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Data Analysis for Monitoring Japan's Real Estate Market

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Large movements in the real estate market not only magnify fluctuations in the real economy but also destabilize the financial system. For this reason, it is quite important for central banks to monitor real estate market trends both in terms of monetary policy and prudential policy. Based on recently enhanced statistics, this article presents a data analysis for monitoring the real estate market from three perspectives: 1) real estate transactions; 2) real estate prices; and 3) real estate finance. In so doing, we explain that dispersions in real estate prices are valuable indicators in detecting overheating of the real estate market.

Introduction

The generation and collapse of the bubble economy in Japan and the experience of the US and European countries around the time of the financial crisis show that large movements in the real estate market not only magnify fluctuations in the real economy but also destabilize the financial system. It is, therefore, quite important for central banks to monitor real estate market trends. There are various methods of monitoring, including business interviews with companies and financial institutions. This article explains an approach to monitoring the real estate market by using various kinds of data. Specifically, it shows how to utilize various data to monitor market trends based on recently enhanced statistics, from three perspectives: 1) real estate transactions; 2) real estate prices; and 3) real estate finance.

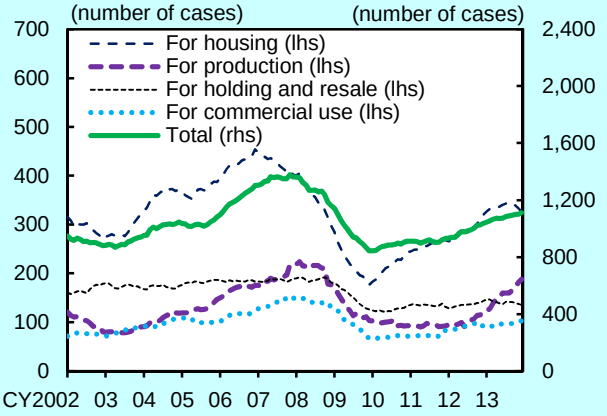
Monitoring of Real Estate Transactions

Monitoring real estate transactions is fundamental to understanding real estate market trends. Here, we analyze two major elements of real estate transactions: 1) the number of land transactions; and 2) the value of real estate transactions focusing on investment properties.

Number of land transactions

Information on the number of land transactions is published by the Ministry of Land, Infrastructure, Transport and Tourism. [1] This statistics are compilations of data on large-scale land transactions involving sale and purchase or other similar contracts reported under the National Land Use Planning Act.[2] The statistics show the trends of land transactions by region and indicate the intended uses of the land, e.g. housing, commercial facilities, or production facilities, as well as those land transactions intended for asset holding or resale.

[Chart 1] Number of large-scale land transactions[1,2]



Notes: *1*. The latest data are as of December 2013; 12-month moving averages.
2. Urban areas covering more than 2,000 square meters, other town planning areas covering more than 5,000 square meters, and other areas covering more than 10,000 square meters are counted.
Source: Ministry of Land, Infrastructure, Transport and Tourism.

In recent years, the number of transactions declined as a whole significantly after the Lehman Shock, hitting bottom at the end of 2009 and then rebounding and increasing over time (Chart 1). By type of intended use, the number of transactions of land for housing was on the increase and, toward 2013, we can see that the number of transactions of land for

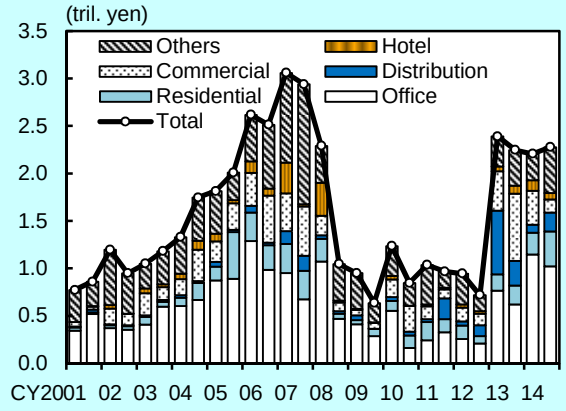
production facilities grew significantly. Increased distribution facilities and solar power generation facilities seem to have largely contributed to the increase of production facilities during this period. On the other hand, transactions for asset holding and resale did not increase for the period until the end 2013, which indicates that speculative land transactions were limited. In this way, it is beneficial to examine the purpose of transactions in addition to the behavior of transactions as a whole in order to understand the trends of land transactions.

