PREFENCES OBSERVED IN JAPANEASE GOVERNMENT BONDS FOR INDIVIDUAL INVESTORS (RETAIL JGBS)

～FROM UNPRECEDENTED MONETARY EASING TO NORMALIZATION～

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Abstract

This study comprehensively examines, the extent to which individual investors' preferences for JGBs can be reasonably explained by the BOJ's monetary policy—from unconventional easing to normalization—and the resulting trends in JGB yields, based on data from January 2014 to December 2025. First, the result of the empirical analysis indicates that the proposed multiple regression model can accurately capture actual preferences for retail JGBs to a certain degree. Second, the analysis of how product characteristics influence preferences, comparing preferences for retail JGBs and new OTC JGBs revealed the impact of principal guarantee (a characteristic of retail JGBs). Third, the analysis of the preference bias observed among individual investors for Floating 10 revealed that during phases where the BOJ's monetary policy is "moving toward normalization," individual investors' preference for Floating 10 cannot be considered rational according to finance theory.

Keywords: Preferences, BOJ's monetary policy, retail JGBs, new OTC JGBs, Behavioral bias

1. Introduction

Japanese Government bonds (JGBs) represent one of the world's largest sovereign bond markets and have long maintained their status as a safe-haven asset for domestic and international investors. Understanding this preference hinges on four key factors: (1) safety and liquidity, (2) the policy environment, (3) supply-demand dynamics, and (4) investor behavior by category. From perspective (1), JGBs carry extremely low default risk and offer high liquidity due to their large market size (see Section 3.1). Consequently, they are strongly preferred as "safe assets" by banks, insurers, and overseas investors. From perspective (2), the Bank of Japan's (BOJ) monetary policy influences JGB yield formation, becoming a factor that causes investor preferences to fluctuate. From perspective (3), the supply-demand structure for JGBs has changed significantly due to the BOJ's increased holdings resulting from unprecedented monetary easing. As normalization progresses and the BOJ reduces its holdings, private investors must fill the resulting gap. From perspective (4), domestic banks exhibit a strong preference for short- and medium-term JGBs due to regulatory compliance and safety concerns; insurance companies and pension funds favor ultra-long-term JGBs to match long-term liabilities; foreign investors' preferences are influenced by currency hedging costs and interest rate differentials, with increased participation typically occurring during policy transition periods; households are strongly safety-oriented, but their preference weakens when yields are low, making policy and product design crucial.

Previous studies related to these investor preferences observed in JGBs include those by Kaihatsu et al. (2024), Itou, Kasai, and Haba (2024), Nakazawa and Osada (2024), Miyakawa and Watanabe (2016), Kankawa (2020), Suimon (2025), and Ueno (2026).

We review prior research analyzing the impact of the BOJ's monetary policy on the government bond market. Kaihatsu et al. (2024) suggest that the purchase of long-term JGBs under unprecedented monetary easing depressed the term premium, lowering long-term interest rates, and potentially had the side effect of compressing financial institutions' profits through reduced lending rates. Ito, Kasai, and Haba (2024) demonstrate that the formation of JGB yields strongly depends on monetary policy factors, as evidenced by the significant decline in interest rates across the term structure following the introduction of negative interest rates. Nakazawa and Osada (2024) confirm that the large-scale government bond purchases and the Yield Curve Control (YCC) framework implemented since the introduction of "quantitative and qualitative monetary easing" in 2013 have affected interest rates across a wide range of maturities, resulting in a flattening effect on the entire yield curve.

We review prior research analyzing investor behavior in the JGB market. Miyakawa and Watanabe (2016) used long-term government bond trading data and bond holding stock data for each type of investor — city banks, regional banks, and foreign investors — to measure a proxy variable for the frequency of selling held JGBs for each type. They estimated the response of this variable to the level, change, and volatility of bond yields, as well as other macroeconomic and financial variables, thereby

identifying the determinants of trading behavior by investor type. Kankawa (2020) attempts an empirical analysis of the determinants of overseas investors' investment behavior using investor-specific trading data, suggesting the possibility of increasing presence of overseas real money players, such as institutional investors and foreign exchange reserves, in the JGB market. Suimon (2025) conducted an empirical analysis of institutional investors' duration preferences in the JGB market, examining their relationship with long-term interest rate formation and the predictive power of long-term rates. The study points out that "loss aversion" and "herding behavior" can be observed through JGB supply and demand dynamics and yield formation. Ueno (2026) examines the role of Retail JGBs by focusing on households with low holdings of JGBs. He argues that expanding household options through improved product features and a broader lineup would increase practical investment tools while also contributing to stable absorption of JGBs and mitigating sharp yield fluctuations.

Within the survey of prior research, advancing the "improvement of product features and expansion of the lineup for retail JGBs" proposed by Ueno (2026) requires first analyzing how current product features influence preferences for these JGBs. Therefore, the objective of this study is to analyze how the current product characteristics influence investor preferences for retail JGBs. This analysis is based on a multiple regression model that includes explanatory variables such as the product features of retail JGBs (which are expected to affect investor preferences) and variables representing the JGB market environment shaped by monetary policy. The analysis follows a review of the BOJ's monetary policy and its impact on the JGB market, from unconventional easing to normalization. In doing so, rather than focusing solely on preferences for retail JGBs, we contrast them with preferences for new OTC JGBs, whose product characteristics are equivalent to those of JGBs for institutional investors. This allows us to more clearly grasp the impact of product characteristics on investor preferences. Additionally, we clarify the preference bias among individual investors observed in Floating Rate 10-Year JGBs (Floating 10), the flagship product within retail JGBs.

The structure of this paper is as follows. Section 2 provides an overview of the BOJ's monetary policy and the yield trends of JGBs. Section 3 confirms the outstanding amounts in the JGB market and the product designs of retail JGBs and new OTC JGBs, then identifies investor preferences for the retail JGBs and new OTC JGBs under analysis. Section 4 conducts an analysis of preferences for retail JGBs, while Section 5 analyzes how product characteristics, based on a comparison of preferences for retail JGBs and new OTC JGBs, influence preferences. Additionally, Section 6 analyzes the preference bias observed among individual investors in Floating 10. The final section provides a summary and future research directions.

2. Overview of the BOJ's Monetary Policy and JGB Yield Trends

As indicated by the title ~From Unprecedented Monetary Easing to Normalization~, this study examines investor preferences observed in retail JGBs during the period from unprecedented monetary

easing under former BOJ Governor Haruhiko Kuroda (March 20, 2013 to April 8, 2023) to the normalization period following the appointment of BOJ Governor Kazuo Ueda (April 9, 2023). Section 2 examines how JGB yields evolved in response to the BOJ's monetary policy tools and their effects during this period.

(Overview of the BOJ's Monetary Policy)

The BOJ's monetary policy during this data period can be organized into the following five phases: ① The "Quantitative and Qualitative Monetary Easing" phase from January 2014 to December 2015 (clarified the 2% inflation target, significantly expanded purchases of long-term government JGBs, extended their average remaining maturity, and strengthened purchases of ETFs and J-REITs), ② The "Quantitative and Qualitative Monetary Easing with Negative Interest Rates" period from January 2016 to August 2016 (introduced negative interest rate policy (▲0.1%), applied negative rates to a portion of financial institutions' current accounts), ③ First half of the "Quantitative and Qualitative Monetary Easing with Yield Curve Control" period (September 2016 – March 2024) (Introduction of Yield Curve Control (YCC), Short-term interest rate: -0.1%, Long-term interest rate: Guiding the JGB 10 yield to around 0%), ④ Second half of the "Quantitative and Qualitative Monetary Easing with Yield Curve Control" period (September 2016 to March 2024) (Expanded the fluctuation range for long-term interest rates from ±0.1% → ±0.2% → ±0.25% → ±0.5%), changed the upper limit for long-term interest rates to a "guideline of 1%," further reduced the YCC framework to a formality, and shifted asset purchases to market-based operations)⑤ March 2024–December 2025: "Toward Normalization" phase (removed negative interest rate (−0.1%) in March 2024, raised rates in July 2024 (to 0.25%), raised rates again in January 2025 (to 0.50%), and another 0.25% hike in December 2025 (to 0.75%).

