limit Orders at the Best-ask Price (Market Depth)

(1) Volume of Limit Orders at the Best-ask Price (Daily Median)



Note: Figures are calculated by taking the median of the volume of limit orders at the best-ask price with a 1-minute frequency within each business day, and then applying a 10-day backward moving average. Latest data as at end-November 2017.

(2) Histogram of Volume of Limit Orders at the Best-ask Price

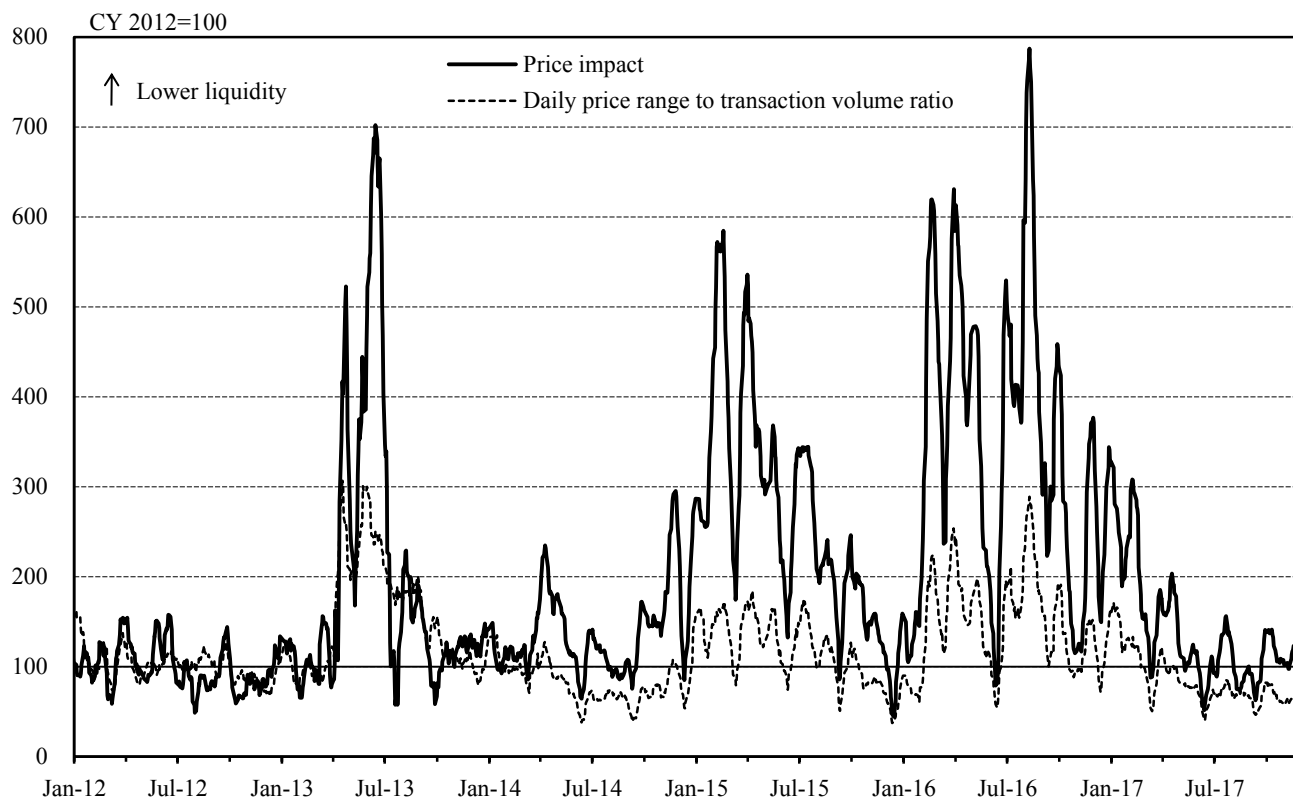


Note: 1. Figures are calculated by summing up the appearance frequency of the volume of limit orders at the best-ask price with a 1-minute frequency within each business day.

2. Figures indicate, from left to right, the day on which the median of the volume of limit orders at the best-ask price is the lowest during FY 2015, FY 2016 and FY 2017, respectively.

Source: Nikkei Inc., "NEEDS."