Value of real estate transactions

With regard to the value of real estate transactions, the Japan Real Estate Institute collects and compiles information from various sources (information disclosed by J-REIT and the Tokyo Stock Exchange, articles in the media, etc.). These statistics cover investment properties mainly in the metropolitan areas, and classify them into categories such as offices, residences (houses and condominiums), commercial facilities, distribution facilities, hotels, healthcare facilities, and others (land for development, etc.) as well as by type of purchasing entity and by region.

The value of real estate transactions, which was on the increase since the early 2000s and reached a peak in 2007, dropped to one-third of the previous level in 2008 (Chart 2). After remaining low for a while, it grew significantly in 2013 and has maintained a high level since then. When sorting by type of property, distribution-related transactions increased significantly in the first half of 2013, and transactions for office use showed large growth from the beginning of 2014. If we look only at offices, the current number is close to the peak level around 2007.

[Chart 2] Value of real estate transactions[1]

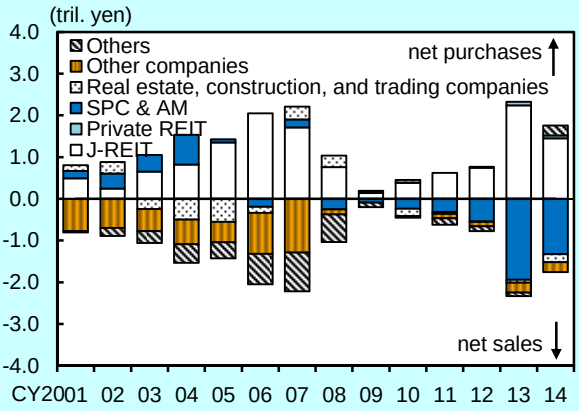


Note: *1*. The latest data are as of the second half of current 2014.
Source: Japan Real Estate Institute.

If we look at real estate transactions by type of entity, it can be seen that J-REITs have been remarkable purchasers of real estate in recent years. Most of the sellers have been special-purpose companies (SPC) and asset management (AM), which mainly represent private offering funds (Chart 3). This data makes clear that, in recent years, the major trend among real estate funds is that private offering funds are selling the real estate properties they acquired before the financial crisis to J-REITs, upon improvements in market conditions. However, quite recently, some changes are observed in the type of purchaser i.e. J-REITs' on-balance buying slightly decreased while "others," including overseas and institutional investors who focus on investment yield, turned to long positions.

Given that the purpose of real estate purchasing differs depending on the entity making the investment, it would be beneficial to focus on the changes in trading entities in addition to the movements of transaction values in order to assess the situation of real estate transactions.

[Chart 3] Real estate transactions by type of entity



Source: Japan Real Estate Institute.

Monitoring of Real Estate Prices

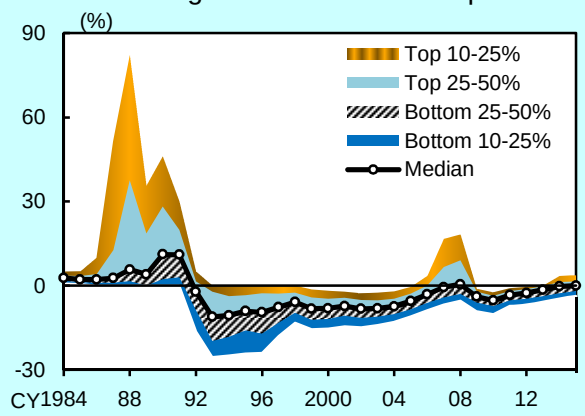
Given Japan's experience of the bubble economy, overheating in the real estate market seems to be typically reflected in land and other real estate prices. Therefore, it is particularly important to monitor real estate prices in terms of understanding financial imbalances. In the following, we explore land appraisal values, real estate transaction prices, and real estate yields as key elements for monitoring real estate prices.