(Overview of JGB Yield Trends)

Exhibit 1 shows JGB yield data (2-year, 3-year, 5-year, and 10-year JGBs) from January 2014 to December 2025. The exhibit shows that the "quantitative and qualitative monetary easing" policy succeeded, causing yields on JGBs from 2-year to 5-year maturities to approach 0% between January 2014 and December 2015, while the yield on the 10-year JGB also fell below 0.5%. Following the introduction of the "negative interest rate policy with quantitative and qualitative monetary easing" in January 2016, yields began to decline rapidly, the yield curve flattened further, and the 10-year JGB yield plunged into negative territory for the first time in history. By July 2016, yields for 2-year, 3-year, 5-year, and 10-year JGBs stood at -0.333%, -0.335%, -0.317%, and -0.234%, respectively. Around this time, concerns about bank profits intensified, causing financial stocks to plummet. Side effects of negative interest rates became apparent, such as declining liquidity in the JGB market leading to more days where trades failed to execute. This raised questions about the policy's sustainability. In September 2016, the BOJ significantly shifted its policy framework. It changed to a policy of "quantitative and qualitative monetary easing with yield curve control," aiming to guide the

long-term interest rate (10-year bond yield) around 0%. This resulted in the 2-year JGB yield remaining around 0% while the 3-year yield fell to around -0.1%.and guiding the long-term interest rate (10-year JGB yield) to around 0%. By the end of 2016, while the 2-year JGB yield remained around -0.2%, the 10-year JGB yield was guided to around 0%. In other words, after the policy shift, JGB yields rose, accompanied by a steepening of the yield curve. By mid-2017, the 2-year JGB yield stabilized around -0.1%, and the 10-year JGB yield around 0%, indicating the QE3 policy had permeated the JGB market. Around August 2019, the JGB market experienced an "external shock" due to global recession concerns and major central banks' monetary easing, causing the 10-year yield to temporarily dip below -0.2%. Excluding this period, until around the end of 2021, the 2-year yield remained around -0.1% and the 10-year yield around 0%. Entering 2022, inflation surged in the US and Europe. Major central banks like the Fed and ECB responded with rapid rate hikes, causing global long-term interest rates to rise simultaneously. JGBs also faced upward pressure due to international linkage, and the 10-year yield began to rise. Furthermore, from the latter half of 2022, the BOJ's YCC adjustments (gradually widening the fluctuation range for long-term interest rates from ±0.1% → ±0.2% → ±0.25% → ±0.5%, changing the upper limit for long-term rates to a "1% guideline," further eroding the YCC framework, and shifting purchases to market-based operations)) accelerated the rise in yields. By the end of 2022, JGB yields stood at -0.015%, -0.003%, 0.139%, and 0.281% for the 2-year, 3-year, 5-year, and 10-year maturities, respectively. During the "normalization" period from March 2024 to December 2025, JGB yields rose rapidly with steepening curves. By the end of 2022, yields for 2-year, 3-year, 5-year, and 10-year JGBs stood at 1.071%, 1.163%, 1.452%, and 1.961%, respectively.

3. Retail JGBs and New OTC JGBs

3.1 Outstanding Amounts in the JGB Market, Product Design of Retail JGBs and New OTC JGBs

(Outstanding Amount of JGBs)

Exhibit 2 shows the outstanding amount of JGBs in the market as of the end of November 2025. Figure 2 shows that the total outstanding market balance is ¥1,194 trillion, with ultra-long-term JGBs maturing in over 20 years accounting for 47%, 10-year JGBs for 28%, and 5-year JGBs for 13%. In contrast, the outstanding market balance of retail JGBs is only ¥17.8 trillion, accounting for about 1.5% of the total. In Japan, individuals rarely invest directly in JGBs. Instead, the BOJ holds them through monetary policy, and institutional investors hold them via bank deposits, insurance products, pension funds, etc. This study focuses on retail JGBs not only to understand individual investors' preferences for JGBs, distinct from institutional investors, but also to examine how the product characteristics of retail JGBs influence these preferences. To achieve this objective, we included New OTC JGBs in our analysis alongside Retail JGBs. Unlike institutional JGBs, where issuance amounts are pre-planned and terms determined by competitive bidding, Retail JGBs and New OTC JGBs

determine issuance amounts based on investor demand during the offering period, under predetermined issuance conditions (the applicant yield). Therefore, the issuance amount itself can be regarded as reflecting retail investors' demand (preference) under the issuance conditions.

(Product Design of Retail JGBs)

Retail JGBs are designed with the purpose of "providing individuals with a highly secure means of asset allocation." Their core features include principal guarantee, the ability to redeem early, a low minimum purchase amount (in increments of ¥10,000), a mechanism to mitigate interest rate fluctuation risk, and zero sales commissions. This product design differs from traditional interest-bearing JGBs and discount JGBs intended for institutional investors.

The product lineup for Individual JGBs includes three types: the 10-year Floating Rate JGB (commonly known as Floating 10), the 5-year Fixed Rate JGB (commonly known as Fixed 5), and the 3-year Fixed Rate JGB (commonly known as Fixed 3).

Key design points for Floating 10 include: interest rates are reviewed every six months and follow increases in the 10-year JGB yield; and a minimum interest rate (0.05%) is guaranteed. These features aim to ensure attractiveness during rising interest rate environments for long-term asset formation, while also avoiding "zero interest rate risk" by guaranteeing a minimum rate even in low-interest-rate periods. The applicant yield is determined by multiplying the yield (base rate) calculated from the average winning bid price at the last 10-year JGB auction held before the offering period start date by 0.66. Multiplying by 0.66 is intended to set the yield lower than the 10-year JGB yield, reflecting the product's features such as the benefits of the early redemption system and the safety of retail JGBs.

Key design points for Fixed 5 include: the interest rate at issuance is fixed for 5 years; under normal monetary policy conditions, the rate tends to be set higher than Floating 10; and a minimum interest rate (0.05%) is guaranteed. These features aim to provide an option for investors seeking stable medium-term investments who dislike interest rate fluctuations. The applicant yield is determined by subtracting 0.05% from the assumed yield (base rate) of the 5-year fixed-rate JGB, calculated based on the prevailing market yield two business days prior to the start of the offering.

The key design points for Fixed 3 are: it has the shortest maturity, the lowest interest rate among the three products, and the minimum interest rate (0.05%) is guaranteed. It aims to serve as an entry-level product for those who want to "try JGBs first," catering to beginners and those seeking short-term, safe assets. The applicant yield is determined by subtracting 0.03% from the assumed yield (base rate) for the 3-year fixed-rate JGB, calculated based on the prevailing market yield two business days prior to the offering start date.

While the product design has primarily focused on benefits for individual investors, it also includes disadvantages to prevent speculative short-term trading. Early redemption is generally permitted only after one year has passed. Although the principal is guaranteed upon redemption, a penalty is imposed where the equivalent of the interest for the two most recent interest payment periods is deducted.

Exhibit 3 shows the trend in the applicant yield for retail JGBs, determined based on the above product design. Reflecting the product design, during the period of "Quantitative and Qualitative Monetary Easing with Negative Interest Rates" from January 2016 to August 2016 (②), and the first half of the "Quantitative and Qualitative Monetary Easing with Yield Curve Control" period from September 2016 to March 2024, the initial interest rates (issuance conditions) for Floating 10, Fixed 5, and Fixed 3 all hovered around 0.05%. Furthermore, since the Floating 10 rate is calculated by multiplying the benchmark rate by 0.66, cases where the initial rate (issuance condition) falls below the Fixed 5 rate are frequently observed after the start of 2025.

(Product Design of New OTC JGBs)

New OTC JGBs are "regular interest-bearing JGBs" sold to individual investors. Unlike retail JGBs (which offer principal guarantee and early redemption), they are a mechanism for selling general JGBs—whose market prices fluctuate—in a form easily accessible to individuals.

The product lineup for New OTC JGBs includes fixed-rate 2-year, 5-year, and 10-year JGBs (hereinafter referred to as JGB 2, JGB 5, and JGB 10, respectively). The product design is identical to that of regular interest-bearing JGBs. The applicant yield is determined by the market, and the issue price may be under or over relative to the face value of 100 yen. When market interest rates rise, the price falls and the yield increases. Selling New OTC JGBs is possible at any time, but the selling price fluctuates with market interest rates, posing a risk of principal loss during rising interest rate phases. The objective of the new OTC JGB design is to open the market mechanism directly to individuals (purchasable from a minimum of ¥50,000 in ¥50,000 increments, with an upper limit of ¥300 million) and provide an option for investors who prefer the risk-return profile of the JGB market.

3.2 Investor Preferences for Retail JGBs and New OTC JGBs

As mentioned in Section 3.1, the outstanding amount of retail JGBs is ¥17.8 trillion. Here, we present the monthly issuance volume by product type for Individual JGBs (demand: Exhibit 4) and the proportion by product type analyzed in this study (preference: Exhibit 5). Analyzing monthly issuance volume reflects preferences between retail JGBs and other financial products like stocks, rather than preferences within retail JGBs themselves. The monthly issuance volume by product type (demand: Exhibit 6) and the proportion by product type (preference: Exhibit 7) for the new OTC JGBs are also shown.

The average monthly issuance volume for all retail JGBs during the analysis period was approximately ¥320 billion, but it fluctuated significantly over time. ① During the "quantitative and qualitative monetary easing" period from January 2014 to December 2015, as JGB yields fell rapidly, the appeal of JGBs diminished, leading to a decline in issuance volume. Within this context, preference for Floating 10 increased. ② During the "Quantitative and Qualitative Monetary Easing with Negative Interest Rates" period from January 2016 to August 2016, issuance remained low, and preference for

Fixed 5 rapidly increased. ③ During the first half of the "Quantitative and Qualitative Monetary Easing with Yield Curve Control" period (September 2016 to March 2024, until around December 2022), as the effects of YCC permeated the government bond market, issuance gradually recovered by late 2019, and preference for Floating 10 rose again. Although issuance temporarily plummeted in 2020 due to the COVID impact (see Section 4), it remained at around ¥200-300 billion, maintaining strong preference for Floating 10. ④ During the latter half of the "Quantitative and Qualitative Monetary Easing with Yield Curve Control" period (September 2016 to March 2024, from around January 2023), as the YCC framework became increasingly nominal, issuance volumes remained around ¥200-300 billion. However, preference gradually shifted from Floating 10 and Fixed 3 towards Fixed 5. ⑤ During the "normalization" phase from March 2024 to December 2025, rising JGB yields increased their appeal. Issuance amounts frequently exceeded ¥400 billion, and preference for Fixed 5 surpassed that for Floating 10 or Fixed 3.

