The real estate channel of unconventional monetary policy

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Abstract

This study investigates how unconventional monetary policy affects the economy when the central bank purchases equities issued by non-banks, focusing on the Bank of Japan's Real Estate Investment Trust (REIT) purchase program. Unlike previous studies that examine the impact of monetary policy on the real estate sector primarily through the bank lending channel, this program influences the sector through the risk-taking channel by purchasing equities issued by non-bank institutions. Using detailed data on REITs, we find that: (1) the central bank's purchases lowered both equity and loan costs for targeted REITs; (2) these REITs acquired riskier properties with higher expected returns; and (3) banks reallocated lending from listed real estate companies toward the REIT sector. Together, these findings indicate that central bank equity purchases stimulate risk-taking in targeted non-bank institutions and affect the broader loan market through banks' portfolio reallocation.

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1. Introduction

Several channels have been proposed to explain how monetary policy affects the economy. The primary mechanism is the interest rate channel, through which changes in funding costs influence firms' capital investment and households' expenditures on housing and durable goods. Another important mechanism is the balance sheet channel, which emphasizes frictions in financial markets: monetary policy alters the strength of borrowers' balance sheets, thereby affecting their external financing costs.

In recent years, growing attention has been paid to the risk-taking channel, which suggests that prolonged periods of low interest rates may encourage financial institutions to assume greater risks. Borio and Zhu (2012) and Adrian and Shin (2010) were among the first to introduce this concept, arguing that a persistently low interest rate environment can alter banks' risk perceptions. Numerous empirical studies provide evidence of such behavior in both advanced and emerging economies (Jiménez et al., 2014; Ioannidou et al., 2015; Dell'Ariccia et al., 2017; Bonfim and Soares, 2018; Paligorova and Santos, 2017; Takaoka and Takahashi, 2022; Morais et al., 2019; Kandrac and Schlusche, 2021). Collectively, these studies show that monetary easing and low interest rates contribute to increased risk-taking by banks.

Beyond interest rate cuts, research has also examined the risk-taking channel under large-scale asset purchases (LSAPs), a key unconventional policy tool increasingly used by central banks since the global financial crisis. DiMaggio et al. (2020), Chakraborty et al. (2020), and Rodnyanski and Darmouni (2017) analyze the Federal Reserve's mortgage-backed securities (MBS) purchase program, while Grosse-Reuschkamp et al. (2019) study the European Central Bank's corporate bond purchase program. A key limitation of this literature, however, is its focus on banks' lending behavior. Little attention has been paid to the non-bank sector and to financial instruments other than loans, even though unconventional policies often involve the purchase of

assets such as corporate bonds or equities and there is a growing concern about the behavior of non-bank financial institutions.

This study fills that gap by focusing on one of the Bank of Japan's (BOJ's) unconventional LSAP programs: its purchases of equities issued by real estate investment trusts (REITs). We examine how these purchases affected the risk-taking behavior of REITs in acquiring real estate properties. The BOJ implemented this policy for about 15 years, accumulating a substantial REIT portfolio relative to market capitalization. The stated objective was to reduce the risk premium, but such interventions may also have altered REITs' investment choices. Moreover, the increased loan demand by REITs could have induced spillover effects on banks, prompting them to reallocate their lending portfolios.

Using a comprehensive dataset covering REIT-level real estate acquisitions, loan transactions, nationwide real estate transactions, and firm-bank matched loan exposures, we address three questions. First, we test whether equity and loan financing costs for REITs declined after the BOJ's purchases. A reduction in equity risk premia should encourage REITs to issue more equity, while improved creditworthiness may lower loan costs and expand borrowing. Second, we examine whether eligible REITs took greater risks in property acquisitions in search of higher returns—purchasing properties with higher expected returns, greater age, and higher operational and capital expenditures. We also assess the ex-post performance of these properties in terms of appraisal values and rental income. We further investigate whether these properties were located in markets with more volatile transaction prices, exposing REITs to greater capital risk. Third, we analyze whether banks reallocated loans from listed real estate companies toward REITs, thereby reshaping their loan portfolios.

Our empirical analysis yields three main findings. First, both equity costs and loan interest rates for REITs eligible for the BOJ's program declined, leading to an increase in their equity

issuance and borrowing. Second, eligible REITs engaged in more risk-taking, acquiring older properties with higher expected returns but also greater expenses and more volatile local market conditions; ex-post, these properties exhibited lower appraisal values and rental income than those acquired by non-eligible REITs. Third, banks reallocated their lending away from listed real estate firms toward REITs, increasing the share of long-term loans to eligible REITs in their portfolios.

Taken together, these results suggest that the BOJ's REIT purchase program uniquely affected the real estate sector by directly encouraging risk-taking among non-bank institutions. This stands in contrast to findings from previous studies, such as Chakraborty et al. (2020), where banks shifted portfolios within lending markets in response to MBS purchases. We refer to this mechanism as the "real estate channel of unconventional monetary policy."[4]

This paper contributes to three strands of literature. First, it extends research on the risk-taking channel of monetary policy by identifying a new pathway operating through non-bank institutions. While prior studies emphasized banks' risk tolerance, we show how central bank interventions can affect risk-taking outside the banking sector and generate feedback effects on banks. Second, it contributes to the literature on the effectiveness of large-scale asset purchases. While earlier studies focused on corporate or banking sectors (DiMaggio et al., 2020; Rodnyanski and Darmouni, 2017; Charoenwong et al., 2021; Grosse-Reuschkamp et al., 2019), our analysis—closely related to Frame and Steiner (2021) and Hattori and Yoshida (2024)—highlights how the central bank's REIT purchase program reduced risk premia while simultaneously increasing REITs' risk-taking. Third, it adds to the literature on REIT real investment behavior, which has typically focused on acquisition and divestment patterns (Crane and Hartzell, 2010; Suzuki et al., 2022) as well as to the literature on financial investment behavior of other non-bank financial

[4] Similarly, Grosse-Reuschkamp et al. (2019) examined the impact of the ECB's corporate bond purchase program on the capital structure of firms whose bonds were likely to be purchased, referring to this mechanism as the "capital structure channel of monetary policy."

institutions such as insurance companies (Becker and Ivashina, 2015; Koijen and Yogo, 2015) and mutual funds (Choi and Kronlund, 2018; Goldstein, Jiang, and Ng, 2017). By linking investment behavior of non-banks directly to monetary policy interventions, our study sheds new light on this area.

The remainder of the paper is organized as follows. Section 2 describes the institutional setup of REITs and the BOJ's purchase program. Section 3 presents the data and empirical methodology. Section 4 reports the results, and Section 5 concludes.

2. REITs and the Bank of Japan's Unconventional Monetary Policy

2.1 Structure of REITs

Real estate investment trusts (REITs) are investment vehicles that raise funds from investors, invest these funds in real estate properties, and distribute the proceeds of rental income and capital gains to the investors. Investors indirectly own real estate and receive investment income through REITs.

REITs were first created in the United States following the enactment of the Real Estate Investment Trust Act of 1960. REITs in the U.S. can be broadly divided into equity REITs and mortgage REITs (mREITs). REITs must meet their own requirements, i.e. equity REITs must invest at least 75% of their total assets in real estate, while mREITs must invest at least 75% of their total assets in mortgage-backed securities. In addition, both types of REITs are required to distribute at least 90% of their taxable income to shareholders.

2.2 REITs in Japan

In Japan, the Act on Investment Trusts and Investment Corporations was amended in 2000, and the REIT market was established on the Tokyo Stock Exchange (the TSE) in 2001. Unlike REITs

in the United States, only equity REITs are listed in Japan. On the other hand, as in the U.S., REITs are required to hold at least 70% of their total assets in real estate and to distribute at least 90% of their taxable income to shareholders.

Since then, the market for listed REITs in Japan has developed. From just two REITs with a capitalization of 260.3 billion yen, the market has grown to 58 REITs with a total market capitalization of 15.4 trillion yen by the end of 2023. This is almost the same size as the market capitalization of blue-chip real estate companies, which is 16.5 trillion yen for 52 companies in the TSE Prime Market. This indicates that REITs in Japan have a non-negligible presence in the asset market, although it is much smaller than the total market capitalization of all listed blue chip companies (833 trillion yen for 1656 companies in the prime market) on the TSE. Based on the market capitalization of listed REITs worldwide, Japan accounts for 6% of the market, second only to the United States.

2.3 REITs' real estate acquisitions

Along with their growing market capitalization, REITs in Japan have been expanding the size of their real estate holdings, as they are required to hold at least 70% of their assets in real estate. The amount of assets under management has grown from 44 properties and 319.4 billion yen at the beginning of the REIT market to approximately 4,700 properties and 22.7 trillion yen at the end of 2023. During the period, the amount of asset acquisition by the REITs reached its lowest point in 2009, the period of recession following the global financial crisis, and then began to increase after 2010, when the BOJ began purchasing REITs, and exceeded 2 trillion yen in 2013. Since then, it has continued to acquire assets of about 2 trillion yen each year through 2021.

The types of properties held by REITs are diverse. The REIT that were listed shortly after the start of the listed REIT market in Japan held only office buildings, but REITs that were listed

on the market later held not only office buildings but also residential properties, commercial properties, logistics facilities, and hotels in their portfolios. The respective shares of their market capitalization are 39%, 15%, 14%, 20% and 8%. The geographical regions in which real estate is located have also become more diversified. In 2001, half of the properties included in the REITs were located in one of the five central wards of Tokyo's 23 special districts. However, by the end of 2023, 30% of the properties were located in the five central wards of Tokyo special wards, 15% in the other 18 wards, 24% in the Kanto region, and 15% in the Kinki region. This indicates a growing geographical diversification of REIT portfolios. (Sumitomo Mitsui Trust Research Institute, 2024)

Since REITs in Japan are required to distribute at least 90% of their taxable income to shareholders, it is difficult for them to use retained earnings to acquire properties. Instead, they raise funds through public equity offerings or debt financing. In addition, each REIT sets its own voluntary limit on the LTV ratio, which is the ratio of debt to asset value, in order to maintain a healthy financial status and avoid excessive reliance on debt. In fact, the average LTV ratio for REITs has been below 50% and stable over time. As a result, REITs find it difficult to continue acquiring real estate solely through debt; instead, they typically borrow in conjunction with raising equity through public offerings.