Land appraisal values

Because the number of actually traded land properties is limited at each point in time, the main information on land prices would be the appraisal values by licensed real estate appraisers. One of the major set of statistics on land appraisal values in Japan is the "Land market value publication" by the Ministry of

Land, Infrastructure, Transport and Tourism. When monitoring real estate prices, the focus is often placed on summary values such as the national average of land prices, but the "Land market value publication" covers about 23,000 locations so it is possible to use the information on distribution of the individual locations as well as the summary values.[3] Here, we review the distribution of the rate of land price increase in commercial districts in the "Land market value publication." Specifically, we classified the rate of land price increase in individual locations in commercial districts into the top 10-25%, the top 25-50%, the bottom 25-50%, and the bottom 10-25% and reviewed the development of the distribution (Chart 4).

[Chart 4] Distribution of year-on-year rates of change in commercial land prices[1,2]

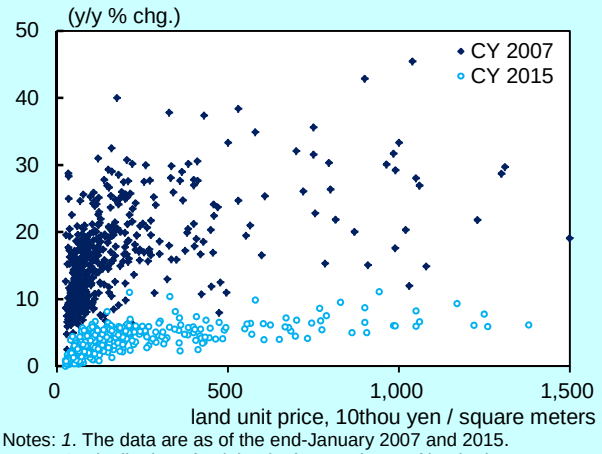


Notes: *1*. The latest data are as of January 2015.
2. Year-on-year rates of change in individual land prices in commercial areas.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Land market value publication."

First, if we look at the behavior of the median (the 50% point of the classification), we can see that it increased from the late 1980s to the beginning of 1990s and then continued to decline over the long term toward the middle of the 2000s. Then, it entered into the neighborhood of zero in 2007-08, but turned to decline again after the financial crisis, and recently started to increase slightly. However, given that the value remained in the neighborhood of zero around 2007, which was called a real estate boom, it may not be sufficient to focus only on the behavior of the median in order to assess the degree of overheating in the real estate market.

In this regard, dispersion in the rate of land price increase (dispersion in the distribution of the top and bottom) at each point in time shows the characteristics of fluctuations in land prices more clearly. We can see that during the bubble period in the late 1980s and the real estate boom around 2007, land prices increased remarkably in a number of places before the median changed and the distribution of the rate of land price increase expanded upward. This shows that during the real estate boom period, a sharp increase in the rate of land price increase can be observed in some locations. From this perspective, no upward expansion of distribution has been observed recently, which differs from the period around 2007.[4] In addition, the relationship between the unit land price and the rate of increase of such prices in the commercial districts in 23 Tokyo wards during the upward phase (Chart 5) shows that while prices increased particularly in areas where the unit land prices are high around 2007, the rate of land price increase is limited recently, even in areas where the unit land prices are high compared to the period around 2007.