During the analysis period, all new OTC JGBs were issued simultaneously only during the periods from January 2014 to October 2014 and from October 2023 to December 2025 (Exhibit 6). In other words, for most of the period when the BOJ's unprecedented monetary easing policy was in effect, individual investors showed no preference for new OTC JGBs. No individual investor would prefer assets carrying the risk of principal loss during the process of rising yields following the end of unconventional monetary easing. Comparing the issuance volume of retail JGBs (Exhibit 4) with that of new OTC JGBs (Exhibit 6) during this period reveals that the principal guarantee and minimum interest rate guarantee (0.05%) inherent in retail JGBs' product characteristics were attractive to individual investors. Confirming the preference for new OTC JGBs (Exhibit 7), from January 2014 to October 2014, preference for JGB 2 and JGB 10 was around 40%, while demand for JGB 5 was around 20%. Looking at the period from October 2023 to December 2025, preference for JGB 10 dominated in October 2023. However, as monetary policy normalization took hold, preference for JGB 2 increased. By December 2025, preference for JGB 2 reached 50%, JGB 10 slightly over 30%, with the remainder preferring JGB 5.

4. The Analysis of Preference for Retail JGBs

4.1 Statistical Method

To analyze in detail the factors influencing individual investors' preferences for retail JGBs, four multiple regression models (Model 1 to Model 4) are employed. The dependent variables in the multiple regression models are individual investors' preferences for Floating 10, Fixed 5, and Fixed 3, as shown in Figure 5. Five factors considered to influence preferences are used as explanatory variables in the multiple regression models, sequentially labeled explanatory variable 1 (X_1) to explanatory variable 5 (X_5).

Retail JGBs incorporate principal protection in their design, eliminating price fluctuation risk.

Conversely, this means there is no capital gain, so carry alone constitutes the return. Therefore, carry is the primary factor influencing preference. According to Litterman and Scheinkman (1991), yield fluctuations in the government bond market are largely explained by three factors. Here, we adopt the Fixed 3 applicant yield as the level factor. To jointly express the slope factor and curvature factor, we adopt the applicant yield spread between Fixed 3 and Fixed 5, and the applicant yield spread between Fixed 5 and Floating 10. These are referred to as explanatory variables 1 through 3, respectively.

As explanatory variable 4 (X_4), we adopted a COVID dummy variable set to 1 for each month from May 2020 to September 2020 and 0 for all other months. This dummy variable was introduced because the state of emergency declaration (covering 7 prefectures) was issued on April 7th, leading to the peak of the first wave occurring from mid- to late April and prompting people to refrain from non-essential outings. In May, the number of infections dropped sharply due to the state of emergency declaration, and in June, it remained at a low level. However, the second wave began in July, partly due to the launch of the "Go to Travel" campaign, reaching its peak in August. The second wave finally subsided in September. Therefore, the period from May 2020 to September 2020 saw an extremely low volume of purchases of retail government JGBs.

Explanatory variable 5 (X_5) aims to confirm whether yield fluctuations in the JGB market around the time the BOJ significantly shifted its policy framework—introducing the new concept of "manipulating the yield curve itself rather than leaving interest rates to market forces" in September 2016—affected preferences for retail JGBs. This variable also serves as a potential proxy for the difference in the real value of the FLOOR guarantee (the difference in the moneyness between Fixed 5 and Floating 10) inherent in the product design of retail JGBs. (the difference in the size of the money effect between Fixed 5 and Floating 10 regarding the FLOOR). The variable is set to the observed 5-year to 10-year spread in the JGB market for the one-year period starting in March 2016, when the Floating 10 applicant yield first fell below 0.05%, and is set to zero for all other periods.

The multiple regression models adopted in the Statistical Method are the following four:

(Model1) $Y = \alpha + \beta_1 X_1 + \varepsilon$

(Model 2) $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$

(Model 3) $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$

(Model4) $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$

Here, "Y" represents preferences for each retail JGB, "α" is the intercept term, "$\beta_1 \sim \beta_5$" are the regression coefficients for the explanatory variables "$X_1 \sim X_5$" respectively, and "ε" is the error term.

Models (Model1) through (Model4) are structured such that the smaller-numbered models are nested within the larger-numbered models. By examining the difference in explanatory power (adjusted coefficient of determination) between models, we can assess the additional explanatory power provided by newly added explanatory variables. In the results and their implications of Section 4.2, we first visually compare the estimated values from (Model4)—which most flexibly captures

preferences for retail JGBs—with actual preferences to verify the model's accuracy. Next, we conduct a detailed analysis of factors influencing preferences for retail government JGBs, focusing on the magnitude of additional explanatory power from added explanatory variables, the significance of each explanatory variable's regression coefficient, and the sign conditions.

4.2 Results and Their Implications

The trends in preferences for Fixed 3, Fixed 5, and Floating 10, along with their estimated values using (Model 4), are shown sequentially in Figures 8 through 10. The multiple regression results are presented in Exhibits 11.

Looking at Exhibits 8 through 10, (Model 4) captures actual preferences accurately, albeit with some estimation error. Notably, even during periods of significant preference shifts toward Fixed 5 or Floating 10 —such as when COVID-19 was rampant, when the BOJ significantly shifted its policy framework, or when moving toward monetary normalization—(Model 4) captures these preferences quite precisely.

Exhibit 11 presents the result of preferences for Fixed 3. Comparing Models 1 through 4, the explanatory power of the model increases substantially when expanding from Model 2 to Model 3, specifically by adding the COVID Dummy as an explanatory variable. The regression coefficient for the COVID Dummy is 0.359, with a significance level of 1%. This positive coefficient indicates that during crises like COVID, heightened awareness of liquidity may increase preference for Fixed 3. Model 1 has almost no explanatory power. Although the regression coefficient for explanatory variable 1 is positive, it is not even significant at the 5% level, indicating that the 3-year applicant yield alone cannot capture the preference for Fixed 3. Extending the model to Model 2 by adding explanatory variables 2 and 3 slightly improves the model's explanatory power (the adjusted R-squared rises to 0.152). Furthermore, the regression coefficients for both explanatory variable 1 and explanatory variable 2 are significant at the 1% level, with explanatory variable 1 being positive and explanatory variable 2 being negative. This indicates that preference for Fixed 3 increases when the 3-year applicant yield rises and the yield spread between Fixed 3 and Fixed 5 narrows (i.e., the relative return of Fixed 3 over Fixed 5 increases).The regression coefficient for explanatory variable 3 is not even 5% significant, indicating that the narrowing of the yield spread between Fixed 5 and Floating 10 (increase in Fixed 5's relative return over Floating 10) has almost no discernible effect on the preference for Fixed 3. Adding explanatory variable 5 to expand the model (Model 4) yields almost no change in the model's explanatory power. Furthermore, the regression coefficient for explanatory variable 5 is not even 5% significant, and no impact of major BOJ policy shifts (value fluctuations seen in the FLOOR between Fixed 5 and Floating 10) on the preference for Fixed 3 is confirmed. The results indicate that the preference for Fixed 3 is largely driven by factors related to its role as a liquidity-conscious substitute for cash and deposits, while factors such as the absolute return of Fixed

3 and its relative return compared to Fixed 5 also exert some influence.

Exhibit 11 presents a factor analysis of preferences for Fixed 5. Comparing Models 1 through 4, unlike Fixed 3, the explanatory power of the model barely increases even when expanded from Model 2 to Model 3—that is, even when adding the COVID dummy variable as an explanatory variable. Although the regression coefficient for the COVID Dummy is positive, it is not even 5% significant. Even when liquidity is considered, the increase in preference seen in Fixed 3 is not observed. The explanatory power of (Model1) is reasonably high (adjusted $R^2 = 0.648$), and the regression coefficient for explanatory variable 1 is also positive and 1% significant. Thus, the 3-year applicant yield alone can reasonably capture the preference for Fixed 5. Adding explanatory variables 2 and 3 to expand to (Model 2) slightly increases the model's explanatory power (the adjusted R-squared rises to 0.698). Furthermore, the regression coefficients for both explanatory variable 1 and explanatory variable 2 are significant at the 1% level, and both signs are positive. This indicates that preference for Fixed 5 increases when the 3-year applicant yield rises and the applicant yield spread between Fixed 3 and Fixed 5 widens (i.e., the relative return of Fixed 5 over Fixed 3 increases).The regression coefficient for explanatory variable 3 is not even significant at the 5% level, indicating that the narrowing of the spread between Fixed 5 and Floating 10 applicant yields (increase in Fixed 5's relative return over Floating 10) has almost no discernible effect on the preference for Fixed 5. Adding explanatory variable 5 to expand the model (Model 4) significantly improves the model's explanatory power. The regression coefficient for explanatory variable 5 is significant at the 1% level and positive, reflecting a preference for the FLOOR value. This indicates that the BOJ's major policy shift (the fluctuation in the value observed in the FLOOR between Fixed 5 and Floating 10) influenced the preference for Fixed 5. The analysis results indicate that preferences for Fixed 5 are hardly influenced by factors related to substitution with cash and deposits. Instead, they are strongly affected by factors such as the level of absolute returns and relative returns compared to Fixed 3.