2.4 Unconventional monetary policy including the purchase of REITs

The BOJ has been easing monetary policy since the early 1990s following the bursting of the bubble economy, and initiated unconventional monetary policy in 1999, first with the zero-interest rate policy and later with the quantitative easing policy. After the Global Financial Crisis, the BOJ introduced another set of unconventional monetary policies in 2010, which was called the comprehensive monetary easing policy. One of the key features of this policy was the

establishment of funds to purchase risky assets such as corporate bonds (CBs), commercial papers (CPs), equity traded funds (ETFs), and REITs. The objective of this policy was to improve investor sentiment by lowering long-term interest rates and risk premiums through the purchase of risky assets. Subsequently, under the quantitative and qualitative monetary easing that began in 2013, the amount of risky assets purchased was further increased.

2.5 Criteria for the purchase of REITs by the BOJ

Our focus here is on the BOJ's purchase of REITs and how it was implemented. Note that the BOJ did not intend to purchase all REITs listed on the market, but rather REITs with relatively high credit quality. Specifically, the BOJ set the following purchase criteria: (1) REITs with adequate credit quality, including a credit rating of AA or higher, and (2) REITs that have been traded continuously for at least 200 days or have an annual trading volume of at least 20 billion yen. As a result of these criteria, there are some REITs that were purchased by the BOJ while there are some others that were not. In the following section, we will compare these two groups of REITs and examine the impact of the purchase.

2.6 Development of BOJ's REIT purchases

The BOJ initially set the total purchase limit for REITs at 50 billion yen and capped purchases of each REIT at 5% of its outstanding equity. The BOJ subsequently raised the overall limit, especially during the quantitative and qualitative monetary easing (QQE) that began in April 2013. At the start of QQE, the BOJ set the annual purchase cap at 30 billion yen and then tripled it to 90 billion yen in 2014. During COVID-19, the BOJ temporarily doubled the annual limit to 180 billion yen. It also later raised the cap for the purchases of each REIT at 10% of its outstanding equity in December 2015.

Thereafter, the actual amount of purchases declined as the QQE was gradually modified. The BOJ made its last QQE REIT purchase in June 2022, and it ended both REIT and ETF purchases when the negative interest rate policy was lifted in March 2024. The cumulative amount of purchases from the start in 2010 to the end in 2022 was 682.3 billion yen. And the increase in the cumulative amount of purchases was most significant when the maximum annual amount of purchases was raised to 90 billion yen in 2014. The ratio of the market value of BOJ-owned REITs to the total market value of REITs was 5.2 percent at the highest point (end of March 2021). As the purchases were concentrated on a limited number of eligible REITs, some REITs were held by the BOJ close to the 10% limit.

In the above we have examined the overall trend of REITs in Japan and the BOJ's purchase of REITs. In the following sections we will examine how the BOJ's REIT purchases have affected the real estate acquisition behavior of REITs.

3. Empirical approach

In this section we detail our empirical approach. We describe our data sources and explain about the estimation procedure used to test hypotheses about the impact of the BOJ's REIT purchase policy on various economic activities.

3.1 Data

For our analysis, we employ four data sources: the Japan REIT DB provided by Prop Tech Plus Incorporated; The database on individual real estate transactions collected and disclosed by the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT) of the Japanese government; The NEEDS-FinancialQUEST database provided by the Nikkei Incorporated; and the database on yields of the Japanese government bonds (JGBs) provided by the Ministry of Finance (MOF)

of the Japanese government. Using one or several of these sources, we construct datasets for empirical estimations we detail in the next subsection.

The Japan REIT DB is a database of publicly traded REITs updated every fiscal year. It contains information on the properties purchased and held by the REITs, their financial statements, and loan issuance. It includes characteristics of individual properties owned by the REITs such as appraisal prices, rental income, rental expenses, capital expenditures, acquisition and construction dates, building floor area, number of stories, land size, distance from the nearest station, names of sellers and appraisers, and other rental-related expenses and income, among others. The database provides information from balance sheets and income statements at the REIT level, including total assets, short- and long-term debt, market capitalization, operating income, and other items related to the REITs' financial conditions. The database also provides detailed information on the new loan issuances by REITs at the loan contract level. This information includes loan amounts, interest rates, collateral status, maturity dates, interest rate types (fixed or floating), lender names, and loan contract start and end dates.

The MLIT's database on individual real estate transactions is reported on the quarterly basis and includes information on transaction prices, land size and shape, building use and structure, floor size, building establishment year, distance from the nearest train station, land use designation by the local government's land use plan, land-to-structure ratio, and floor-to-land ratio. The NEEDS-FinancialQUEST database provides the financial information not only on listed companies, including REITs, and the banks with which these companies transact on a fiscal year basis. The database provides information on the stock prices of the REITs on a daily basis, which is unavailable in the Japan REIT DB. It also provides information on the outstanding loan amounts extended by banks with which each of listed firm and REIT transacts. The Ministry of Finance's (MOF's) database on the Japanese government bonds (JGBs) provides daily information on the

yields of the JGBs with maturities ranging from one to forty years.

Using the Japan REIT DB, we construct a dataset to examine the characteristics of real estate properties that are acquired by REITs using the following sample selection procedure. First, we restrict the sample to properties acquired by each REIT between 2005 and 2022, given that the BOJ began purchasing REITs in 2010. Finally, we drop observations for REITs that were newly listed on the stock exchange after 2011 and those that were private or bankrupt before 2011. Following these steps, we obtain a sample of 1,910 properties from 31 REITs covering the period from 2005 to 2022. Regarding loan contracts, we use loan issuance data from the 31 REITs in our sample from 2005 to 2022.

To the above dataset we add information on other real estate transactions located near the properties acquired by the REITs using the MLIT's database. This allows us to construct variables representing the characteristics of the local real estate market. We define the neighborhood of each REIT's purchased properties as a circle with a radius of one, two, or three kilometers. We then use transaction records within this circle to construct variables representing the local real estate market's status in the vicinity of the REITs' purchased properties. Figure 1 shows an example of an area within a three-kilometer radius (shown in blue) from the location of a property purchased by a REIT (shown as a red point), which includes properties transacted around the REIT's purchase (shown as green points).

(Figure 1)

We construct another dataset to examine the issuance of equities by the REITs and the allocation of loan portfolio for the banks. For this purpose we employ the NEEDS-FinancialQUEST database and the BOJ's JGBs database. For examining equity issuance and its costs, we integrate the former data source with the latter. For examining the impact on banks' loan portfolio, we use the information on loan amount outstanding for each bank that listed firms

including REITs transact with and construct banks' loan portfolio to the REITs and that to listed real estate companies for many years. The panel dataset enables us to examine how banks changed their loan supply from real estate companies to REITs after the introduction of the BOJ's REIT purchase program.

3.2 Hypothesis building and empirical specifications

This section sets out the empirical hypotheses and corresponding estimation specifications. First, we hypothesize how the BOJ's purchases of REITs affect the equity and loan risk premia, as well as the issuance volumes of equities and loans by REITs. Second, we propose a hypothesis on how these purchases influence REITs' risk-taking behavior in real estate investment. Finally, we examine potential spillover effects on the loan market.

3.2.1 Lower risk premium for and larger issuance of equities and loans

The primary objective of the BOJ's REIT purchase program was to reduce risk premiums in the financial market. By purchasing equities issued by REITs, the BOJ aimed to lower the risk premium on the eligible REITs' equity after the program's introduction. Lower funding costs, in turn, are expected to encourage these REITs to issue more equity.

Because Japanese REITs impose voluntary upper limits on their loan-to-value ratios, they are likely to borrow more when they issue additional equity. Accordingly, we expect that eligible REITs face lower risk premiums and thus lower loan interest rates compared with non-eligible REITs. We also expect them to take out a larger volume of new loans. Based on this reasoning, we propose the following hypothesis regarding the financing of REITs:

Hypothesis 1: Eligible REITs face lower equity and loan costs than non-eligible REITs after the

start of the BOJ's REIT purchase program. Consequently, they issue larger amounts of equity and loans.

To test Hypothesis 1 concerning the equity financing costs of eligible REITs, we employ a DID approach and estimate the following equation (1):

$$Y_{jt} = \beta_1 Eligible_{jt} + \beta_2 Post_t + \beta_3 Eligible_{jt} * Post_t + \delta_1 X_{jt} + +\theta_j + \mu_t + \varepsilon_{ijt} \quad (1)$$

where Y_{jt} denotes either the cost of equity issuance or the ratio of new equity issuance to total assets for REIT j in year t. Note that the data on equity costs and new equity issuance are reported at different frequencies and in different formats. For equity issuance costs, we apply the Capital Asset Pricing Model (CAPM) framework and regress the risk premium of an individual REIT's stock return on the market return to obtain β on a monthly basis, which enables us to construct a balanced panel dataset. In contrast, for the size of equity issuance, we use information on individual REIT equity offerings, which results in a dataset with pooled observations.