[Chart 5] Relationship between unit land prices and rate of land price increase[1,2]



Notes: *1*. The data are as of the end-January 2007 and 2015.
2. Distribution of unit land prices and rate of land price increase in Individual locations in commercial districts.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Land market value publication."

In light of the above, it is beneficial to review the distribution of the rate of land price increase in individual locations in addition to focusing on overall average and median values. Also, movements of the rate of land price increase in the top regions tend to precede that of the median.[5] In light of this, if the rate of land price increase grows significantly in some locations even partially, then it is possible that the real estate market as a whole is becoming overheated. Therefore, it is also necessary to pay attention to the trends of local land price increases from a monitoring perspective.

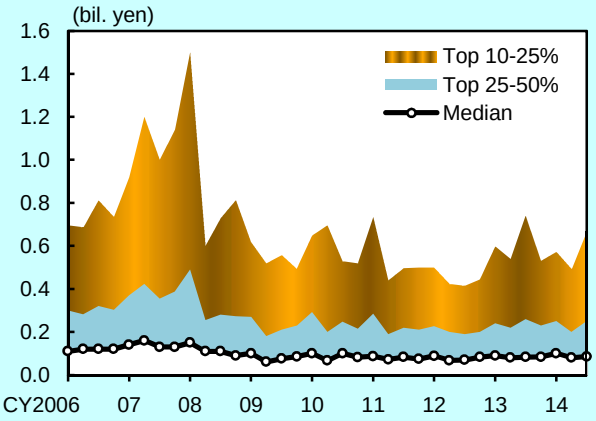
Real estate transaction prices

Since the land price data explained above are based on appraisal values, they may differ from actual transaction prices. Therefore, it has been pointed out over a long term that in order to assess the actual situation of real estate prices, it is important to grasp the actual transaction prices of real estate properties.[6]

In order to assess the actual transaction prices of real estate properties, the Ministry of Land, Infrastructure, Transport and Tourism started to carry out a questionnaire survey on the transaction prices of entities that had registered the properties with the Legal Affairs Bureau at the time of purchase (purchasers of real estate properties) and, in 2006, published the results as "Real estate transaction-price information" on a quarterly basis. Since it is a questionnaire survey, it does not cover all real estate transaction prices, but is still valuable since it provides information on the actual transaction prices of individual locations and is considered to offer valuable information for monitoring.[7]

Here, we review the historical development of the distribution of real estate transaction prices of individual properties (land or land and building), taking the commercial properties in 23 Tokyo wards and Fukuoka City as examples. First, in 23 Tokyo wards (Chart 6), the median of the transaction prices has remained stable at around 100-200 million yen since the mid-2000s. However, from the movements of transaction prices in the higher price range (for example, the top 10-25% point), we can see that transactions of expensive properties were remarkable during the real estate boom around 2007. The distribution of transaction prices showed upward expansion during the real estate boom, which shows the same characteristics as the land appraisal values as already provided. Concerning recent developments, transactions of expensive properties increased slightly in 23 Tokyo wards but are still limited compared to the period around 2007.

[Chart 6] Distribution of individual commercial property transaction prices (23 Tokyo wards)[1]



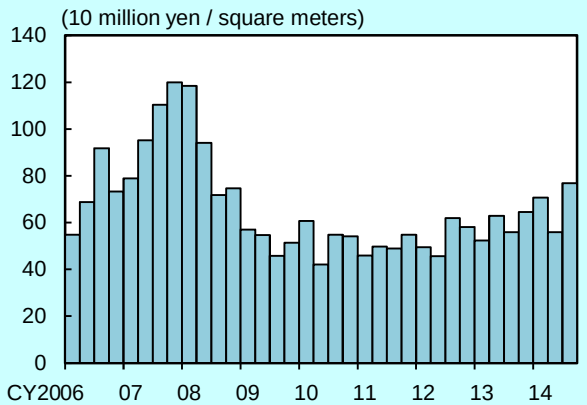
Note: *1*. The latest data are as of the July-September quarter of 2014.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Real estate transaction-price information."