Indicators in the JGB Futures Market: Price Impact

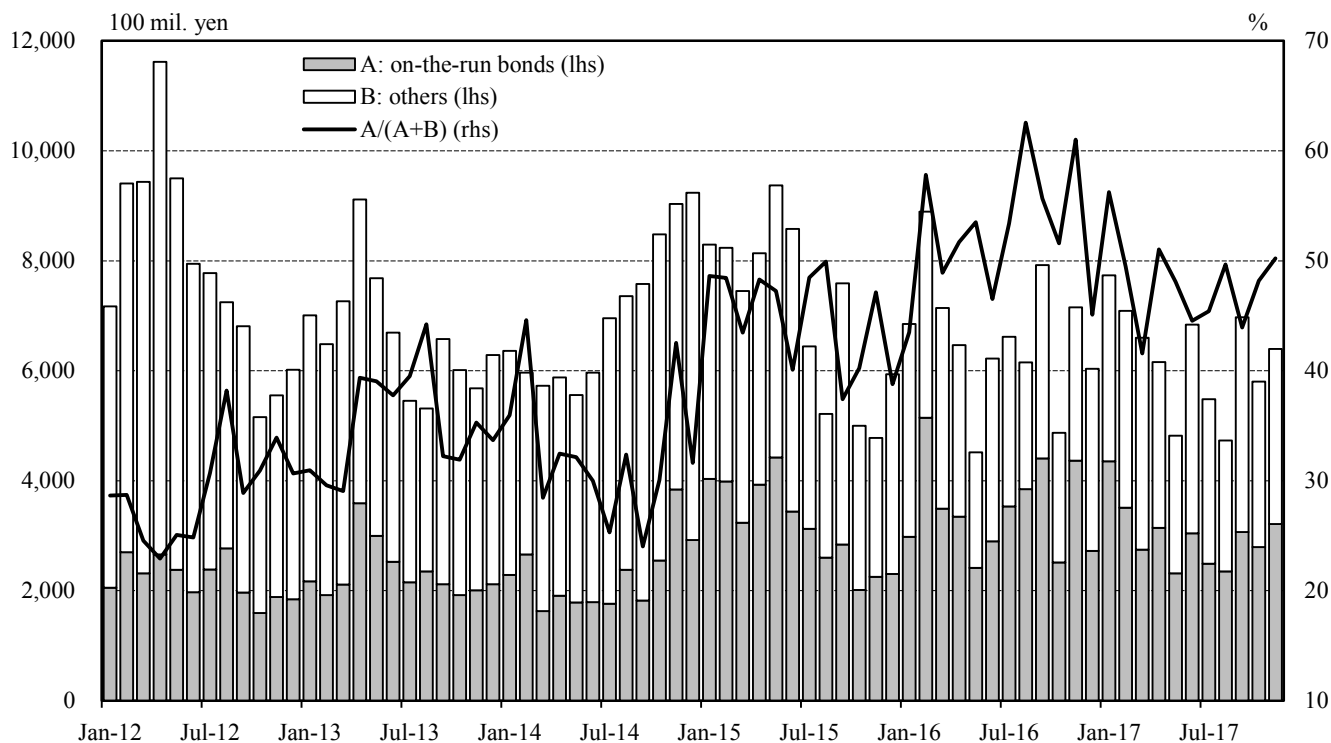


Note: "Price impact" is calculated by taking the average of each business day. A 10-day backward moving average is then applied to both time-series. Latest data as at end-November 2017.

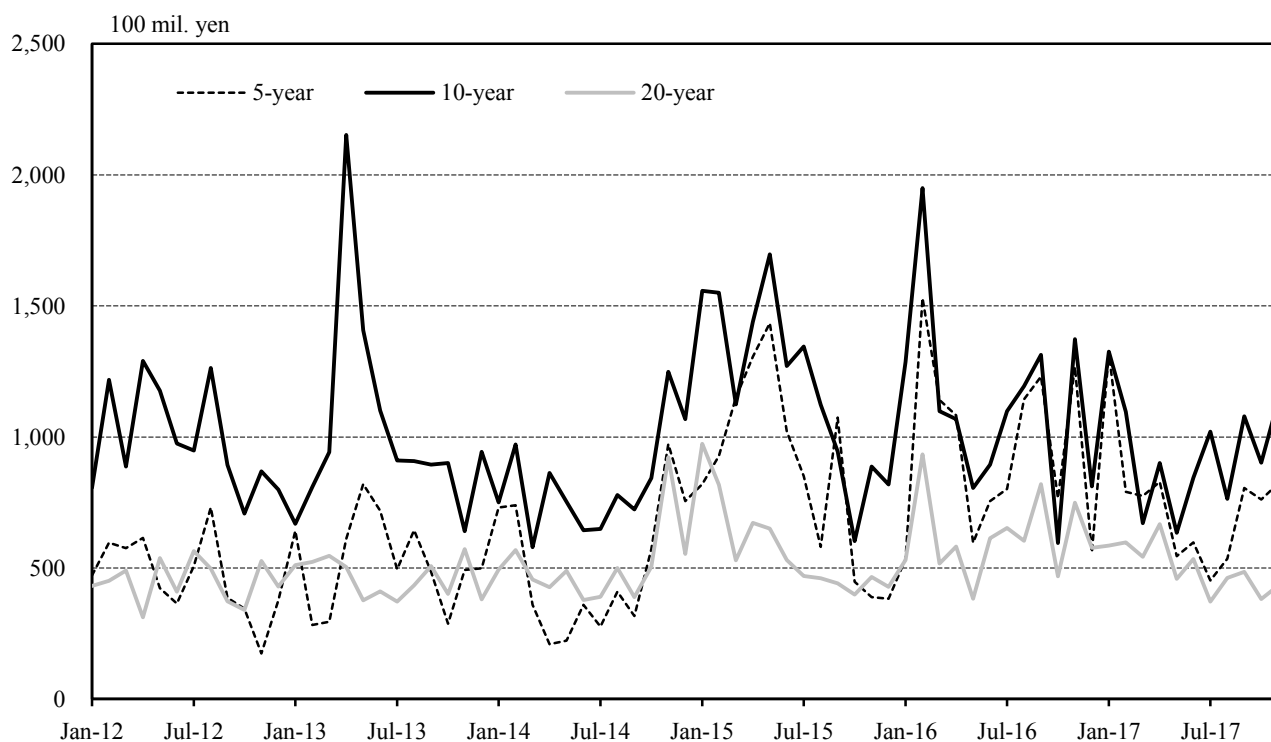
Sources: Nikkei Inc., "NEEDS."; QUICK; Osaka Exchange, Inc.

Indicators in the JGB Cash Market: Inter-dealer Transaction Volume

(1) Inter-dealer Daily Transaction Volume (via Japan Bond Trading)



(2) Inter-dealer Daily Transaction Volume of On-the-run Bonds (via Japan Bond Trading)