Exhibit 11 presents the result of preference for Floating 10. Since preference for Floating 10 is calculated by subtracting the sum of preferences for Fixed 3 and Fixed 5 from 1, the intercept term is obtained by subtracting the sum of the intercepts for Fixed 3 and Fixed 5 from 1. Each regression coefficient is derived by assigning a negative sign to the sum of the regression coefficients for Fixed 3 and Fixed 5. Noteworthy across Models 1 through 4 is that the regression coefficient for explanatory variable 1 is negative and 1% significant in all models. Unlike Fixed 3 or Fixed 5, an increase in the 3-year applicant yield reduces preference for Floating 10 and increases preference for Fixed 3 or Fixed 5. Adding explanatory variables 2 and 3 to expand to Model 2 does not improve the model's explanatory power. Although the regression coefficient for explanatory variable 3 is positive, it is not even significant at the 5% level. Therefore, it cannot be concluded that an expansion in the spread between Fixed 5 and Floating 10 applicant yields (an increase in Floating 10's relative return over Fixed 5) necessarily increases preference for Floating 10. One possible reason for this is that Floating

10's applicant yield is calculated by multiplying the base rate by 0.66. Including the COVID Dummy to expand to (Model3) improves the model's explanatory power. The regression coefficient for the COVID Dummy is -0.370, negative in sign and significant at the 1% level. This indicates that when a crisis like COVID occurs and liquidity becomes a concern, preferences shift from Floating 10 to Fixed 3. Adding explanatory variable 5 to expand to (Model4) further improves the model's explanatory power. The regression coefficient for explanatory variable 5 is significant at the 1% level and negative, reflecting a preference for the FLOOR value. This indicates that the BOJ's major policy shift (the relative value change observed in the FLOOR between Fixed 5 and Floating 10) influenced the preference for Floating 10. Analysis results indicate that preference for Float 10 is high in extremely low-yield environments where future yield increases are anticipated. However, as the 3-year applicant yield rises, preference declines even if the applicant yield spread between Fixed 3 and Fixed 5 or between Fixed 5 and Floating 10 widens (increasing the relative return of Floating 10 compared to Fixed 3 or Fixed 5). Preference drops sharply when liquidity concerns arise.

5. Factors Affecting Preference with Comparison of Retail JGBs and New OTC JGBs

5.1 Statistical Method

We conduct a multiple regression analysis using (Model 2) for the periods from January 2014 to October 2014 and from October 2023 to December 2025 (Exhibit 6), when preferences for both retail JGBs and new OTC JGBs were available. Model 2 was selected because the analysis period excludes the periods where explanatory variables 4 and 5 influence preferences. By comparing preferences for retail JGBs and new OTC JGBs while focusing on the magnitude of additional explanatory power from the variables, the significance of each explanatory variable's regression coefficient, and the sign conditions, we conduct a detailed analysis of how the product characteristics of retail JGBs affect preferences. When applying (Model2), the analysis period for retail JGBs is shortened, but the data used for the dependent variable and the three explanatory variables is the same as in Section 4. For the new OTC JGBs, the preference for new OTC JGBs shown in Exhibit 7 is used as the dependent variable. The JGB 2 yield is adopted as explanatory variable 1 to represent the level factor. To express the slope factor and curvature factor together as explanatory variables 2 and 3, the yield spread between JGB 2 and JGB 5, and the spread between the applicant yields of JGB 5 and JGB 10.

5.2 Results and Their Implications

The results applying (Model 2) to the preference for retail JGBs and new OTC JGBs are shown in Exhibit 12. Focusing on the adjusted coefficient of determination, comparing the explanatory power of (Model 2) for preferences toward retail JGBs and new OTC JGBs reveals that for all three maturities, (Model 2)'s explanatory power is higher for retail bond preferences than for new OTC bond preferences. However, the difference in explanatory power is not particularly large for shorter-term

JGBs like Fixed 3 or JGB 2. This result is likely strongly influenced by the principal guarantee inherent in the product characteristics of the retail JGBs. As discussed in Section 4.1, the retail JGBs have a principal guarantee, eliminating price fluctuation risk; thus, preference is primarily determined by return. Furthermore, since there is no capital gain, the return is determined solely by the carry, leading to higher explanatory power for (Model 2). Conversely, new OTC JGBs carry price fluctuation risk. Except for short-term JGBs assumed to be held to maturity, this risk influences preferences. Moreover, expected returns encompass not only carry but also potential capital gains, which can affect preferences. According to CAPM theory, optimal investment weights are determined by expected return, price fluctuation risk, and risk aversion. Consequently, the explanatory power of Model 2, where carry is the sole explanatory variable, is relatively low.

Comparing Fixed 3 and JGB 2 by examining the significance and sign conditions of each regression coefficient reveals that all coefficients share similar significance and sign conditions. As previously noted, the principal guarantee inherent in the product characteristics of retail JGBs does not significantly influence shorter-term JGBs. In contrast, Fixed 5 and JGB 5 show differences in the significance and sign conditions of their regression coefficients. While preference for Fixed 5 significantly increases as the applicant yield for Fixed 3 rises, preference for JGB 5 decreases as the applicant yield for JGB 2 increases, though this decrease is not statistically significant. Furthermore, the regression coefficient for the applicant yield spread between JGB 5 and JGB 10 is negative and significant, meaning preference for the JGB 5 decreases as its attractiveness relative to the JGB 10 diminishes. For Floating 10 and JGB 10, the sign conditions of the regression coefficients are the same, but differences in significance are observed. For both Floating 10 and JGB 10, the sign conditions for the spread between Fixed 3 (JGB 2) and Fixed 5 (JGB 5), and between Fixed 5 (JGB 5) and Floating 10 (JGB 10), are both positive. When the yield curve steepens and the yield on Floating 10 (JGB 10) rises relatively sharply, both Floating 10 and JGB 10 become more preferred, though significance is confirmed only for JGB 10. Possible reasons include: for JGB 10, price fluctuation risk makes preferences more sensitive to returns; and for Floating 10, while the benchmark interest rate is multiplied by 0.66, holding JGB 10 to maturity guarantees its applicant yield.

6. Preference Bias of Individual Investor Observed in Floating 10

6.1 Methodology

In the analysis up to Section 4, we introduced Models 2 through 4 assuming the individual investors' preference for Floating 10 is determined by comparing its applicant yield (base rate * 0.66) with the applicant yields of Fixed 3 and Fixed 5. As confirmed in Exhibit 10, Model 4 adequately captured the preference for Floating 10. The point to consider here is that due to its product characteristics, Floating 10 is a floating-rate instrument. The applicant yield, which is the base rate multiplied by 0.66 at the time of purchase, is not paid for the next 10 years. Instead, at each future coupon payment date, the

base rate multiplied by 0.66 prevailing at that point in time is paid. Specifically, at each future coupon payment date (every six months for the next ten years), the forward 10-year par yield at that point serves as the base rate. Since the interest is compounded semi-annually, half of this base rate multiplied by 0.66 is paid. First, we calculate the expected cash flow (half of the base rate multiplied by 0.66) from Floating 10 at each point over the next ten years, every six months. Next, use the discount function at the time of purchase of Floating 10 to calculate the sum of the discounted present values of these expected cash flows. The coupon rate of a 10-year fixed-rate bond whose present value equals this sum, multiplied by 0.66, is termed the applicant's fair value yield here. From a financial theory perspective, it is considered that the applicant's fair value yield, rather than the applicant's yield for Floating 10, should be compared to the applicant's yield for Fixed 5.

(Derivation of the Floating 10 Applicant Fair Value Yield)

For JGBs where the Ministry of Finance publishes daily yields on its website, JGBs with maturities of 20 years or less include 1-year to 10-year JGBs at yearly intervals, plus 15-year and 20-year JGBs. In addition to these JGBs, we also use the price of discount JGBs with a maturity of 6 months (or substitute with a 3-month maturity).

STEP1: Determine the current discount function.

Linear interpolation is used to determine yields for maturities every six months from the 1-year JGB yield to the 20-year JGB yield, represented as $Y_{0,1}, Y_{0,1.5}, Y_{0,2}, Y_{0,2.5}, \cdots, Y_{0,19.5}, Y_{0,20}$. The 0 preceding the suffix indicates the current time point; 0.5 indicates six months ahead, 1 indicates one year ahead, and so on. These yields are treated as par bond yields, with coupons assumed equal to the yields. That is,

$$\left(Y_{0,1}, Y_{0,1.5}, Y_{0,2}, Y_{0,2.5}, \cdots, Y_{0,19.5}, Y_{0,20} \right) = \left(C_{0,1}, C_{0,1.5}, C_{0,2}, C_{0,2.5}, \cdots, C_{0,19.5}, C_{0,20} \right)$$

Apply a coupon strip to this data to obtain the present-day semi-annual discount function $\left(D_{0,1}, D_{0,1.5}, D_{0,2}, D_{0,2.5}, \cdots, D_{0,19.5}, D_{0,20} \right)$. $D_{0,0.5}$ is the present-day price of a 6-month discount Treasury bond (already obtained data) divided by 100. The coupon strip is obtained by sequentially solving the following set of equations (only the first three are listed):

$100 = \frac{C_{0,1}}{2} \cdot D_{0,0.5} + \left(\frac{C_{0,1}}{2} + 100 \right) D_{0,1}$ From this, we obtain $D_{0,1}$.

$100 = \frac{C_{0,1.5}}{2} \cdot D_{0,0.5} + \frac{C_{0,1.5}}{2} \cdot D_{0,1} + \left(\frac{C_{0,1.5}}{2} + 100 \right) D_{0,1.5}$ From this, we obtain $D_{0,1.5}$.

$$100 = \frac{C_{0,2}}{2} \cdot D_{0,0.5} + \frac{C_{0,2}}{2} \cdot D_{0,1} + \frac{C_{0,2}}{2} \cdot D_{0,1.5} + \left(\frac{C_{0,2}}{2} + 100 \right) D_{0,2} D_{0,2}$$

Similarly, obtain $\left(D_{0,1}, D_{0,1.5}, D_{0,2}, D_{0,2.5}, \cdots, D_{0,19.5}, D_{0,20} \right)$.