For the explanatory variables, $Eligible_{jt}$ is an indicator that equals one if REIT j was eligible for the BOJ's purchase program, and zero otherwise. $Post_t$ equals one for years after 2011, when the BOJ began purchasing REITs. X_{jt} denotes the characteristics of REIT j, such as size, profitability, leverage, and market-to-book ratio. We control for REIT and year fixed effects by θ_j and μ_t, respectively. If the risk premium decreased for eligible REITs after the start of the BOJ's purchases, the coefficient of β_3 is expected to be negative in the equity cost estimation. In the equity issuance estimation, a lower risk premium facilitates access to external finance for eligible REITs, leading to greater equity issuance compared with non-eligible REITs. Thus, the coefficient of β_3 is expected to be positive. For loan costs of eligible REITs and the amount of

loan issuance, we employ the following specification of the equation (2):

$$Y_{bjt} = \beta_1 Eligible_{jt} + \beta_2 Post_t + \beta_3 Eligible_{jt} * Post_t + \delta_1 X_{bjt} + \delta_2 Z_{jt} + \delta_3 W_{bt} + \theta_j + \mu_t + \varepsilon_{bjt} \quad (2)$$

where Y_{bjt} is interest rate or the amount of new loan issuance to the total assets for REIT j from bank b in year t. The frequency and format of the dataset is the same between the interest rate and the loan amount estimations. X_{bjt} represents characteristics of the loan contract extended by bank b to REIT j and includes maturity, loan syndication, type of interest rate (floating or fixed), and collateralization. Z_{jt} represents characteristics of REIT j such as its size, profitability, leverage, and market-to-book ratio. W_{bt} represents bank b's characteristics such as size, profitability, capital ratio, and the non-performing loan ratio. We control for the REIT and year fixed effects by θ_j and μ_t, respectively. If eligible REITs face lower interest rates after the BOJ's purchasing program, the coefficient β_3 is expected to be negative in the interest rate estimation. On the other hand, in the loan amount estimation, the lower interest rate environment for eligible REITs will increase their loan demand more than that of non-eligible REITs, resulting in a positive β_3.

3.2.2 More risk-taking in real estate investment

If eligible REITs face lower financing costs and issue larger amounts of equity and loans, they will have greater capacity for risk-taking in their investments. We therefore expect them to purchase riskier properties with higher returns rather than safer properties with lower returns. To test this prediction, we posit the following hypothesis regarding risk-taking in investment:

Hypothesis 2: Eligible REITs purchase more profitable but riskier properties than non-eligible

REITs following the introduction of the BOJ's REIT purchase program.

We examine the characteristics of real estate properties purchased by the REITs and how they changed after the BOJ's REIT purchase. We employ the same DID framework as in the equation (2). However, we use different sets of dependent and explanatory variables for the estimation as in the equation (3):

$$Y_{ijt} = \beta_1 Eligible_{jt} + \beta_2 Post_t + \beta_3 Eligible_{jt} * Post_t + \delta_1 X_{it} + \delta_2 Z_{jt} + \theta_j + \mu_t + \varepsilon_{ijt} \quad (3)$$

where Y_{ijt} is the characteristics of the real estate property i that are purchased by REIT j in year t. There are three types of characteristics. For the first type of variables, we use the return of a real estate property, property age, a dummy for middle-aged property, rental expenses and capital expenditures for a property.

As real estate properties age, they require higher maintenance expenditures and greater investment in renovation. Such properties also face an increased risk of future income decline due to obsolescence and higher vacancy rates. Consequently, older properties—those requiring substantial maintenance and renovation—are riskier and thus expected to offer higher returns as compensation. Following Yoshida et al. (2024), we construct a dummy variable for middle-aged properties (10–20 years old), which typically require renovation investment. We then examine whether eligible REITs are more likely than non-eligible REITs to purchase riskier but potentially more profitable properties.

As a second measure of risk, we use the volatility of transaction prices in the neighborhood where a REIT acquires a property. Specifically, we test whether eligible REITs tend to invest in areas where returns from nearby real estate transactions are more volatile. To capture this, we use

the MLIT real estate transaction database to calculate average transaction prices and average transaction prices per square meter in the vicinity of each purchased property on a quarterly basis. We then compute the standard deviation of these average prices over the 12 quarters (three years) preceding the acquisition. When including these measures as dependent variables, we also control for X_{it}, which incorporates the average characteristics of nearby transacted properties—namely, building size, age, and distance to the nearest station—over the same three-year pre-acquisition period.

For the third type of variables, we assess the ex-post riskiness of properties acquired by REITs. Specifically, we construct two dummy variables that indicate whether a property's appraisal value and operating income, respectively, decline within several quarters after acquisition. This allows us to examine whether eligible REITs are more likely to acquire properties whose value or income subsequently falls.

For the explanatory variables, $Eligible_{jt}$ equals one if property i is acquired by a REIT eligible for the BOJ's purchase program, and zero otherwise. $Post_t$ equals one for years after 2011, when the BOJ began purchasing REITs. X_{it} denotes property-level characteristics, including building size, land size, number of stories, and distance to the nearest train station. We also include REIT fixed effects (θ_j) and year fixed effects (μ_t).

Using these three types of dependent variables—the property's physical characteristics, the volatility of nearby transaction prices, and the ex-post riskiness of acquired properties—we test whether eligible REITs take on more risk after the BOJ's purchase program. If eligible REITs began acquiring riskier properties than non-eligible REITs, the coefficient of β_3 would be positive not only in specifications using property characteristics as the dependent variable, but also in those using transaction price volatility.

3.2.3 Spillover effect in the loan market

For the third analysis, we examine the reallocation of loans among eligible REITs, non-eligible REITs, and publicly traded companies in the real estate industry. While listed real estate companies engage in activities similar to REITs—developing land, constructing buildings, and renting properties—they differ from eligible REITs in that their shares were not directly purchased by the BOJ and thus they had no incentive to increase risk-taking.

We therefore expect that banks, recognizing the greater risk-taking of eligible REITs, responded more positively to their loan demand than to that of other real estate companies. As a result, banks are expected to have reallocated their loan portfolios away from publicly traded real estate companies toward eligible REITs following the BOJ's REIT purchase program. Summarizing these conjectures, we propose the following hypothesis:

Hypothesis 3: After the start of the BOJ's REIT purchase program, banks reallocated their loan portfolios from publicly traded real estate companies to eligible REITs, reflecting a spillover effect of the program on the allocation of bank credit.

To examine this hypothesis, we employ the following specification for estimation of the equation (4):

$$Loan_{ijt} = \beta_1 EligibleREIT_{it} + \beta_2 NonEligibleREIT_{it} + \beta_3 Post_t + \beta_4 EligibleREIT_{it} * Post_t + \beta_5 NonEligibleREIT_{it} * Post_t + \beta_6 X_{it} + \beta_7 Z_{jt} + \theta_i + \varphi_j + \xi_t + \varepsilon_{ijt} \quad (4)$$

where $Loan_{ijt}$ is the loan amount outstanding extended to REIT i by bank j in year t, which is constructed from the NEEDs FinancialQUEST database. $EligibleREIT_{it}$ and

$NonEligibleREIT_{it}$ are dummies for the loans extended to the eligible REITs and non-eligible REITs, respectively. $Post_t$ is a dummy that the year is after 2011. X_{it} represents characteristics of REIT j such as its size, profitability, leverage, and market-to-book ratio. Z_{jt} represents characteristics of bank b such as its size, profitability, capital ratio, and the non-performing loan ratio. We also control for the REIT, bank, and year fixed effects by θ_i, φ_j, and ξ_t respectively. In this estimation, if banks allocate their funds toward eligible REIT after the introduction of the BOJ's purchasing program, and the key variable β_4 is expected to be positive.

4. Results

In this section, we present the estimation results and evaluate the hypotheses outlined in the previous section regarding the impact of the Bank of Japan's (BOJ) REIT purchase program. Sections 4.1 and 4.2 focus on the effects on equity and loan issuance by REITs, respectively. Section 4.3 examines changes in REITs' risk-taking behavior in their property acquisitions. Finally, Section 4.4 explores potential spillover effects of REITs' behavior on the broader loan market. Definitions of variables employed for estimations are explained in Table 1 and their summary statistics are presented in Table 2.

4.1 Equity costs and issuance of new equities

Hypothesis 1 posits that the BOJ's REIT purchase program lowers risk premiums for eligible REITs. We therefore expect these REITs to experience reduced equity financing costs compared to non-eligible REITs. As a result, we anticipate a greater volume of equity issuance among eligible REITs following the program's introduction.

(Table 3)

Table 3 shows the results for equity costs. The most important coefficient in the estimations is

that on the interaction between Eligible and After, which measures the change in equity costs for the eligible REITs after the start of the BOJ's REIT purchase policy. The coefficients are in general negative as shown in the columns (4), (7), (8), and (9) when we control for the attributes of the REITs. The size of the coefficients, when statistically significant, ranges between -0.13 to -0.18 percentage points and are economically substantial.

Focusing on the column (9) that employs the most comprehensive set of explanatory variables, we have a few additional findings. First, the coefficient on Eligible is statistically insignificant when REITs' attributes are being controlled for, which underlines the importance of including these attributes in the estimations. Second, coefficients on the size and ROA of the REITs are negative and significant. We interpret that investors require a lower rate of return when the REITs are sizable and profitable, indicating a low degree of investor-REIT information asymmetry. Third, the coefficients on the debt held by REITs are negative and those on the market-to-book value ratios are positive. The former result may suggest that investors view high borrowing by REITs as a signal of continuous access to bank financing, which in turn reduces their required equity issuance costs. The latter may reflect investors' perception that firms with greater growth opportunities are uncertain in their future performance and therefore incur higher equity issuance costs.

(Table 4)

Table 4 shows the results for the size of equity issuance. Throughout the columns, with or without controlling for the attributes of REITs, the coefficients on the interaction between Eligible and Post are all positive and significant with their size ranging from 0.62 to 0.90. This indicates that the size of the individual equity issuance relative to the total assets becomes larger for the eligible REITs after the BOJ's policy by 62 to 90 percentage points. We find that the results of Tables 3 and 4 are consistent with the prediction regarding equity costs and the issuance of equities of

Hypothesis 1.