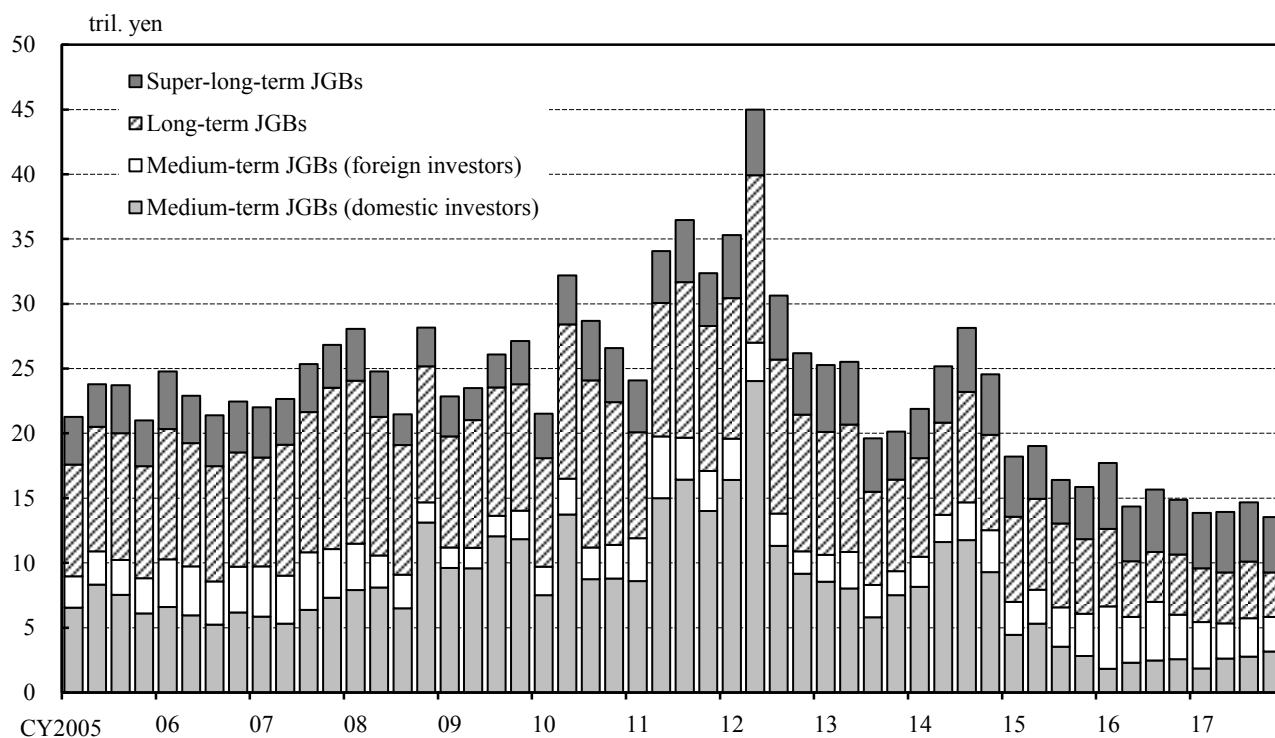
Notes: 1. Latest data as at November 2017.

2. Daily transaction volume of 2-year, 5-year, 10-year, 20-year, 30-year, and 40-year JGBs via Japan Bond Trading.

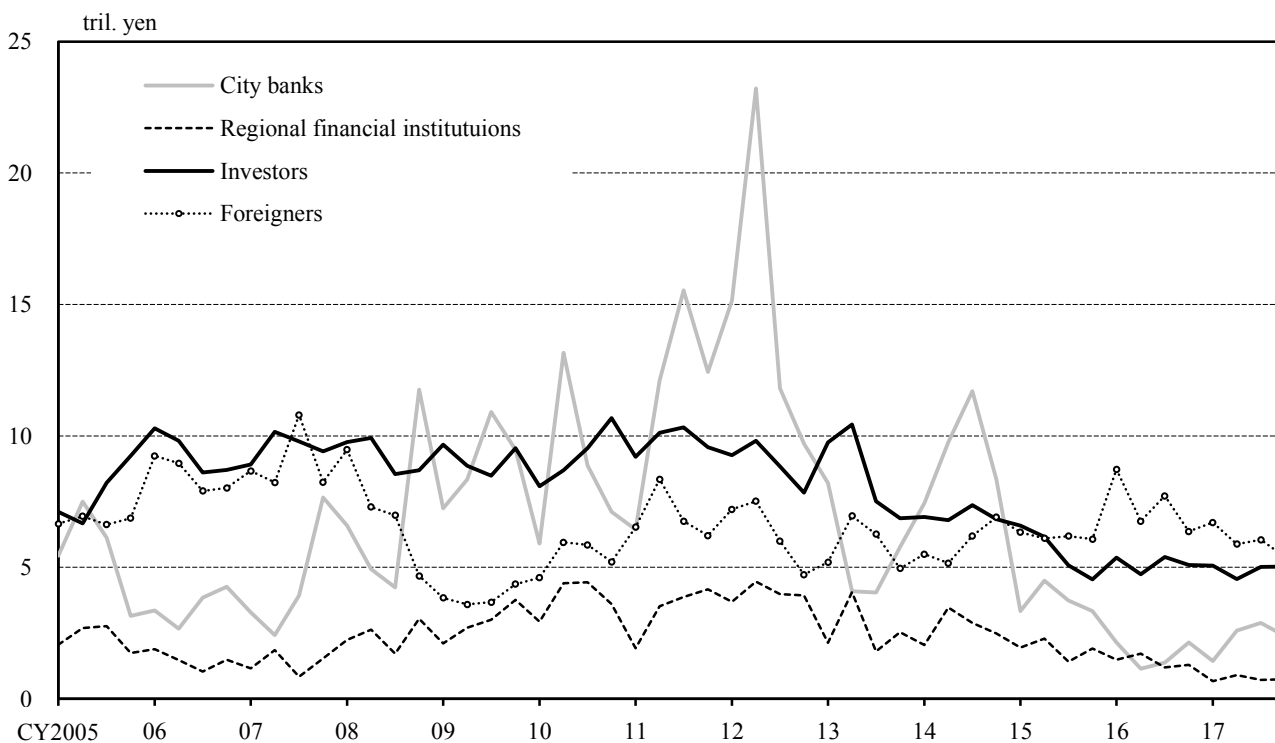
Source: QUICK.

Indicators in the JGB Cash Market: Dealer-to-client Transaction Volume

(1) Dealer-to-client Monthly Transaction Volume (Gross Amount Purchased by Clients)



(2) Breakdown of Dealer-to-client Monthly Transaction Volume (Gross Amount Purchased by Clients)



Notes: 1. Latest data as at October-November 2017.