STEP2: Calculate the 10-year forward yield at $0.5 * i$.

First, the $0.5 * i$ -year forward discount function

$$\left(D_{0.5*i,0.5*i+0.5}, D_{0.5*i,0.5*i+1}, D_{0.5*i,0.5*i+1.5} \cdots, D_{0.5*i,0.5*i+9.5}, D_{0.5*i,0.5*i+10} \right)$$

For example, $D_{0.5*i,0.5*i+0.5} = \frac{D_{0,0.5*i+0.5}}{D_{0,0.5*i}}$ can be easily derived from the current semi-annual discount functions obtained in STEP1. To calculate the 10-year forward yield $Y_{0.5*i,0.5*i+10} = C_{0.5*i,0.5*i+10}$ using this $0.5 * i$ forward discount function, solve the following equation:

$$100 = \frac{C_{0.5*i,0.5*i+10}}{2} \cdot D_{0.5*i,0.5*i+0.5} + \frac{C_{0.5*i,0.5*i+10}}{2} \cdot D_{0.5*i,0.5*i+1} + \cdots$$

$$+ \left(\frac{C_{0.5*i,0.5*i+10}}{2} + 100\right) D_{0.5*i,0.5*i+10}$$

STEP3: Deriving the Applicant's Fair Value Yield ($Y_{0,CMT10}$) for Floating 10

To find the applicant's fair value yield ($Y_{0,CMT10}$), solve the following equation.

$$\frac{Y_{0,CMT10}}{2} \cdot D_{0,0.5} + \frac{Y_{0,CMT10}}{2} \cdot D_{0,1} + \cdots + \left(\frac{Y_{0,CMT10}}{2} + 100\right) D_{0,10}$$

$$= 0.66 * \left(\frac{Y_{0,10}}{2} \cdot D_{0,0.5} + \frac{Y_{0.5,10.5}}{2} \cdot D_{0,1} + \cdots + \left(\frac{Y_{9.5,19.5}}{2} + 100\right) D_{0,10}\right)$$

6.2 Results and Their Implications

Exhibit 13 shows the applicant's fair value yield for Floating 10, the applicant's yield, and the applicant's yield for Fixed 5 combined. Using Exhibit 13, we interpret the preferences for Floating 10 and their estimated values confirmed in Figure 10. We exclude the COVID period from May 2020 to September 2020, when Fixed 3 was strongly preferred due to liquidity needs. From around mid-2014 to late 2015, preference for Floating 10 increased from around 60% to over 80%. During this period, while the applicant yield for Fixed 5 reached the minimum interest rate (0.05%), the spread between the applicant fair value yield for Floating 10 and the applicant yield for Fixed 5 remained around 0.7%, increasing the relative appeal of Floating 10 compared to Fixed 5. Following the introduction of the "Quantitative and Qualitative Monetary Easing with Negative Interest Rates" policy in January 2016, preference for the Floating 10 declined from around 80% to nearly 40% by July 2016. During this period, the Floating 10's applicant fair value yield fell sharply, reducing its relative appeal compared to the Fixed 5. With the shift to the "quantitative and qualitative monetary easing with yield curve control" policy in September 2016, preference for Floating 10 recovered to around 80% and has generally maintained this level until around the first half of 2022. From September 2016 to early 2017, while the Fixed 5 applicant yield remained near the minimum rate (0.05%), the applicant fair value yield for Floating 10 rose to around 0.3%. This restored some relative appeal of Floating 10 compared to Fixed 5, and the yield hovered around 0.3% from 2017 to mid-2022. During this period, individual investors' preference for the Floating 10, as seen in both the applicant fair value yield and the applicant yield, was deemed rational from a financial theory perspective. However, starting in the latter half of 2022, as the BOJ's YCC was adjusted and the Fixed 5 applicant yield began rising above the minimum

interest rate (0.05%), preference for the Fixed 5 gradually increased while preference for the Floating 10 gradually decreased. From March 2024, as the BOJ's monetary policy began "moving towards normalization," the Fixed 5 applicant yield approached and then surpassed the Floating 10 applicant yield. During this period, preference for the Floating 10 fell from around 80% to around 30%, while preference for the Fixed 5 surged sharply from around 10% to around 50%. However, the fair value yield for Floating 10 rose rapidly as the yield curve for government JGBs with maturities over 10 years steepened. The spread over the Fixed 5 yield exceeded 0.5%, significantly increasing the relative value of Floating 10 compared to Fixed 5. Based on finance theory, individual investors' preferences cannot be considered rational. A behavioral bias is evident, where investors continue to focus on the immediate applicant yield as an indicator without sufficiently considering the floating-rate nature of the Floating 10.

7. Summary and Future Challenges

This study comprehensively examines, from a finance theory perspective, the extent to which individual investors' preferences for JGBs can be reasonably explained by the BOJ's monetary policy—from unconventional easing to normalization—and the resulting trends in JGB yields, based on data from January 2014 to December 2025. The analysis of preferences for retail JGBs indicates that the proposed (Model4) can accurately capture actual preferences to a certain degree. Preference for Fixed 3 is largely driven by its role as a substitute for cash and deposits, though it is also somewhat influenced by Fixed 3's absolute return and its relative return compared to Fixed 5. Preference for Fixed 5 is strongly influenced by its absolute return and relative return compared to Fixed 3. Preference for Floating 10 is high in an environment of extremely low yields where future yield increases are anticipated. However, when the applicant yield for Fixed 3 rises, preference for Floating 10 declines even if its relative returns compared to Fixed 3 and Fixed 5 improve. Based on a factor analysis of how product characteristics influence preferences, comparing preferences for retail JGBs and new OTC JGBs revealed that the impact of principal guarantee—a characteristic of retail JGBs—is not particularly noticeable for short-term JGBs but is relatively evident for medium- to long-term JGBs. It also showed that even when the spread between the applicant yields for Floating 10 and Fixed 5 widens, preference for Floating 10 does not increase significantly. One reason cited for this is that the Floating 10 applicant yield is calculated by multiplying the base rate by 0.66. Analysis of the preference bias observed among individual investors toward Floating 10 revealed that during phases where the BOJ's monetary policy is "moving toward normalization," individual investors' preference for Floating 10 cannot be considered rational according to finance theory; they exhibit behavioral biases that emphasize the applicant yield.

Two main challenges remain for future research:

First, once the BOJ completes its monetary policy normalization and the government bond market

fully regains its market-driven dynamism, how will individual investors' preferences for retail JGBs and new OTC JGBs evolve? To what extent will these preferences align with the CAPM?

Second, considering the introduction of the tax-free investment system NISA in Japan starting in 2024, which is shifting savings toward investment in personal assets, and the planned expansion of retail JGB sales to corporations starting in fiscal year 2026, demand for retail JGBs is expected to increase, not just preference. How will preferences for other financial assets, such as stocks and investment trusts, evolve at that time?

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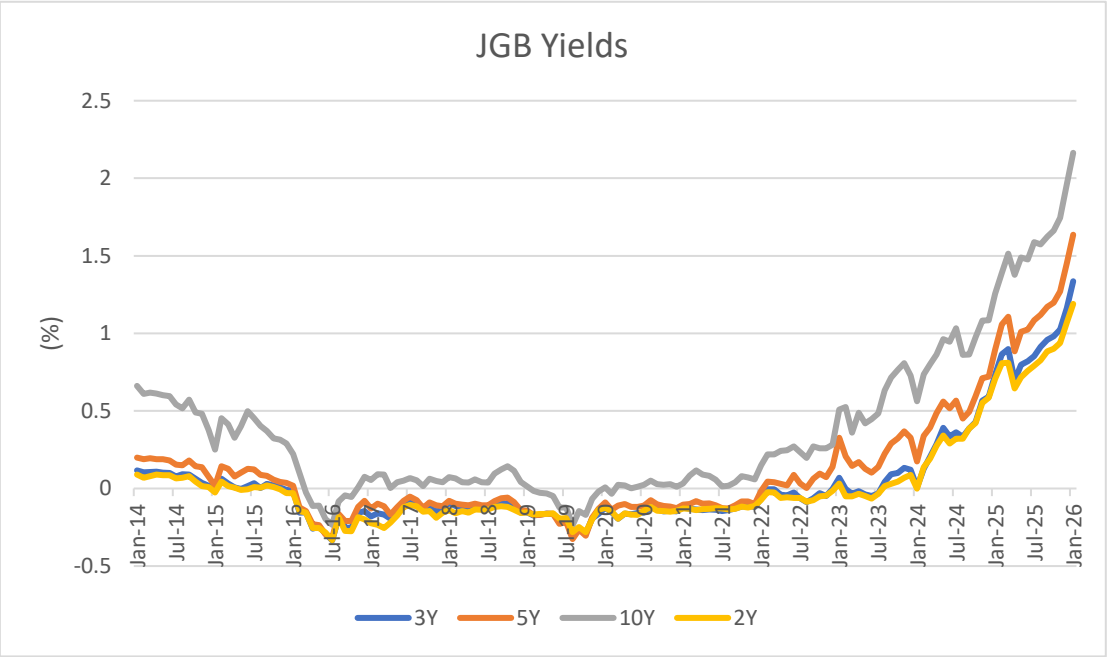