4.2 Loan costs and issuance of new loans

We next examine the impact of the BOJ's program on REITs' debt financing. In line with the expectations for equity markets, we predict lower borrowing costs and increased loan issuance for eligible REITs relative to non-eligible ones after the BOJ's intervention.

(Table 5)

Table 5 shows the results for the interest rate charged for the REITs. In all the columns except for (3), coefficients on the interaction term are negative and statistically significant, indicating that the decline in the loan interest rate for the eligible REIT after the BOJ's policy ranges between 0.05 to 0.07 percentage points. Considering that the level of interest rates during the period of analysis is extremely low in Japan, the margin of the decline is substantial.

In addition to the impact of the BOJ's policy for the eligible REITs, a few relevant findings regarding the determinants of the interest rates are in order. For the variables on bank characteristics, financially healthier banks charge lower interest rates, while those that are larger in size charge higher interest rates to REITs, possibly due to their high bargaining power. For the variables on loan contracts, interest rates charged to REITs tend to be higher when the loans have fixed interest rates, longer maturities, and are secured by collateral. For the attributes of REITs, interest rates charged to REITs tend to be higher when the REITs are smaller, more profitable, and have lower market to book value ratios in the stock market.

(Table 6)

Table 6 shows the results for the size of loan issuance. In all the columns, with or without controlling for the attributes of banks and REITs and loan contract terms, the coefficients on the interaction between Eligible and Post are all positive and significant with their size ranging from

0.004 to 0.009. This indicates that the size of the individual loan issuance relative to total assets held by the REIT becomes larger for the eligible REITs after the BOJ's policy by 0.4 to 0.9 percentage points. Note that the size of the coefficients is substantially smaller here than in Table 4, in which the size of the individual equity issuance becomes larger by more than 50 percent.[5] Also, when bank and REIT fixed effects are controlled for in the column (9), coefficients on most of the other explanatory variables except for loan contract terms are not necessarily statistically significant.

To summarize the results of Tables 5 and 6, interest rates are lower and the issuance amount is larger after the introduction of the BOJ's purchase for the eligible REITs. These are consistent with the prediction regarding loan costs and the issuance of loans of Hypothesis 1.

4.3 Risk-taking in property acquisitions

Given the observed decline in equity and loan financing costs - and the associated increase in the issuance of credit - for eligible REITs, it is plausible that these REITs also increased their capacity and willingness to take on risks. Hypothesis 2 proposes that eligible REITs respond to this enhanced capacity by engaging in riskier real estate acquisitions than non-eligible REITs. We investigate this hypothesis using several dimensions of risk in property acquisitions.

Specifically, we estimate models using three types of dependent variables: (i) characteristics of the properties acquired by REITs at the time of purchase; (ii) ex-ante volatility and growth of prices of the transacted real estate properties in the surrounding area, and (iii) ex-post performance of the acquired properties.

4.3.1 Characteristics of acquired properties at the time of purchase

[5] One possibility is that eligible REITs increased the number of loan issuances, while they increased the volume of each loan issuance by a very slim margin after the introduction of the BOJ's purchases.

We assess whether eligible REITs acquired properties with riskier characteristics - such as older buildings requiring higher operating and capital expenditures - relative to non-eligible REITs. We also examine whether eligible REITs offset these risks by targeting more profitable properties.

(Table 7)

Table 7 shows the results for the estimations of various characteristics of the acquired real estate properties. The column (1) presents the results for the return on property. The coefficient on the interaction between Eligible and Post is positive and significant at the 1% level, indicating that the eligible REITs invest in more profitable properties after the introduction of the BOJ's policy relative to the non-eligible REITs. The columns (2) and (3) show results for the age of the acquired properties and all the coefficients on the interaction term are positive and significant, indicating that the eligible REITs purchase older properties after the start of BOJ's policy relative to non-eligible REITs. The columns (4) and (5) show results for operating expenses and capital investment expenditures. Coefficients on the interaction terms are positive, indicating that the eligible REITs undertake more expenditures for maintenance and investment possibly for renovation. We interpret that older properties involve higher operating expenses and capital expenditures and are exposed to a greater risk of obsolescence. The results of all these columns are consistent with Hypothesis 2 that the eligible REITs invest in riskier but more profitable properties after the BOJ's REIT purchase policy.

To further explore the REITs' risk-taking behavior and examine the role of financial constraints, we stratify the analysis based on REITs' ex-ante credit ratings. Since REITs with lower credit ratings may have faced greater financing constraints, we examine whether the BOJ's program disproportionately influenced their acquisition behavior. To examine this possibility, we divide eligible REITs into three categories based on credit ratings (AA-, AA, and AA+) and expect the treatment effect to be the largest for the lowest rated and most constrained (AA-) REITs.

(Table 8)

Table 8 shows the results.[6] Coefficients on the interaction between Eligible AA- and Post are statistically significant and positive except for the columns (2) and (3), while those on the other interaction terms are insignificant. Moreover, the size of the coefficients on the interaction term between the AA- rated REITs and Post is similar to the size of the coefficients on the interaction between Eligible and Post in Table 7. This indicates that the positive treatment effects of risk-taking are driven by the behavior of eligible but least creditworthy REITs.

For the examination of characteristics of acquired real estate properties, we implement a battery of additional estimations for robustness and present the results in the appendix tables. These include estimations for the matched sample (Tables A1 and A2), placebo tests (Table A3), and estimations for the sample that includes marginally eligible (AA-) REITs and marginally ineligible (A+) REITs (Table A5).

4.3.2 Combinations of property characteristics representing risk and return

While the preceding subsection analyzed each property characteristic separately, it may well be the case that REITs assess properties based on a bundle of attributes. To describe this decision-making process by the REIT more precisely, we construct dummy variables by combining a variable for riskiness of a property (e.g., property age, operating expenses, capital investment expenditures) with a variable for profitability of the property and examine how eligible REITs balance risk and return when acquiring properties. More specifically, we construct a HighReturn_HighAge dummy in which the value of one is assigned for the property whose rate of return and property age are respectively higher than each of the medians and the value of zero

[6] Note that there are no observations for eligible REITs with credit rating of AA+ after the introduction of the BOJ's purchasing program, which is the reason for missing coefficients on eligible AA+*Post in the Table 8.

is assigned for the property whose rate of return and property age are respectively lower than each of the medians. In a similar manner we construct a HighReturn_HighOE (operating expenses) and a HighReturn_HighCAPEX (capital expenditures) dummy. We expect that the eligible REITs choose properties that are high return and high risk more than the non-eligible REITs after the introduction of the BOJ's purchase policy.

(Table 9)

Using these dependent variables, we estimate the equation (3) and show the results in Table 9. For two of the three dependent variables, the coefficients on the interaction term are positive and significant, which is consistent with Hypothesis 2.[7]

4.3.3 Ex-ante return and risk of neighboring properties

The data on characteristics for the acquired real estate properties by REITs is only available after their acquisition. To capture real estate market risk at the time of purchase, we draw on information about local market conditions in the areas of the properties acquired by the REITs. As explained in Section 3, we utilize transaction data for neighboring properties to assess the historical volatility and growth trends in the vicinity of the acquired properties, thereby capturing the extent of risk in the local real estate market. More specifically, we define the market as circular areas with radius of 1 km, 2 km, and 3 km centered on each acquired property. For each property, we calculate the standard deviation and growth rate of transaction prices within each market area, and use these as dependent variables in our analysis.

(Table 10)

Table 10 shows the results. In the column (1), we present coefficients on the interaction

[7] We also construct a variable that combines two property characteristics—(i) a high return on the properties acquired by REITs and (ii) a high standard deviation of transaction prices of neighboring properties—and use it in the estimation. The results are reported in Appendix Table A4.

between Eligible and Post in the estimations of the standard deviation of transaction prices in the local market. In all the three estimations we have significant and positive coefficients, indicating that the eligible REITs purchase properties in a more volatile real estate market than non-eligible REITs. In the column (2), the results are for the estimation using the growth of transaction prices for the dependent variable. One of the coefficients is negative and significant, indicating that the eligible REITs purchase properties in the market in which transaction prices are more likely to decrease. The results are generally consistent with Hypothesis 2 in that the eligible REITs participate in risky real estate market after the introduction of the BOJ's purchase policy.

4.3.4 Ex-post performance of acquired properties

To further assess the extent of risk-taking by the eligible REITs, we examine the post-acquisition performance of the properties acquired by REITs. If eligible REITs pursued higher-risk investments, we may observe underperformance of the invested properties—such as declines in appraisal values and rental income—relative to properties acquired by non-eligible REITs.

(Table 11)

Table 11 shows the results. Panel A reports the estimation results using a dummy for declining appraisal values of the purchased properties as the dependent variable. We run six separate estimations by varying the post-purchase period, and the coefficients on the interaction between Eligible and Post are positive and significant in most cases. Similarly, panel B presents coefficients on the interaction term for the estimation of the declining rental income. In half of the estimations, the signs are positive and significant. These results suggest that eligible REITs acquire properties with greater risk, which are more prone to post-purchase declines in appraisal values and rental income than those acquired by non-eligible REITs.

4.4 Spillover effects in the loan market

Our preceding results suggest that the BOJ's purchase program reduced risk premiums and encouraged risk-taking by eligible REITs. In this subsection, we test Hypothesis 3 by investigating whether these changes have spillover effects on bank lending behavior - specifically, whether banks reallocate loans from non-REIT sectors to REITs, particularly those eligible for the BOJ's purchases.

To examine this, we compare trends in loan allocation across three groups: publicly traded real estate companies, non-eligible REITs, and eligible REITs. This analysis provides insight into whether increased credit flows to eligible REITs came at the expense of other sectors, implying a reallocation of credit within the real estate financing market.