2. Treasury Discount Bills, etc. are excluded from the transaction volume.

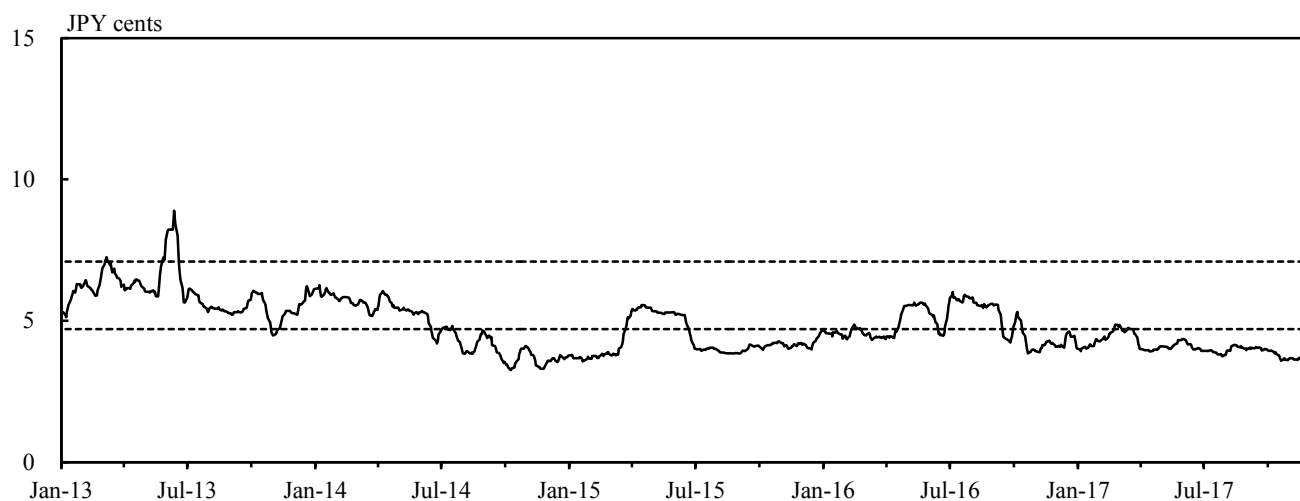
3. "Clients" include "city banks," "regional financial institutions," "investors," and "foreigners." Other institutions (government, Bank of Japan, Japan Post Bank, Japan Post Insurance, business corporations, other financial institutions etc.) are excluded from "clients."

4. "Investors" are insurance companies, trust banks, agricultural, forestry and fishery financial institutions, investment trusts, and national and local public officers mutual aid associations.

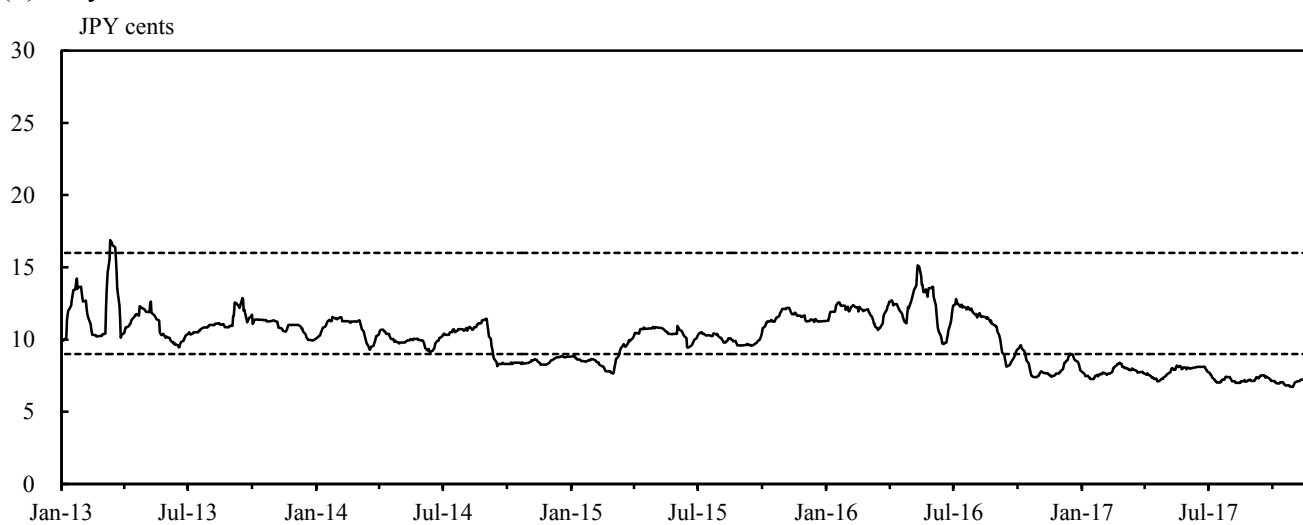
Source: Japan Securities Dealers Association.

Indicators in the JGB Cash Market: Bid-ask Spreads in the Dealer-to-client Market