Exhibit 1　JGB Yields

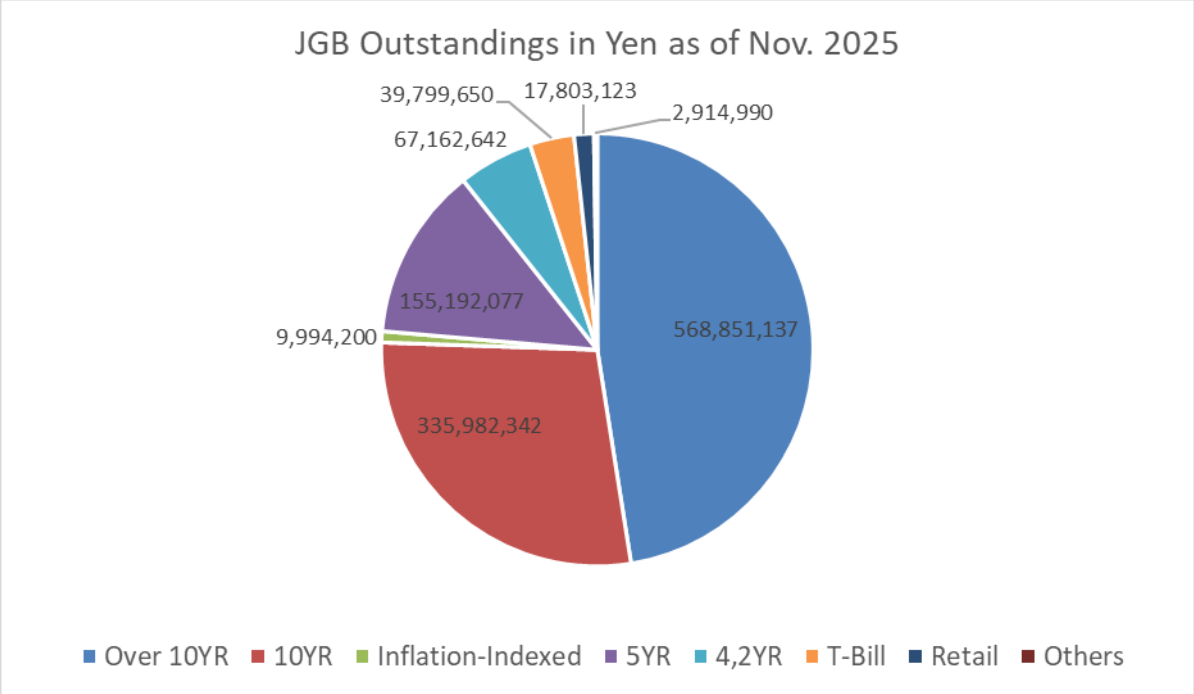

Exhibit 2　JGB Outstandings

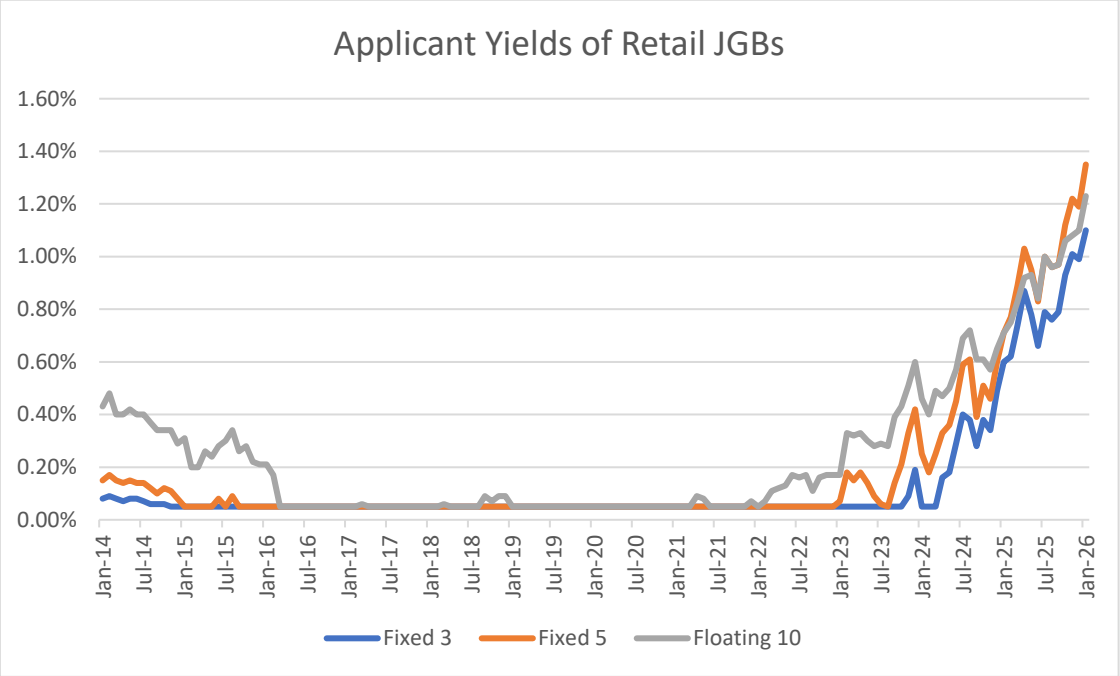

Exhibit 3 Applicant Yields of Retail JGBs

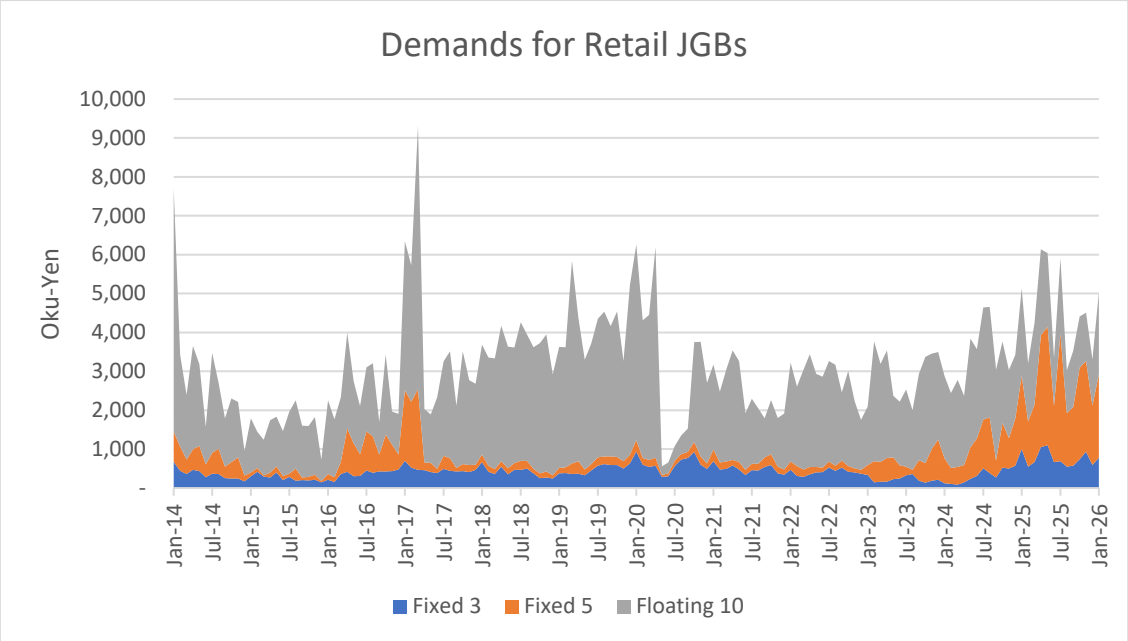

Exhibit 4 Demands for Retail JGBs

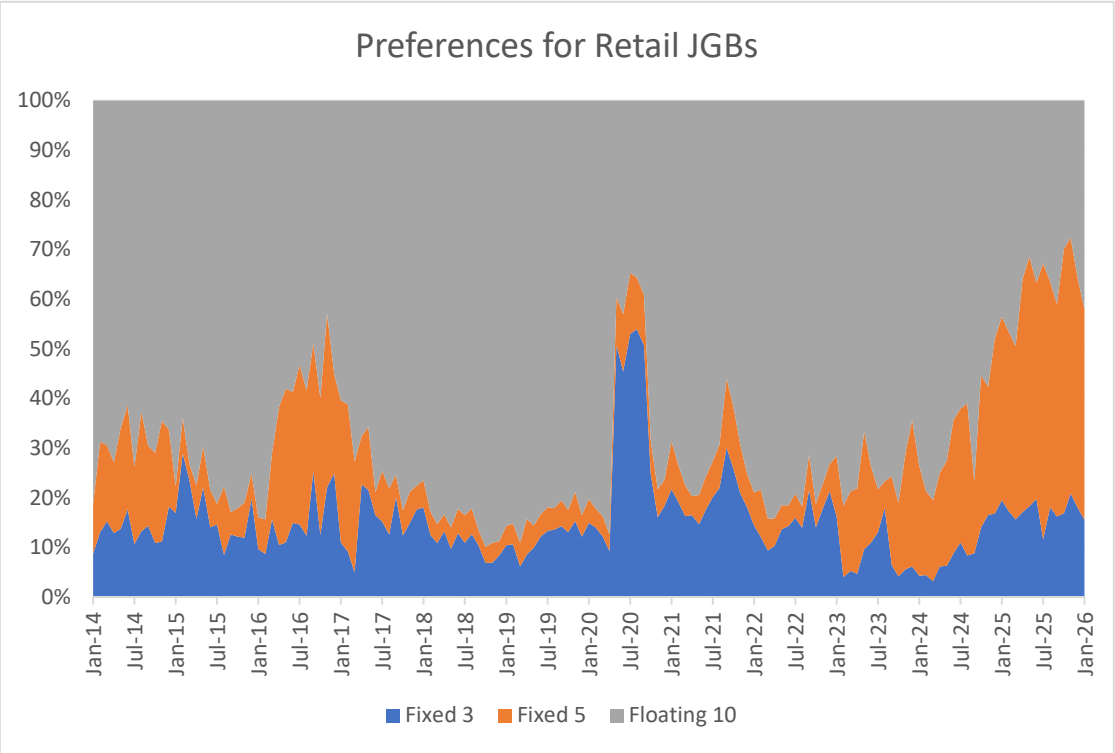

Exhibit 5 Preferences for Retail JGBs

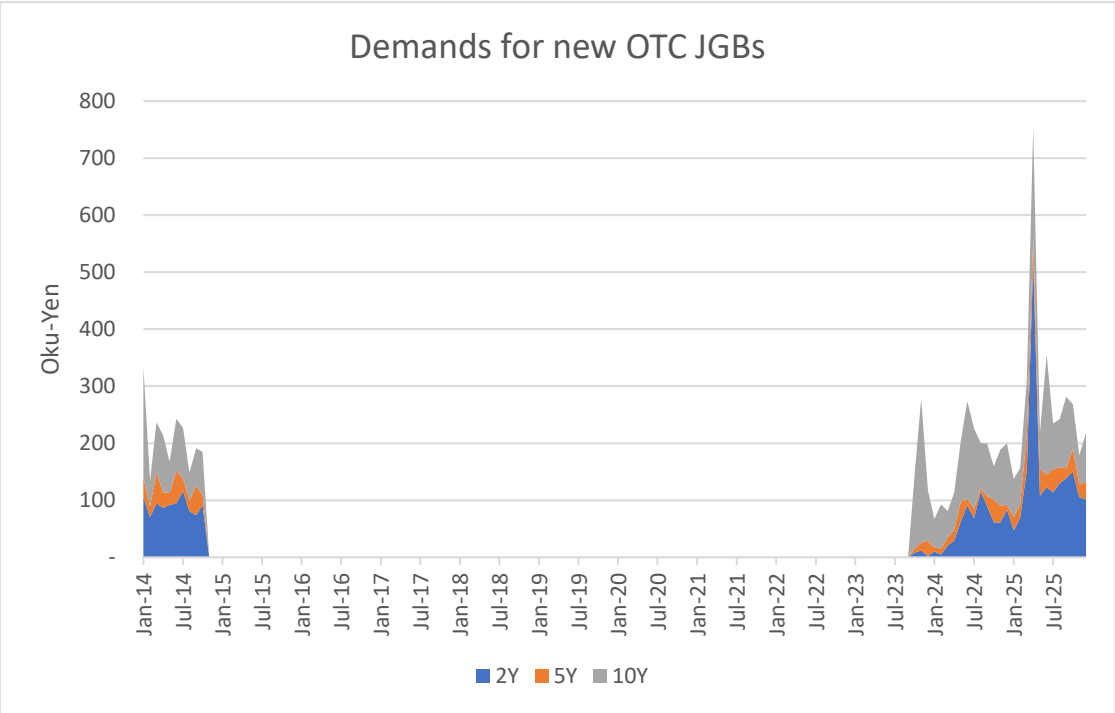

Exhibit 6 Demands for new OTC JGBs

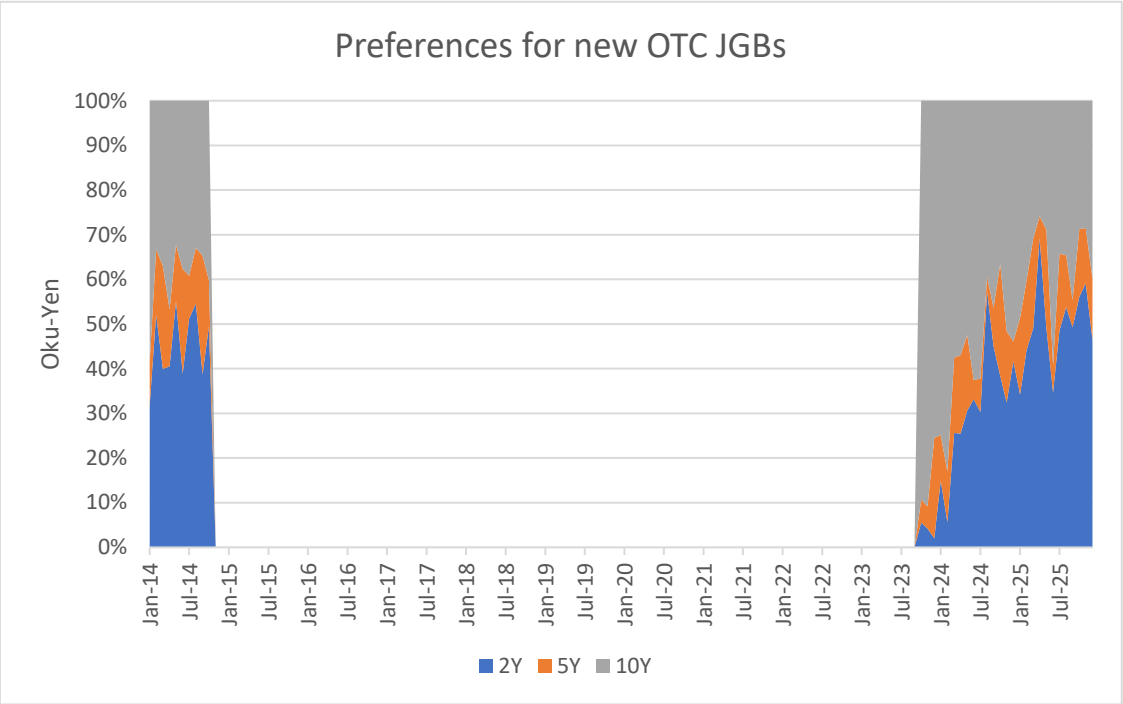

Exhibit7　Preferences for new OTC JGBs

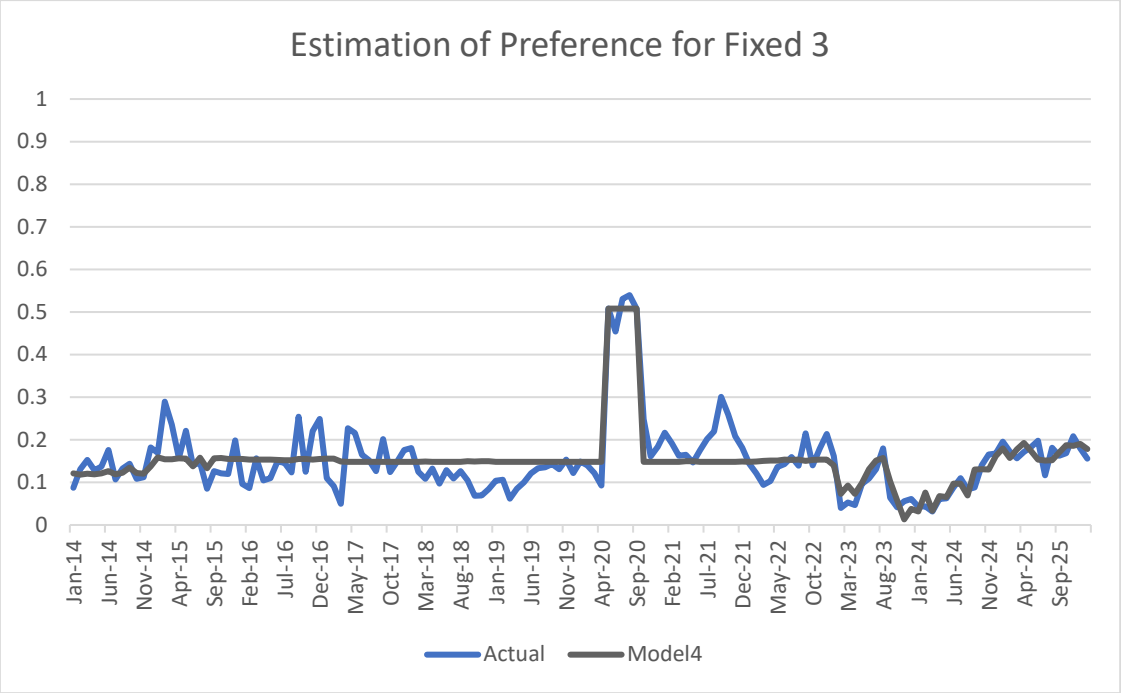

Exhibit 8　Estimation of Preference for Fixed 3

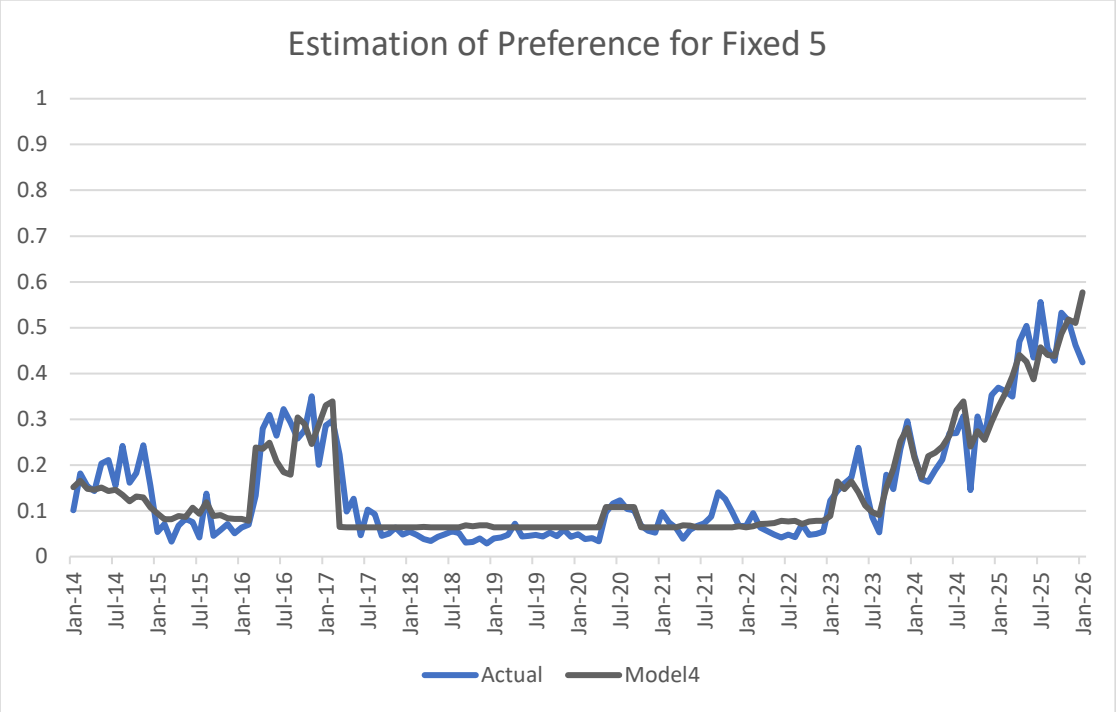

Exhibit 9　Estimation of Preference for Fixed 5

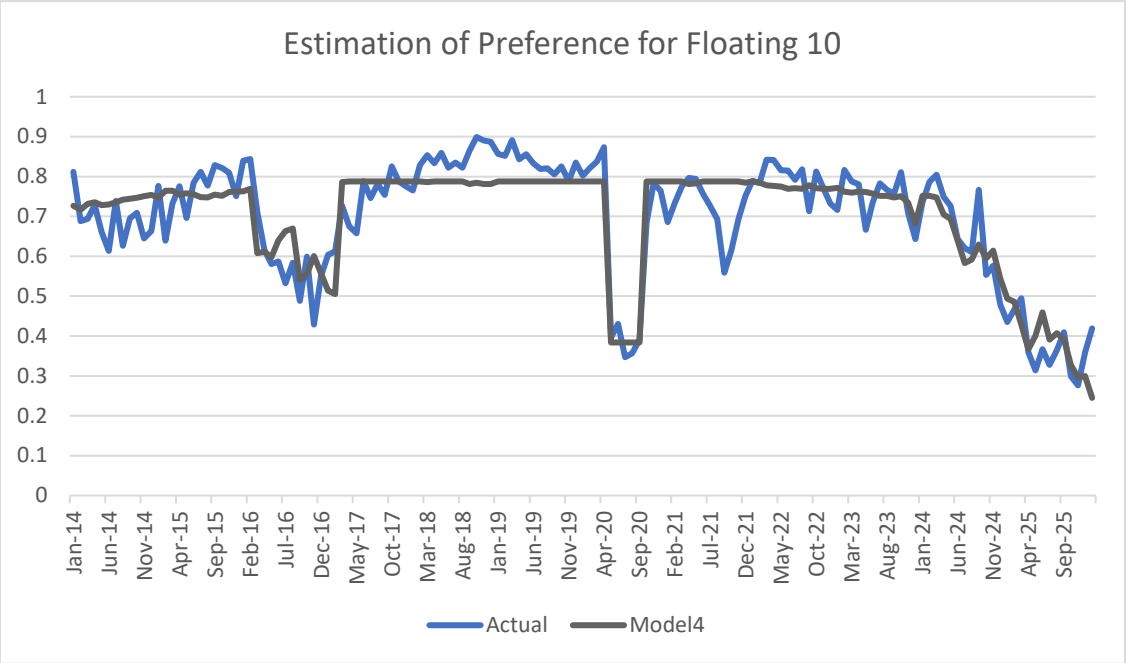

Exhibit10　Estimation of Preference for Floating 10

Preference for Fixed 3								
	Intercept	3Y LEVEL	3-5Y SP	5-10Y SP	Covid	5-10Y FL	Adj-R2	F-stat
1Factor	0.151	1.197					-0.006	0.148
t-value	18.167	0.385						
3Factor	0.166	13.865	-60.995	-8.252			0.152	9.635
t-value	16.319	2.575	-3.703	-0.979				