(Table 12)

Table 12 reports the results for long-term loans. The coefficients on the two interaction terms—Eligible*Post and Non-eligible*Post—are positive and statistically significant across all specifications. This indicates a notable reallocation of loans from listed non-REIT real estate companies to the REIT sector. Moreover, the coefficients for Eligible*Post are consistently larger than those for Non-eligible*Post, suggesting that the shift in credit was more pronounced toward eligible REITs. These findings imply that the BOJ's REIT purchase policy contributed to this reallocation of loans from the non-REIT sector to the REIT sector.

In summary, the results support Hypothesis 3: banks reallocated their loan portfolios toward eligible REITs and away from listed real estate companies following the implementation of the BOJ's policy.

5. Conclusion

In this study, we examined how one form of unconventional monetary policy—central bank

purchases of equity in real estate investment trusts (REITs)—affects the real economy. Leveraging the unique characteristics of REITs, which primarily hold real estate assets, we focused on the risk profile of their property holdings to assess the presence of a risk-taking channel in monetary policy transmission.

Using detailed data on REITs, we conducted several empirical analyses and found that: (1) the central bank's equity purchases reduced both equity financing and borrowing costs for the targeted REITs; (2) these REITs subsequently acquired riskier, higher-return properties; and (3) banks reallocated lending away from non-REIT real estate firms toward REITs. These findings suggest that central bank equity purchases encourage greater risk-taking among targeted institutions and influence the broader loan market through a reallocation of bank portfolios. We argue that these effects are distinctive enough to be considered a new transmission mechanism: the real estate channel of unconventional monetary policy.

Several issues remain for future research. First, we need a deeper understanding of how monetary policy affects the economy when the central bank purchases equity rather than debt. Our analysis shows that the reduction in equity issuance costs was greater than the decline in loan costs following the Bank of Japan's REIT purchase program. However, it remains unclear whether one unit of equity purchase has a larger impact on financing costs than an equivalent unit of debt purchase. Exploring this further would yield valuable insights into the relative effectiveness of different monetary policy tools.

Second, the spillover effects of this policy may extend beyond the loan market. For instance, REITs' acquisitions could significantly affect local property markets. If so, property prices in nearby areas may rise following acquisitions by eligible REITs. Investigating such spillover effects represents another important avenue for future research.

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Table 1 Variable definitions

Variables	Definitions
(A) Variables used for real estate property-level estimation	
Characteristics of purchased properties	
Return	Annual rental income of a property / its appraisal price
Property_Age	Property age in months
Operating_Expense	Log(1+rental expenses for a property in million yen)
Capital_Expenditure	Log(1+capital expenditures for a property in million yen)
Decrease_in prices	1 if appraisal price for a property decreases after acquisition, and 0 otherwise.
Decrease_in rental income	1 if rental income from a property decreases after acquisition, and 0 otherwise.
HighReturn_HighAge	1 if return is higher than median and property age is above the median, and 0 if return is no higher than the median and the property age is below the median.
HighReturn_HighOE	1 if return is higher than median and property rental expenses are above the median, and 0 if return is no higher than the median and rental expenses are below the median.
HighReturn_HighCAPEX	1 if return is higher than median and capital expenditures are above the median, and 0 if return is no higher than the median and capital expenditures are below the median.
Story	Log(1+the number of stories)
Land_size	Log(1+land size in square meters)
Distance	Log(1+distance from the nearest train station in meters)
Characteristics of REITs	
Post	1 if year is after 2010, and 0 otherwise.
Eligible	1 if a REIT satisfies the following two conditions for being eligible for the Bank of Japan's purchase: (1) it has credit ratings of AA or better and (2) annual transaction volume is more than or equal to JPY2 billion and there are more than or equal to 200 days in which it has positive transactions in the market, and 0 otherwise.
REIT_size	Log(1+total assets held by a REIT)
REIT_ROA	Operating revenue of a REIT / its total assets
REIT_debt	(Short- and long-term debt held by a REIT) / its total assets
REIT_market to book ratio	(Short- and long-term debt held by a REIT + its market capitalization) / its total assets
Characteristics of local property transactions in the vicinity of the properties purchased by the REIT	
Std_transaction prices	The standard deviation of the quarterly mean transaction prices of properties located in the vicinity of real estate properties purchased by REITs over the past three years
Growth_transaction prices	The growth of the quarterly mean transaction prices of properties per a square meter located in the vicinity of real estate properties purchased by REITs over the past three years
Mean_distance (m)	Average of the quarterly mean distance from the nearest station for transacted properties located in the vicinity of real estate properties purchased by REITs over the past three years
Mean_property age (year)	Average of the quarterly mean property age of transacted properties located in the vicinity of real estate properties purchased by REITs over the past three years
Mean_area size (m^2)	Average of the quarterly mean area size of transacted properties located in the vicinity of real estate properties purchased by REITs over the past three years

Table 1 Variable definitions (continued)

Variables	Definitions
(B) Variables used for loan contract estimation	
Characteristics of loans	
New_loan	Amount of a new loan extended to a REIT / Total assets held by a REIT
Interest rate	Interest rate (%)
Floating	1 if interest rate is floating, and 0 otherwise.
Syndicate	1 if loan is extended by multiple banks, and 0 otherwise.
Maturity	Maturity in the number of days
Collateral	1 if a REIT pledges its assets as collateral, and 0 otherwise.
Characteristics of banks	
Bank_size	Log(1+total assets held by a bank)
Bank_capital ratio	BIS capital ratio for a bank (%)
Bank_cash flow	Operating revenue of a bank / its total assets
Bank_NPL ratio	Non-performing loans of a bank/ its total loans
(C) Variables used for firm/REIT-bank relationship level estimation	
Long-term_loan_ratio	Outstanding amount of long-term loans extended by a bank to a firm/ total amount of loans extended by the bank (%)
(D) Variables used for equity cost estimation	
Equity_costs	The yield of 10-year Japanese government bonds + Beta*(the market return of REIT in Tokyo Stock Exchange − the yield of 10-year JGBs) (%)
Beta	Coefficients from the regression of (an individual REIT stock return - the yield of 10-year JGBs) on (the market return of REITs in Tokyo Stock Exchange - the yield of 10-year JGBs) for each year
(E) Variables used for equity issuance estimation	
New_equity	Amount of new equity issued by a REIT / Total assets held by the REIT

Table 2 Summary statistics

	Obs.	Mean	S.D.	Min	Median	Max
(A) Property characteristics						
Return	1,910	0.024	0.013	0.001	0.024	0.066
Property Age	1,910	134.960	116.475	1.000	99.000	466.000
Operating Expense	1,910	33.147	52.833	0.088	14.000	316.000
Capital Expenditure	1,910	2.371	6.342	0.000	0.256	42.368
Decrease_in_prices	1,910	0.229	0.420	0.000	0.000	1.000
Decrease_in_rental income	1,910	0.118	0.323	0.000	0.000	1.000
Story	1,910	2.330	0.446	1.099	2.398	3.638
Land_size	1,910	6.922	1.154	5.035	6.691	10.658
Distance	1,910	5.769	0.791	4.394	5.771	7.561
(B) REIT characteristics						
Post	1,910	0.583	0.493	0.000	1.000	1.000
Eligible	1,910	0.330	0.470	0.000	0.000	1.000
REIT size	1,910	267528	226118	8485	201546	1367720
REIT ROA	1,910	0.016	0.003	0.008	0.016	0.028
REIT debt	1,910	0.472	0.064	0.270	0.473	0.618
REIT market to book ratio	1,910	1.012	0.216	0.639	0.982	1.703
(C) Local transaction characteristics						
Std_transaction prices2	1,669	5358986	11600000	1693	2463202	305000000
Mean_distance	1,703	596.498	374.814	106.667	511.330	7250.000
Mean_property age	1,700	17.328	4.624	0.579	17.072	40.917
Mean_area size	1,704	120.635	87.079	15.000	100.626	2000.000
(D) Loan characteristics						
New loan	6,407	0.011	0.017	0.001	0.005	0.106
Interest spread	4,360	0.740	0.463	0.049	0.665	2.055
Floating	6,407	0.673	0.469	0.000	1.000	1.000
Syndicate	6,407	0.197	0.398	0.000	0.000	1.000
Maturity	6,407	1467.286	1266.346	14.000	1278.000	3671.000
Collateral	6,407	0.039	0.193	0.000	0.000	1.000
(E) Bank characteristics						
Bank size	6,407	412424.300	282828.000	8484.589	325315.900	1367720.000
Bank capital ratio	6,317	15.522	3.678	8.540	15.540	28.060
Bank cash flow	6,400	0.014	0.006	0.005	0.012	0.033
Bank NPL ratio	6,401	0.014	0.010	0.002	0.011	0.055
(F) Firm/REIT-bank relationship characteristics						
Long-term_loan_ratio	20,371	0.044	0.072	0.000	0.018	0.409
(G) Equity characteristics						
Equity costs	5,656	-0.007	0.008	-0.062	-0.005	0.014
New equity	322	0.490	0.855	0.006	0.243	5.294

This table reports summary statistics for the samples used for the estimations. Variable definitions are provided in Table 1.