Box: Hedonic Analysis of Real Estate Transaction Prices

The movements of published real estate transaction prices tend to be affected by the attributes of individual properties traded. For example, even if the land is of the same size, the price would be different depending on the distance from the station, i.e., higher if it is close to, or lower if it is far from, the station. But if the price of a land parcel that is close to the station is recorded at one point in time and the price of another land parcel that is far from the station is recorded later, statistically, the price declines. However, in fact, the real state price would remain constant if it is adjusted for the distance from the station. As just explained, in order to assess real estate prices, it is beneficial to adjust the attributes of individual properties so as to understand the trends. The method of adjusting individual attribute information to understand the overall trend is called Hedonic analysis.

Here, we conducted a Hedonic analysis of land transaction prices in the commercial districts in 23 Tokyo wards. Specifically, each factor: 1) the location dummy, 2) the period dummy, 3) the distance from the station, 4) the land area, 5) the building coverage ratio, 6) the land floor-area ratio, 7) the width of the frontal road, and 8) the land shape dummy of the land transaction price per 1 square meter was regressed by the least-squares method to calculate the land transaction price adjusted for each factor. The results (BOX Chart) show that the land transaction prices adjusted for individual factors in 23 Tokyo wards, which increased in 2007-2008, dropped to around half that level following the financial crisis. In recent periods, they are on a gradual increase pattern, but have not yet reached the peak level of around 2007.

Box: Real estate traded prices adjusted for individual factors (23 Tokyo wards)[1,2]

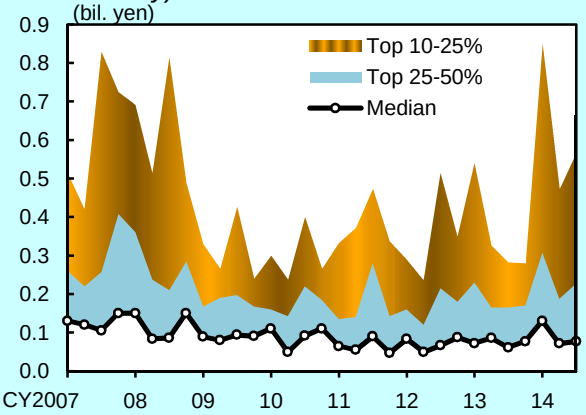


Notes: *1*. The latest data are as of July-September 2014.
2. This figures are calculated by using "Real estate transaction-price information" (published by Ministry of Land, Infrastructure, Transport and Tourism).

On the other hand, in Fukuoka City (Chart 7), while the median remains stable at around 100 million yen, the distribution by price fluctuates significantly depending on the period. Transactions of expensive properties significantly increased around 2007 also in Fukuoka City, which is a similar trend as seen in 23 Tokyo wards, but we can see that in Fukuoka City, the transactions of expensive properties increased recently (in 2014) to about the same level as the period around 2007.

As just described, the movements of real estate prices may differ between large cities. Therefore, in order to capture the local sharp increase in prices, it would be effective to monitor the development of distribution of data of individual properties as explained here.

[Chart 7] Distribution of individual commercial property transaction prices (Fukuoka city)[1]



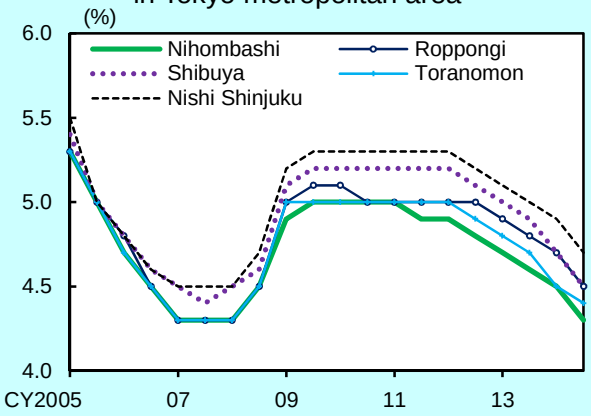
Note: *1*. The latest data are as of the July-September quarter of 2014.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Real estate transaction-price information."