4Factor	0.140	17.955	-62.302	3.522	0.359		0.733	99.704
t-value	23.760	5.922	-6.736	0.737	17.526			
5Factor	0.139	18.114	-62.352	3.978	0.360	0.041	0.731	79.317
t-value	21.663	5.906	-6.721	0.807	17.408	0.400		
Preference for Fixed 5								
	Intercept	3Y LEVEL	3-5Y SP	5-10Y SP	Covid	5-10Y FL	Adj-R2	F-stat
1Factor	0.086	44.867					0.648	266.217
t-value	11.748	16.316						
3Factor	0.083	29.239	65.589	-4.980			0.698	111.985
t-value	9.140	6.087	4.463	-0.662				
4Factor	0.082	29.364	65.549	-4.623	0.011		0.696	83.487
t-value	8.739	6.075	4.446	-0.607	0.334			
5Factor	0.046	35.042	63.735	11.726	0.044	1.456	0.872	197.112
t-value	6.987	11.074	6.658	2.307	2.064	13.899		
Preference for Floating 10								
	Intercept	3Y LEVEL	3-5Y SP	5-10Y SP	Covid	5-10Y FL	Adj-R2	F-stat
1Factor	0.762	-46.064					0.480	134.107
t-value	71.570	-11.580						
3Factor	0.751	-43.105	-4.593	13.232			0.479	45.101
t-value	52.811	-5.737	-0.200	1.125				
4Factor	0.777	-47.319	-3.247	1.101	-0.370		0.672	74.647
t-value	66.714	-7.912	-0.178	0.117	-9.155			