Table 3 Equity costs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable:	Equity costs								
Eligible	-0.159***	-0.087**	-0.123***	0.071	-0.009	-0.013	0.078*	0.066	0.064
	(0.040)	(0.039)	(0.041)	(0.047)	(0.046)	(0.046)	(0.047)	(0.047)	(0.042)
Post	0.085***	0.063*	0.064	0.404***	0.179***	0.075	0.296***	0.410***	0.421***
	(0.032)	(0.034)	(0.099)	(0.088)	(0.038)	(0.047)	(0.055)	(0.089)	(0.145)
Eligible*Post	0.026	0.027	-0.013	-0.181***	-0.049	-0.049	-0.125**	-0.174***	-0.174***
	(0.044)	(0.045)	(0.044)	(0.054)	(0.046)	(0.045)	(0.053)	(0.054)	(0.049)
REIT_size				-0.337***	-0.152***	-0.151***	-0.283***	-0.349***	-0.370***
				(0.044)	(0.020)	(0.019)	(0.038)	(0.045)	(0.044)
REIT_debt				-0.245	-0.586***	-0.537***	-0.380**	-0.271	-0.265*
				(0.167)	(0.124)	(0.130)	(0.160)	(0.169)	(0.156)
REIT_ROA				-2.920	-3.901**	-2.719	-4.239**	-3.631**	-5.009***
				(1.806)	(1.877)	(1.985)	(1.809)	(1.836)	(1.831)
REIT_market to book ratio					0.230***	0.245***	0.226***	0.172**	0.411***
					(0.052)	(0.069)	(0.055)	(0.082)	(0.073)
Year FE	No	No	Yes	Yes	No	Yes	No	Yes	No
REIT FE	No	Yes	No	Yes	No	No	Yes	Yes	Yes
Year-Month FE	No	No	No	No	No	No	No	No	Yes
Observations	5,122	5,122	5,122	5,049	5,049	5,049	5,049	5,049	5,049
R-squared	0.012	0.072	0.062	0.160	0.042	0.094	0.106	0.162	0.340

This table reports the estimation results for the impact of the BOJ's REIT purchases on REIT equity costs. The dependent variable is Equity Costs. The specification follows the equation (1) and includes year, REIT, and year–month fixed effects. Standard errors are clustered at the firm–year–month level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Table 4 Size of equity issuance

	(1)	(2)	(3)	(4)	(5)
Dependent variable:	New equity				
Eligible	-0.972***	-0.982***	-0.887***	-0.817***	-0.626**
	(0.193)	(0.213)	(0.228)	(0.271)	(0.260)
Post	-1.112***	-1.362***	-1.199***	-1.623***	-0.706
	(0.186)	(0.345)	(0.226)	(0.436)	(0.482)
Eligible*Post	0.835***	0.859***	0.879***	0.898***	0.623**
	(0.198)	(0.218)	(0.235)	(0.244)	(0.253)
REIT_size					-0.599**
					(0.254)
REIT_debt					7.119
					(25.457)
REIT_ROA					-0.393
					(1.299)
REIT_market to book ratio					-0.019
					(0.308)
Firm FE	No	No	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	Yes
Firm controls	No	No	No	No	Yes
Observations	322	322	322	322	322
R-squared	0.295	0.348	0.337	0.393	0.417

This table reports the estimation results for the size of equity issuance and estimates the impact of the BOJ's REIT purchases on REIT equity issuance size. The dependent variable is New equity. The specification follows the equation (1) and includes year and REIT fixed effects. Standard errors are clustered at equity issuance deal level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Table 5 Loan interest rates

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Interest rate					
Eligible	-0.231***	-0.134***	-0.070***	-0.018	-0.017	-0.016
	(0.023)	(0.015)	(0.016)	(0.016)	(0.017)	(0.017)
Post	-0.390***	-0.140***	-0.230***	-0.007	0.015	-0.071
	(0.025)	(0.027)	(0.029)	(0.041)	(0.041)	(0.046)
Eligible*Post	-0.072**	-0.056***	0.004	-0.055***	-0.049**	-0.046**
	(0.031)	(0.019)	(0.021)	(0.020)	(0.021)	(0.020)
Bank size					0.008**	0.067***
					(0.003)	(0.022)
Bank capital ratio					0.003***	-0.004**
					(0.001)	(0.002)
Bank cash flow					-0.094	-1.266*
					(0.631)	(0.674)
Bank NPL ratio					1.573***	2.167***
					(0.442)	(0.647)
Floating		-0.278***	-0.261***	-0.263***	-0.267***	-0.263***
		(0.013)	(0.014)	(0.013)	(0.013)	(0.014)
Syndicate		0.056***	0.015	0.003	0.005	0.020
		(0.012)	(0.013)	(0.013)	(0.013)	(0.014)
Maturity		0.000***	0.000***	0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Collateral		0.429***	0.336***	0.221***	0.219***	0.243***
		(0.024)	(0.031)	(0.035)	(0.035)	(0.036)
REIT size				-0.170***	-0.164***	-0.145***
				(0.024)	(0.024)	(0.024)
REIT ROA				6.899***	6.966***	7.386***
				(1.779)	(1.801)	(1.782)
REIT debt				0.125	0.146	0.152
				(0.111)	(0.109)	(0.110)
REIT market to book ratio				-0.238***	-0.235***	-0.210***
				(0.027)	(0.027)	(0.027)
REIT FE	No	No	Yes	Yes	Yes	Yes
Bank FE	No	No	No	No	No	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes
Bank controls	No	No	No	No	Yes	Yes
Loan controls	No	Yes	Yes	Yes	Yes	Yes
REIT controls	No	No	No	Yes	Yes	Yes
Observations	3,705	3,705	3,705	3,705	3,637	3,637
R-squared	0.356	0.770	0.811	0.820	0.822	0.832

This table reports the estimation results for the loan costs and estimates the impact of the BOJ's REIT purchases. The dependent variable is Interest rate. The specification follows the equation (2) and includes year and REIT, bank, and year fixed effects. Standard errors are clustered at loan contract level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Table 6 Size of loan issuance

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	New loan					
Eligible	-0.017***	-0.009***	-0.008***	-0.003***	-0.003***	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Post	-0.012***	-0.021***	-0.025***	0.006*	0.004	0.010***
	(0.001)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
Eligible*Post	0.007***	0.008***	0.009***	0.005***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Bank_size					0.001***	-0.005***
					(0.000)	(0.001)
Bank_capital ratio					0.000	-0.000
					(0.000)	(0.000)
Bank_cash flow					0.085***	-0.009
					(0.033)	(0.037)
Bank_NPL ratio					-0.096***	0.023
					(0.021)	(0.034)
Floating		-0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Syndicate		0.017***	0.014***	0.013***	0.012***	0.012***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Maturity		0.000**	0.000**	0.000***	0.000***	0.000**
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Collateral		0.024***	0.020***	0.009***	0.010***	0.010***
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
REIT_size				-0.024***	-0.024***	-0.024***
				(0.002)	(0.002)	(0.002)
REIT_ROA				-0.043	-0.036	-0.012
				(0.075)	(0.076)	(0.077)
REIT_debt				-0.014	-0.015*	-0.013
				(0.009)	(0.009)	(0.009)
REIT_market to book ratio				0.001	0.001	0.000
				(0.002)	(0.002)	(0.002)
REIT FE	No	No	Yes	Yes	Yes	Yes
Bank FE	No	No	No	No	No	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes
Bank controls	No	No	No	No	Yes	Yes
Loan controls	No	Yes	Yes	Yes	Yes	Yes
REIT controls	No	No	No	Yes	Yes	Yes
Observations	5,330	5,330	5,330	5,330	5,248	5,248
R-squared	0.181	0.456	0.530	0.592	0.601	0.611

This table reports the estimation results for the size of loan issuance and estimates the impact of the BOJ's REIT purchases. The dependent variable is New loan. The specification follows the equation (2) and includes year and REIT, bank, and year fixed effects. Standard errors are clustered at loan contract level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Table 7 Characteristics of real estate properties acquired by REITs

	(1)	(2)	(3)	(4)	(5)
Dependent variables	Return	Property Age	lnProperty Age	lnOperating_ Expense	lnCaptal_Exp enditure
Eligible	-0.008***	-24.867	-0.369*	-0.339*	-0.512***
	(0.002)	(15.390)	(0.188)	(0.193)	(0.126)
Post	0.006***	-46.502***	-0.905***	0.760***	0.525**
	(0.002)	(15.900)	(0.202)	(0.139)	(0.201)
Eligible*Post	0.010***	25.726*	0.445**	0.299*	0.420***
	(0.002)	(14.352)	(0.191)	(0.166)	(0.141)
Size	0.000	7.532	-0.042	0.905***	0.356***
	(0.001)	(10.208)	(0.117)	(0.060)	(0.053)
Story	-0.001	-42.145***	-0.306**	-0.106	-0.149*
	(0.001)	(11.903)	(0.133)	(0.095)	(0.085)
Land size	0.001	2.612	0.206*	-0.178***	-0.053
	(0.001)	(9.616)	(0.104)	(0.060)	(0.066)
Distance	0.001	2.519	0.007	0.002	0.030
	(0.000)	(4.571)	(0.054)	(0.028)	(0.029)
REIT size	0.003***	9.325	-0.098	0.544***	0.116*
	(0.001)	(8.427)	(0.095)	(0.071)	(0.069)
REIT ROA	0.490***	1,826.661*	5.546	-2.436	-8.730
	(0.109)	(977.302)	(13.157)	(8.109)	(8.405)
REIT debt	0.010	109.913	0.049	1.178**	0.259
	(0.006)	(72.235)	(0.907)	(0.513)	(0.454)
REIT market to book ratio	0.001	21.478	0.441	0.399**	0.254
	(0.003)	(27.243)	(0.290)	(0.161)	(0.155)
Property-type FE	Yes	Yes	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes
Observations	1,846	1,846	1,846	1,846	1,846
R-squared	0.444	0.469	0.420	0.704	0.305

This table reports the estimation results for the characteristics of real estate properties acquired by the REITs and estimates the impact of the BOJ's REIT purchases. The dependent variable is Return, Property Age, Operating expenses, and Capital expenditure. The specification follows the equation (3) and includes property-type, REIT, year, and prefecture fixed effects. Standard errors are clustered at prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable definitions are provided in Table 1.