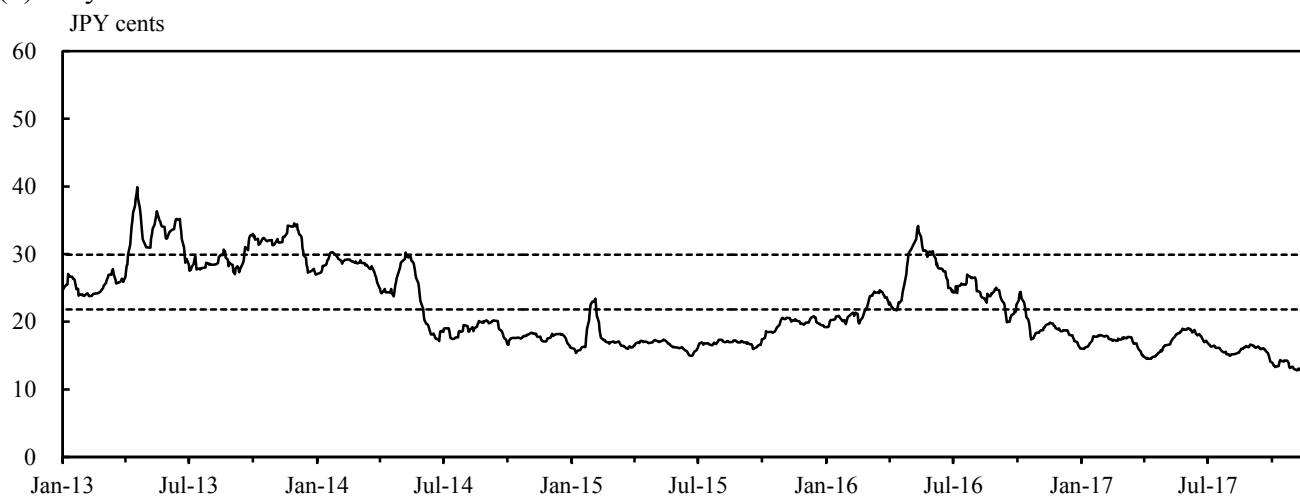
(1) 5-year JGBs



(2) 10-year JGBs



(3) 20-year JGBs



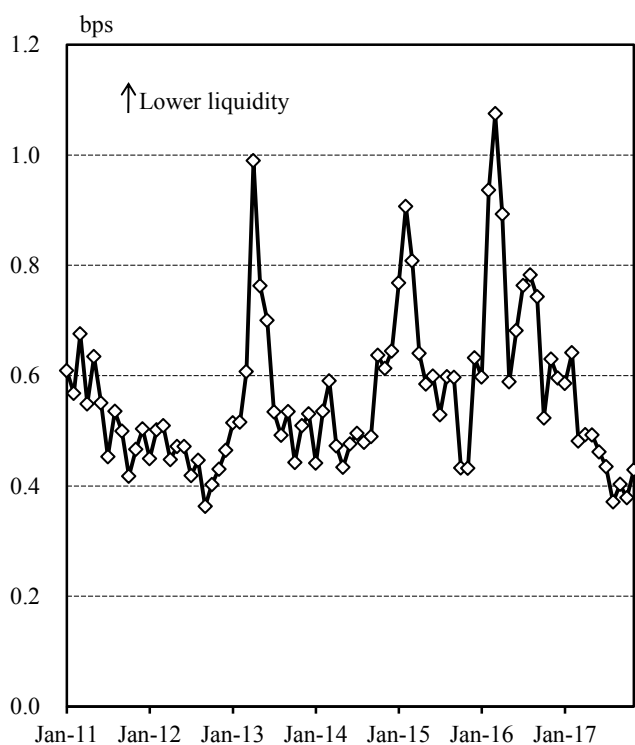
Notes: 1. Solid lines indicate 10-day backward moving average of the quotations through Trade web as of 3:00 p.m. Latest data as at end-November 2017.

2. Dotted lines indicate the first/third quartile spreads between January 2010 and March 2013.

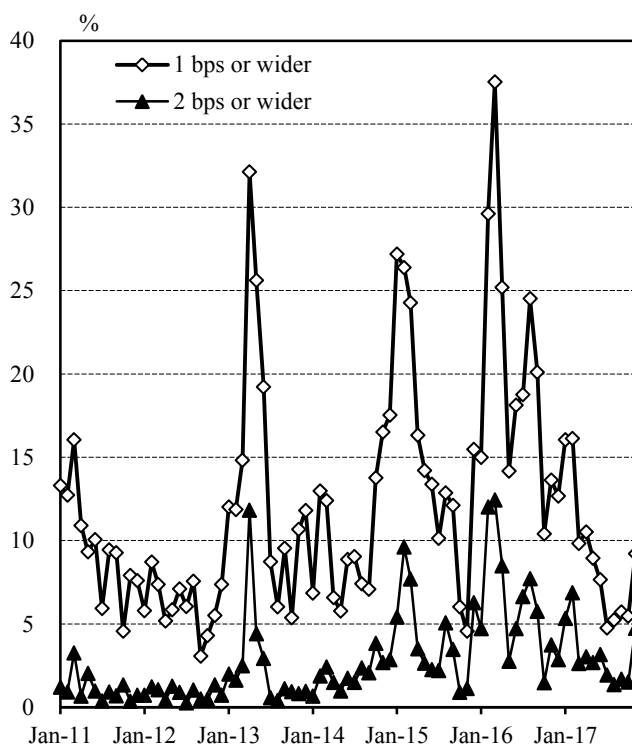
Source: Thomson Reuters.

Indicators in the JGB Cash Market: Best-worst Quote Spreads

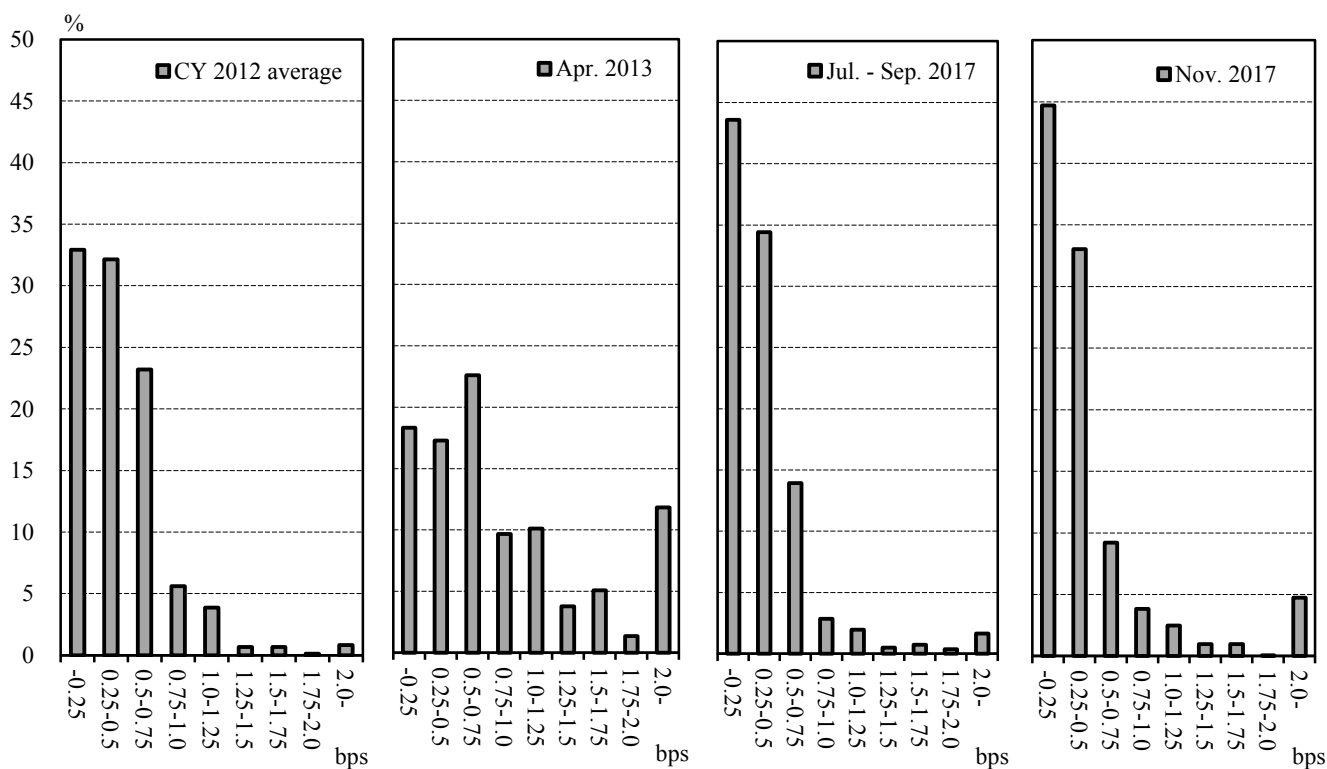
(1) Best-worst Quote Spreads (Average)