5Factor	0.814	-53.156	-1.383	-15.704	-0.404	-1.496	0.802	117.666
t-value	82.889	-11.349	-0.098	-2.087	-12.794	-9.652		

Exhibit11　Preferences for Retail JGBs

Comparison of the Preference between retail JGBs and new OTC JGBs								
	Intercept	2,3Y LEVEL	2,3-5Y SP	5-10Y SP			Adj-R2	F-stat
3Y IND	0.170	13.485	-61.615	-5.663			0.788	46.733
t-value	4.831	3.081	-7.594	-0.478				
2Y USU	0.624	46.436	-140.209	-39.125			0.686	27.254
t-value	6.301	8.459	-7.174	-1.864				
5Y IND	0.165	29.615	17.862	-11.059			0.859	76.098
t-value	2.223	3.227	1.050	-0.445				
5Y USU	0.353	-4.257	9.329	-53.095			0.398	8.935
t-value	6.556	-1.425	0.877	-4.648				
10Y IND	0.665	-43.100	43.752	16.722			0.864	79.475
t-value	7.147	-3.735	2.045	0.536				
10Y USU	0.023	-42.172	130.887	92.258			0.564	16.527
t-value	0.186	-6.124	5.339	3.503				

Exhibit12　Factors Affecting Preference with Comparison of retail JGBs and new OTC JGBs

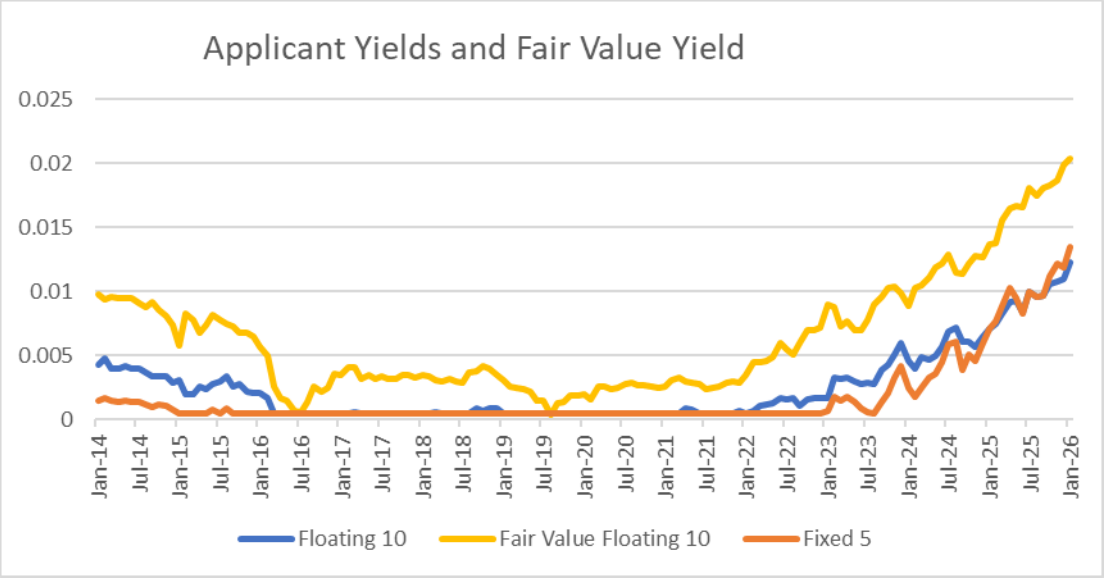

Exhibit13　Individual Investors' Bias on the Preference for Floating 10