Table 8 Differentiating by credit ratings among eligible REITs

Dependent variables	(1) Return	(2) Property Age	(3) lnProperty Age	(4) lnOperating_ Expense	(5) lnCaptal_Exp enditure
Eligible AA-	-0.009***	-18.132	-0.236	-0.447*	-0.553***
	(0.002)	(18.237)	(0.227)	(0.228)	(0.139)
Eligible AA-	-0.005	-41.064	-0.717	-0.036	-0.212
	(0.004)	(27.609)	(0.543)	(0.156)	(0.322)
Eligible AA+	-0.003	39.109	0.598	-0.361	-0.320
	(0.003)	(62.525)	(0.639)	(0.357)	(0.351)
Post	0.006***	-44.797***	-0.850***	0.705***	0.555***
	(0.002)	(15.995)	(0.202)	(0.139)	(0.201)
Eligible AA-*Post	0.011***	18.722	0.300	0.420**	0.451***
	(0.002)	(15.319)	(0.214)	(0.200)	(0.142)
Eligible AA*Post	0.005	47.081	0.971	-0.179	0.251
	(0.004)	(33.905)	(0.603)	(0.143)	(0.339)
Eligible AA+*Post	Omitted	Omitted	Omitted	Omitted	Omitted
Property FE	Yes	Yes	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes
Observations	1,846	1,846	1,846	1,846	1,846
R-squared	0.446	0.470	0.422	0.706	0.307

This table reports the estimation results for the characteristics of real estate properties acquired by the REITs and estimates the impact of the BOJ's REIT purchases. The dependent variable is Return, Property Age, Operating expenses, and Capital expenditure. The specification follows the equation (3) and includes property-type, REIT, year, and prefecture fixed effects. Standard errors are clustered at prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Table 9 Combinations of characteristics of real estate properties acquired by REITs

	(1) HighReturn_HighAge	(2) HighReturn_HighOE	(3) HighReturn_HighCAPEX
Eligible	-0.408***	-0.138	-0.319***
	(0.078)	(0.089)	(0.076)
Post	-0.021	0.249***	0.266**
	(0.131)	(0.068)	(0.121)
Eligible*Post	0.304***	0.057	0.341***
	(0.082)	(0.080)	(0.096)
Property-type FE	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes
Control variables	Yes	Yes	Yes
Observations	993	1,120	1,166
R-squared	0.595	0.564	0.443

This table reports the estimation results for the characteristics of real estate properties acquired by the REITs and estimates the impact of the BOJ's REIT purchases. The dependent variable is the combinations of property characteristics of (high return and high Property Age) and (low return and low Property Age) for column (1), (high return and high Operating expenses) and (low return and low Operating expenses) for column (2), and (high return and high Capital expenditure) and (low return and low Capital expenditure) for column (3). The specification follows the equation (3) and includes property-type, REIT, year, and prefecture fixed effects. Standard errors are clustered at prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Table 10 Neighborhood real estate market conditions around properties purchased by the REITs

	Time window for transactions before the the REIT purchased the property	Distance from the property purchased by REIT	(1) Std_transaction prices	(2) Growth_transaction prices
Eligible*Post	Three years	1km	0.139*	-0.694***
			(0.073)	(0.214)
		2km	0.153***	-0.219
			(0.046)	(0.300)
		3km	0.095*	-0.148
			(0.048)	(0.287)

This table reports the estimation results for the real estate market conditions in the neighborhood of the properties purchased by the REITs and estimates the impact of the BOJ's REIT purchases. The dependent variable is the standard deviation of prices of the transacted properties located near from the property purchased by the REIT, and the rate of growth in the prices of the transacted properties located near from the property purchased by the REIT. The specification follows the equation (3) and includes property-type, REIT, year, and prefecture fixed effects. Standard errors are clustered at prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Table 11 Ex-post property performance

Panel A: appraisal prices

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Decrease_in_prices					
	0.5 years	1.0 years	1.5 years	2.0 years	2.5 years	3.0 years
Eligible	-0.101**	0.052	-0.008	-0.011	-0.007	0.050
	(0.039)	(0.055)	(0.055)	(0.045)	(0.037)	(0.045)
Post	-0.099	-0.090	-0.041	0.057	0.082	0.041
	(0.085)	(0.106)	(0.094)	(0.085)	(0.076)	(0.059)
Eligible*Post	0.193***	0.056	0.135**	0.118**	0.099**	0.053
	(0.046)	(0.049)	(0.054)	(0.052)	(0.048)	(0.051)
Property-type FE	Yes	Yes	Yes	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,846	1,846	1,846	1,846	1,846	1,846
R-squared	0.389	0.435	0.462	0.516	0.543	0.581

Panle B: rental income

	(8)	(9)	(10)	(11)	(12)	(13)
Dependent variable	Decrease_in_rental income					
	0.5 years	1.0 years	1.5 years	2.0 years	2.5 years	3.0 years
Eligible	-0.052	-0.088**	-0.008	-0.035	-0.024	-0.104***
	(0.051)	(0.035)	(0.040)	(0.027)	(0.031)	(0.038)
Post	0.410***	0.399***	0.431***	0.469***	0.462***	0.425***
	(0.081)	(0.075)	(0.082)	(0.070)	(0.089)	(0.089)
Eligible*Post	0.060	0.126***	0.055	0.074**	0.030	0.081*
	(0.051)	(0.040)	(0.042)	(0.036)	(0.046)	(0.047)
Property-type FE	Yes	Yes	Yes	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,846	1,846	1,846	1,846	1,846	1,846
R-squared	0.276	0.271	0.294	0.301	0.275	0.273

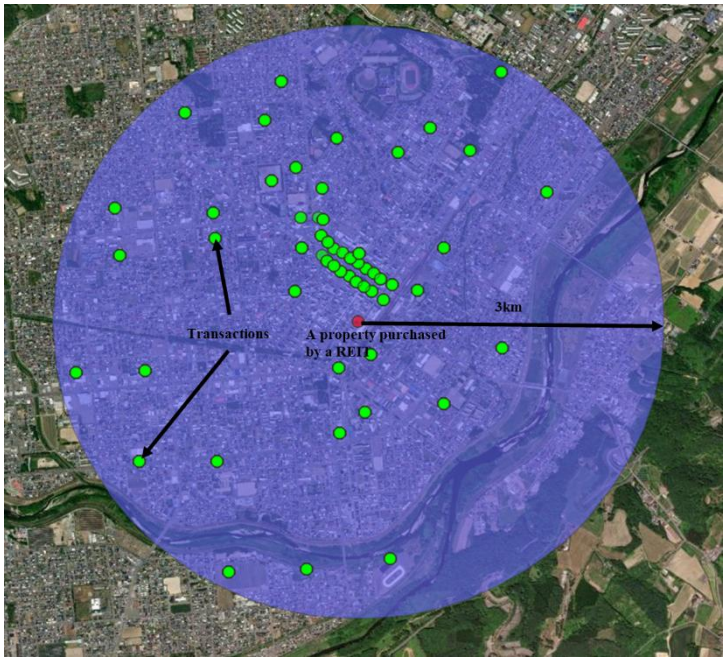
This table reports the estimation results for the ex-post performance of real estate properties acquired by the REITs and estimates the impact of the BOJ's REIT purchases. The dependent variable is a dummy for a decrease in appraisal prices for Panel A and a dummy for a decrease in rental income for Panel B. The specification follows the equation (3) and includes property-type, REIT, year, and prefecture fixed effects. Standard errors are clustered at prefecture. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Table 12 Reallocation of banks' loan portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Long-term loan ratio					
Non-Eligible	-0.022***	-0.005	-0.025***	-0.006	-0.015***	-0.014***
	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
Eligible	-0.037***	-0.021***	-0.044***	-0.027***	-0.041***	-0.041***
	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)
Post	0.006**	0.006***	0.012***	0.017***	0.037***	0.037***
	(0.002)	(0.002)	(0.004)	(0.004)	(0.006)	(0.007)
Non-eligible*Post	0.017***	0.020***	0.017***	0.020***	0.012***	0.011***
	(0.005)	(0.005)	(0.004)	(0.004)	(0.003)	(0.003)
Eligible*Post	0.027***	0.031***	0.030***	0.033***	0.037***	0.036***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	Yes	Yes	Yes
Firm controls	No	No	No	No	No	Yes
Bank controls	No	No	No	No	Yes	Yes
Observations	20,371	20,371	20,371	20,371	19,725	19,182
R-squared	0.203	0.454	0.206	0.457	0.469	0.472

This table reports the estimation results for the reallocation of loan portfolio for banks between the REIT sector and non-REIT listed real estate companies and estimates the impact of the BOJ's REIT purchases. The dependent variable is the ratio of long-term loans to a firm extended by a bank to total loans by the bank. The specification follows the equation (4) and includes firm/REIT, year, and bank fixed effects. Standard errors are clustered at firm-year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Figure 1 An example of real estate transactions around a property purchased by a REIT



This figure illustrates a geographical distribution of transacted properties in the vicinity of a property purchased by a REIT. The red point indicates the location of a REIT-purchased property. The green points represent transactions that occurred between 2005 and 2022. The blue area represents a zone within a circle of a radius of three kilometers.