(2) Probability that the Best-worst Quote Spread is 1 bps (2 bps) or wider



(3) Histogram of Best-worst Quote Spreads



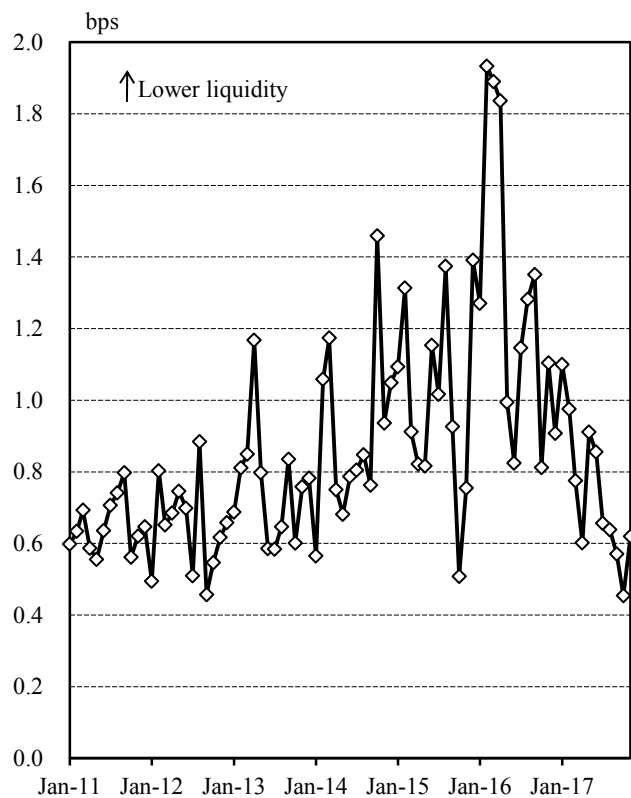
Notes: 1. A portion of transactions with the spread wider than 10 bps is excluded from the calculation.

2. As for figures (1) and (2), latest data as at November 2017.

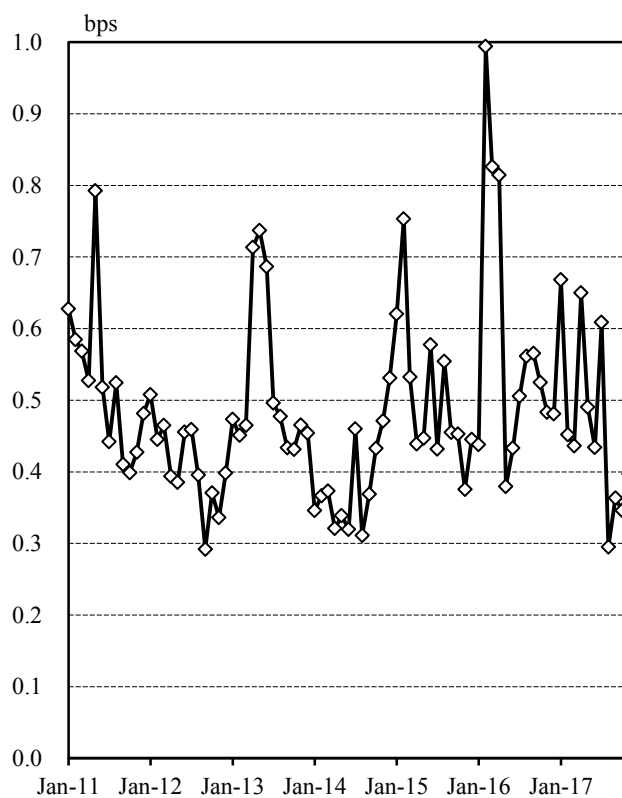
Source: Yensai.com.

Best-worst Quote Spreads (by Residual Maturity)

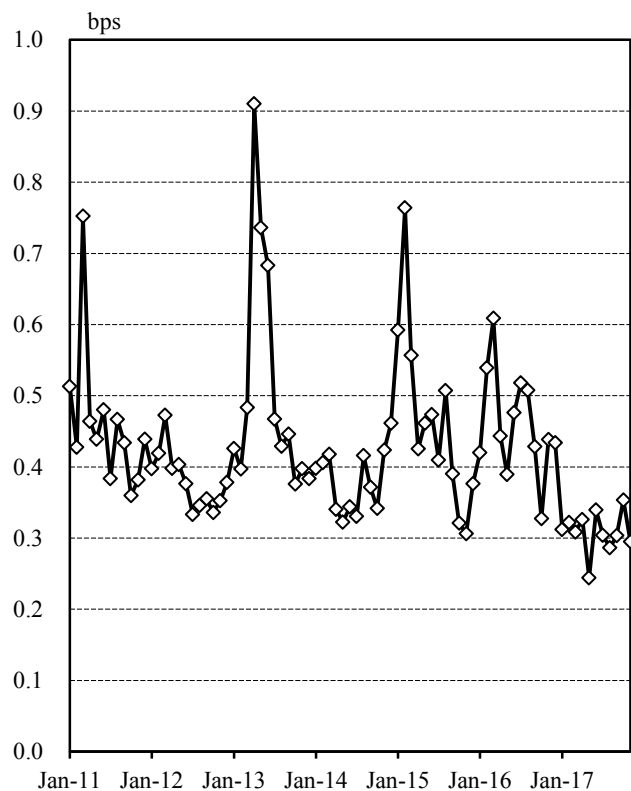
(1) Short-term (2 years or less)



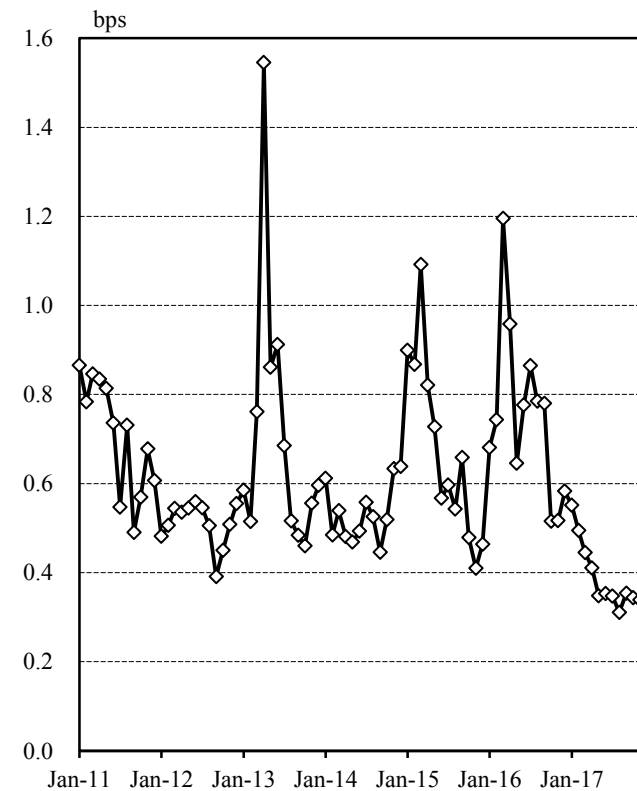
(2) Medium-term (2-5 years)



(3) Long-term (5-10 years)



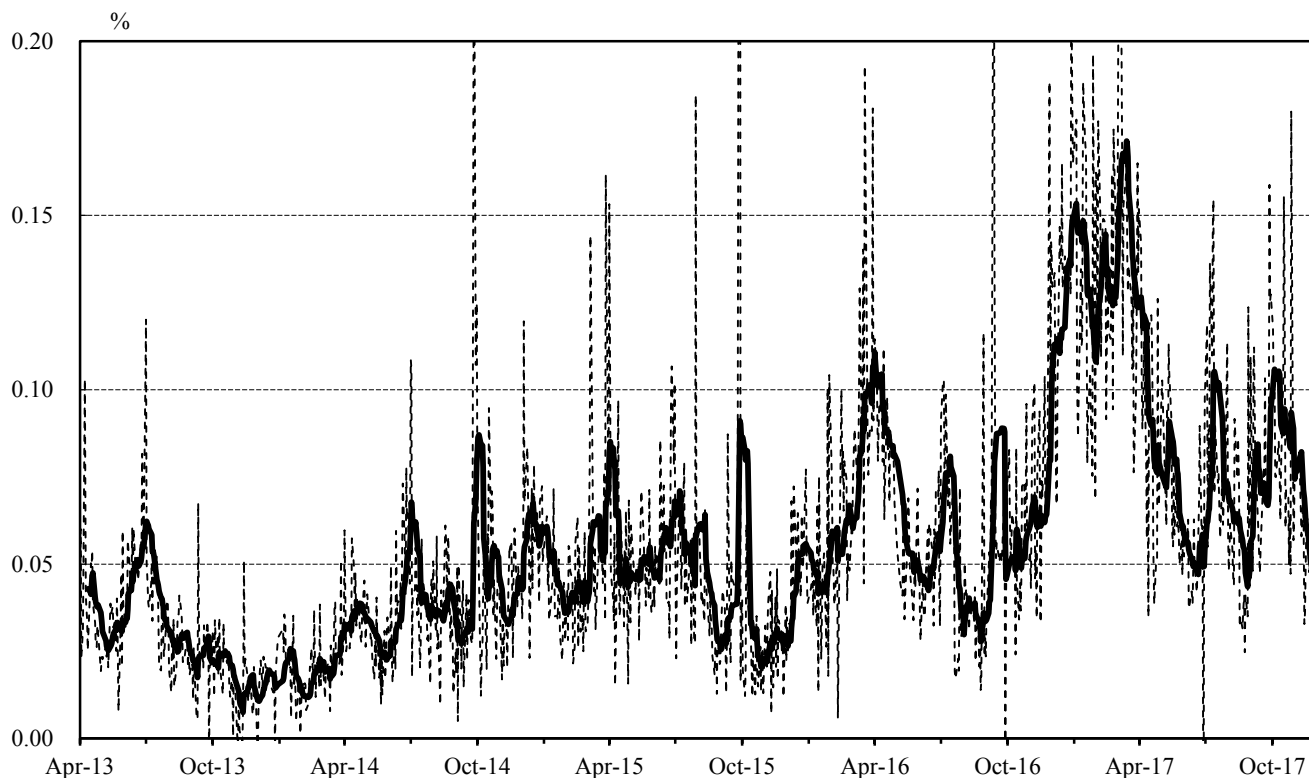
(4) Super-long-term (over 10 years)