Appendix Tables

Table A1 Results for matched sample

(A) Matched sample: REIT size, ROA, debt, and market to book ratio

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variables	Return	Property Age	lnProperty Age	lnOperating_Expense	lnCaptal_Expenditure	HighReturn_HighAge	HighReturn_HighOE	HighReturn_HighCAPEX
Eligible	-0.007***	-22.119	-0.150	-0.341	-0.550***	-0.500***	-0.161	-0.350***
	(0.002)	(18.358)	(0.187)	(0.280)	(0.149)	(0.085)	(0.142)	(0.109)
Post	0.009***	-51.853***	-0.932***	0.783***	0.472**	-0.116	0.282***	0.296**
	(0.002)	(17.604)	(0.193)	(0.147)	(0.208)	(0.145)	(0.065)	(0.141)
Eligible*Post	0.009***	35.873**	0.400*	0.378	0.556***	0.452***	0.119	0.424***
	(0.003)	(17.962)	(0.212)	(0.257)	(0.147)	(0.118)	(0.158)	(0.131)
Propety controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
REIT controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Property-type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,571	1,571	1,571	1,571	1,571	853	939	981
R-squared	0.452	0.519	0.469	0.692	0.323	0.623	0.559	0.473

(B) Matched sample: REIT size, ROA, and market to book ratio

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variables	Return	Property Age	lnProperty Age	lnOperating_Expense	lnCaptal_Expenditure	HighReturn_HighAge	HighReturn_HighOE	HighReturn_HighCAPEX
Eligible	-0.008***	-19.751	-0.122	-0.424	-0.632***	-0.496***	-0.244	-0.484***
	(0.002)	(18.025)	(0.179)	(0.264)	(0.160)	(0.086)	(0.152)	(0.090)
Post	0.007***	-50.850***	-0.897***	0.657***	0.409*	-0.139	0.245***	0.274*
	(0.002)	(17.773)	(0.198)	(0.150)	(0.212)	(0.162)	(0.071)	(0.149)
Eligible*Post	0.010***	32.723*	0.343	0.493**	0.634***	0.453***	0.209	0.560***
	(0.002)	(18.730)	(0.220)	(0.241)	(0.153)	(0.119)	(0.161)	(0.117)
Propety controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
REIT controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Property-type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,531	1,531	1,531	1,531	1,531	837	901	941
R-squared	0.467	0.520	0.474	0.698	0.327	0.618	0.577	0.508

This table reports estimation results for the characteristics of real estate properties acquired by the REITs and estimates the impact of the BOJ's REIT purchases. Dependent variables are Return in column (1), Property age in column (2), lnProperty age in column (3), lnOperating_Expence in column (4), lnCapital_Expenditure in column (5), Dummy for high return and high property age in column (6), Dummy for high return and high operating expense in column (7), and Dummy for high return

and high capital expenditure in column (8). The specification follows the equation (3) and includes property-type, REIT, year, and prefecture fixed effects. Standard errors are clustered at prefecture level. ***, **, and * indicate coefficients are statistically significant at the 1, 5, and 10% level, respectively. To construct the matched sample, we conduct probit estimations using Eligible for the dependent variable and REIT size, ROA, debt (only for panel A), and the market-to-book ratio for independent variables. Variable definitions are provided in Table 1.

Table A2 Balance test for REIT characteristics

(A) Matched sample: REIT size, ROA, debt, and market to book ratio)

	Mean		t-test	
Variable	Treatment	Control	t	p>t
REIT size	12.647	12.611	1.450	0.147
REIT ROA	0.016	0.016	0.510	0.612
REIT debt	0.483	0.460	4.750	0.000
REIT market to book ratio	1.054	1.046	0.520	0.605

(B) Matched sample:REIT size, ROA, and market to book ratio)

	Mean		t-test	
Variable	Treatment	Control	t	p>t
REIT size	12.605	12.592	0.450	0.656
REIT ROA	0.016	0.016	-1.430	0.155
REIT market to book ratio	1.018	1.040	-1.460	0.145

This table reports the results for balance test for covariates used in the propensity matching in Table A1. The t-test shows results for the examination of the null hypothesis that the mean of each covariate in the treatment group is equal to that in the control group.

Table A3 Placebo test

	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)
Dependent variables	Return	Property Age	lnProperty Age	lnOperating_Expense	lnCaptal_Expenditure	HighReturn_HighAge	HighReturn_HighOE	HighReturn_HighCAPEX
Eligible	-0.014***	-71.754*	-0.879*	-0.849**	-1.098***	-0.671***	-0.492**	-0.797***
	(0.004)	(39.317)	(0.472)	(0.396)	(0.399)	(0.141)	(0.190)	(0.173)
Post2008	0.007**	-29.005	-0.381	1.195**	-0.032	0.054	0.527*	Omitted
	(0.003)	(25.428)	(0.645)	(0.487)	(0.312)	(0.112)	(0.274)	
Eligible*Post2008	0.003	-22.228	-0.563**	0.967***	0.123	-0.340***	0.055	0.088
	(0.006)	(22.816)	(0.275)	(0.294)	(0.341)	(0.120)	(0.182)	(0.206)
Propety controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
REIT controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Property-type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	753	753	753	753	753	403	376	470
R-squared	0.549	0.537	0.541	0.790	0.392	0.714	0.673	0.591

This table reports placebo estimation results for the characteristics of real estate properties acquired by the REITs and estimates the impact of the BOJ's REIT purchases. Dependent variables are Return in column (1), Property age in column (2), lnProperty age in column (3), lnOperating_Expence in column (4), lnCapital_Expenditure in column (5), Dummy for high return and high property age in column (6), Dummy for high return and high operating expense in column (7), and Dummy for high return and high capital expenditure in column (8). The specification follows the equation (3) and includes property-type, REIT, year, and prefecture fixed effects. Post2008 is a dummy variable that equals 1 if the year is between 2009 and 2010, and 0 if it is between 2005 and 2008. Standard errors are clustered at prefecture level. ***, **, and * indicate coefficients are statistically significant at the 1, 5, and 10% level, respectively. Variable definitions are provided in Table 1.

Table A4 Combinations of property characteristics

	(1)	(2)	(3)
	HighReturn_HighSD_1km	HighReturn_HighSD_2km	HighReturn_HighSD_3km
Eligible	-0.403***	-0.437***	-0.320***
	(0.126)	(0.132)	(0.110)
Post	0.078	0.203**	0.208**
	(0.070)	(0.098)	(0.097)
Eligible*Post	0.365***	0.457***	0.302**
	(0.124)	(0.148)	(0.143)
Property-type FE	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes
Control variables	Yes	Yes	Yes
Observations	843	868	834
R-squared	0.483	0.520	0.535

This table reports the estimation results for the characteristics of real estate properties acquired by the REITs and estimates the impact of the BOJ's REIT purchases. The dependent variable is defined as a combination of (i) a dummy for high return of the properties acquired by the REITs and (ii) a dummy for the high standard deviation of transaction prices of properties located in the vicinity of those acquisitions. The standard deviation is calculated from transactions within a one-kilometer radius of the acquired properties in column (1), within two kilometers in column (2), and within three kilometers in column (3). The specification follows equation (3) and includes property-type, REIT, year, and prefecture fixed effects. Standard errors are clustered at the prefecture level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Table A5 REITs with ratings AA- and A+

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variables	Return	Property Age	lnProperty Age	lnOperating_ Expense	lnCaptal_E xpenditure	HighReturn_ HighAge	HighReturn_ HighOE	HighReturn_ HighCAPEX
EligibleAA_A+	-0.009***	7.702	0.187	-0.685***	-0.302	-0.268**	-0.368***	-0.280*
	(0.003)	(28.473)	(0.406)	(0.175)	(0.193)	(0.111)	(0.100)	(0.162)
Post	-0.001	30.649	0.507	-0.309	0.976***	0.486	-0.194	0.259
	(0.005)	(58.949)	(0.787)	(0.346)	(0.315)	(0.297)	(0.208)	(0.241)
EligibleAA_A+*Post	0.014***	-15.758	-0.147	0.977***	0.359	0.191	0.526***	0.485**
	(0.003)	(31.148)	(0.417)	(0.192)	(0.230)	(0.124)	(0.113)	(0.198)
Size	0.001	19.217	0.223	0.914***	0.257***	0.182**	0.283***	0.201***
	(0.002)	(12.391)	(0.136)	(0.105)	(0.089)	(0.076)	(0.047)	(0.057)
Story	-0.002	-24.544**	-0.156	-0.124	-0.144	-0.184**	-0.123*	-0.246***
	(0.002)	(11.440)	(0.147)	(0.118)	(0.121)	(0.072)	(0.063)	(0.080)
Land size	0.002	-19.797	-0.145	-0.135	0.038	-0.156**	-0.061	-0.063
	(0.002)	(11.949)	(0.112)	(0.094)	(0.095)	(0.065)	(0.042)	(0.059)
Distance	0.001	-2.112	-0.055	0.048	0.024	0.018	0.022	0.031
	(0.000)	(5.277)	(0.054)	(0.038)	(0.053)	(0.030)	(0.025)	(0.031)
REIT size	0.005	10.036	0.207	0.441	-0.272	0.145	0.236	0.262
	(0.003)	(34.770)	(0.362)	(0.277)	(0.260)	(0.191)	(0.158)	(0.206)
REIT ROA	0.168	4,239.313**	51.389**	-12.374	15.189	28.039*	-1.549	8.308
	(0.269)	(1,955.174)	(20.219)	(25.607)	(21.091)	(14.466)	(12.842)	(11.334)
REIT debt	-0.026	150.608	3.511	0.172	1.167	-1.074	-1.331*	-0.738
	(0.017)	(132.601)	(2.274)	(1.101)	(1.429)	(1.426)	(0.756)	(1.166)
REIT market to book ratio	-0.016***	74.941	1.595***	-0.725***	-0.464	-0.118	-0.530***	-0.875***
	(0.005)	(48.678)	(0.543)	(0.268)	(0.341)	(0.225)	(0.183)	(0.205)
Property-type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
REIT FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	826	826	826	826	826	396	533	509
R-squared	0.487	0.514	0.483	0.703	0.329	0.669	0.614	0.517

This table reports estimation results for the characteristics of real estate properties acquired by the REITs and estimates the impact of the BOJ's REIT purchases. Dependent variables are Return in column (1), Property age in column (2), lnProperty age in column (3), lnOperating_Expence in column (4), lnCapital_Expenditure in column (5), Dummy for high return and high property age in column (6), Dummy for high return and high operating expense in column (7), and Dummy for high return and high capital expenditure in column (8). The specification follows the equation (3) and includes property-type, REIT, year, and prefecture fixed effects. Eligible AA_A+ is a dummy variable that equals 1 if the credit rating for the REIT is AA- and 0 if it is A+. Standard errors are clustered at prefecture level. ***, **, and * indicate coefficients are statistically significant at the 1, 5, and 10% level, respectively. Variable definitions are provided in Table 1.