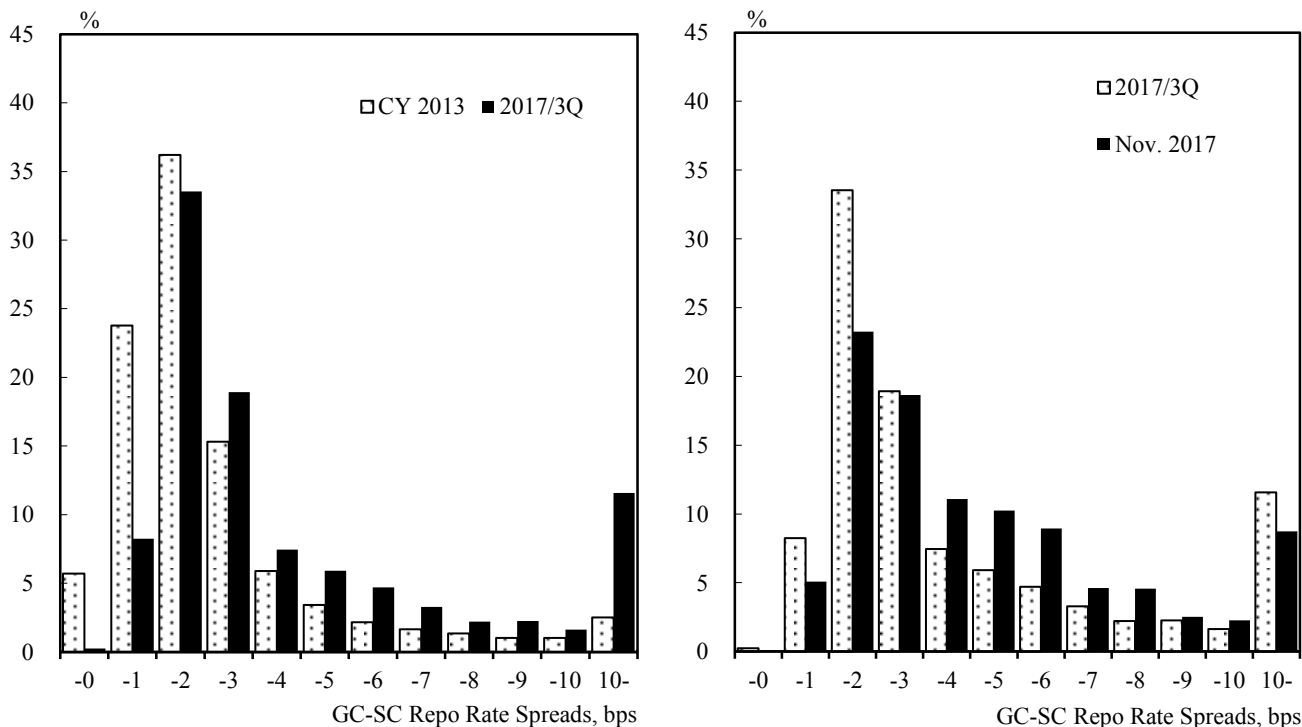
Note: A portion of transactions with the spread wider than 10 bps is excluded from the calculation. Latest data as at November 2017.
Source: Yensai.com.

GC-SC Repo Rate Spreads

(1) Volume Weighted Average Rate of All the Traded Issues



(2) Histogram

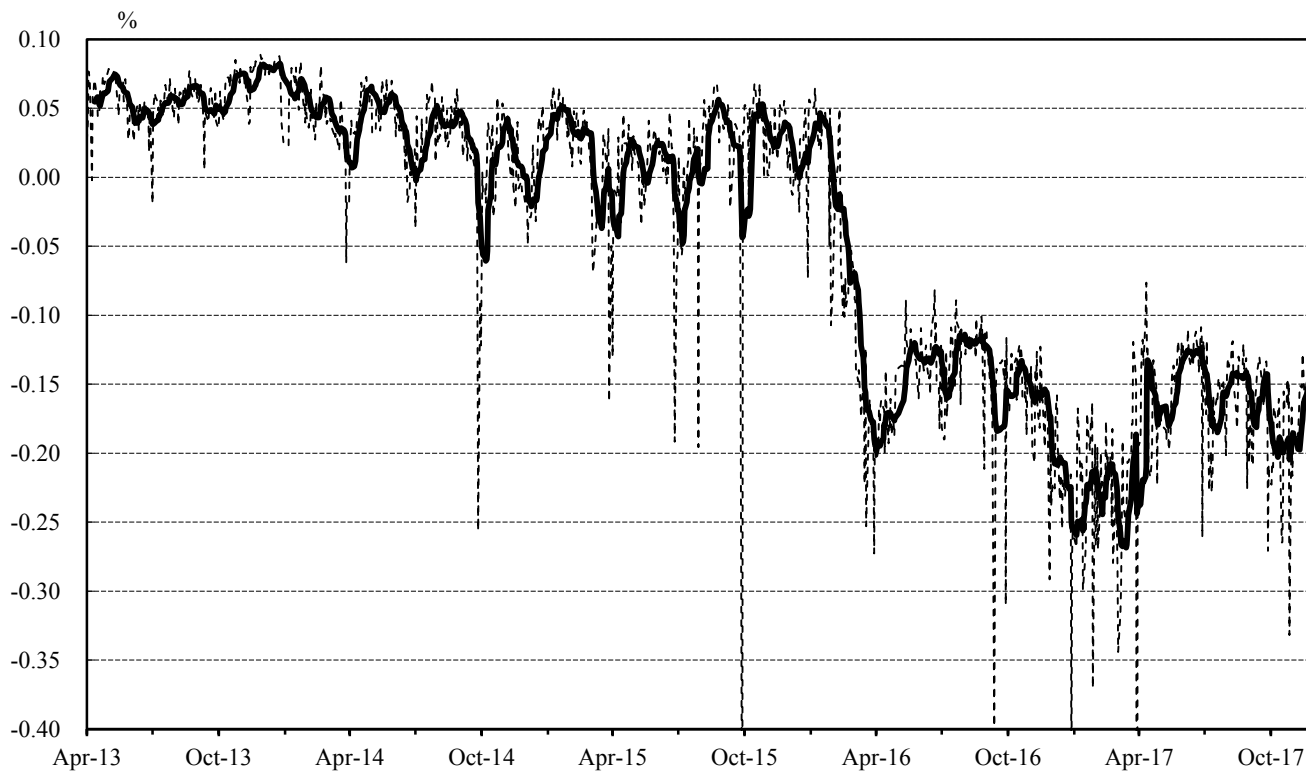


Notes: 1. As for figure (1), latest data as at end-November 2017. The bold line indicates 10-day backward moving average.

2. CY 2013 in figure (2) is the average of April to December 2013.

Sources: Japan Securities Dealers Association; JBond Totan Securities.

SC Repo Rates



Note: Figures indicate the volume weighted average rate of all the traded issues. Latest data as at end-November 2017. The bold line indicates 10-day backward moving average.

Source: JBond Totan Securities.