Real estate investment yield

Now, as an indicator to assess the degree of overheating in the real estate market in light of pricing, we examine real estate investment yield.

First, let us look at the expected capitalization rate. The expected capitalization rate is net profit (such as rent, etc.) earned by holding the real estate property divided by the purchase price of the property acceptable to investors, which represents the property's rate of return required by investors. For example, if the purchase price level of an office property acceptable to the investor increases compared to the current rent, the expected capitalization rate declines. If we look at the expected capitalization rate in office properties in the Tokyo metropolitan area using Japan Real Estate Institute's "The Japanese real estate investor survey," we can see that the rate has clearly declined over the recent period showing that investors are taking a positive stance towards the purchasing of office properties (Chart 8).[8]

[Chart 8] Capitalization rate of office buildings in Tokyo metropolitan area[1]

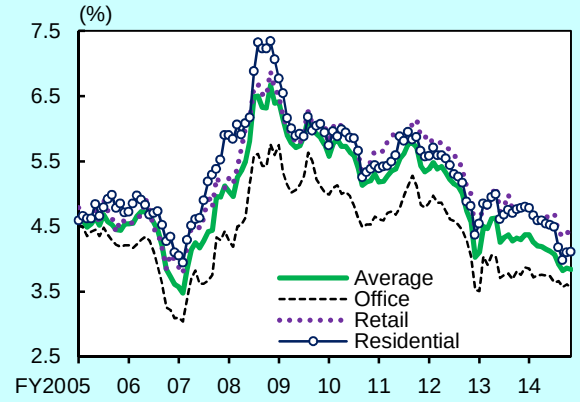


Note: *1*. The latest data are as of October 2014.
Source: Japan Real Estate Institute, "The Japanese real estate investor survey."

Now, let us examine the J-REIT capitalization rate. The rate is calculated by dividing net operating income by the sum of market capitalization, net interest-bearing debt, and deposits from tenants, and it represents the yield of the J-REIT investment property. The Sumitomo Mitsui Trust Research Institute publishes the J-REIT capitalization rates by type of property (Chart 9), and the recent trends show that not only offices but also commercial and housing-related properties exhibit a declining trend.

As just described, the time-series of real estate investment yields should offer valuable information to assess the degree of overheating in the real estate market.[9]

[Chart 9] J-REIT capitalization rate[1]



Note: *1*. The latest data are as of end-February 2015. The ratio is net operating income divided by the sum of market capitalization, net interest-bearing debt, and deposits from tenant.
Source: Sumitomo Mitsui Trust Research Institute.

Monitoring of Real Estate Finance

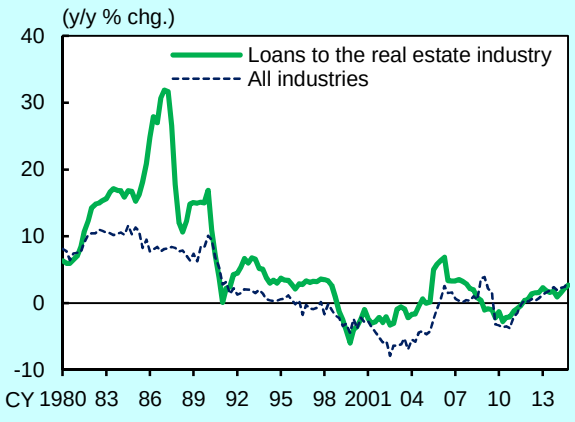
Lastly, we explain the monitoring of real estate finance. As shown by the generation and collapse of the bubble economy and the recent financial crises in the US and European countries, large movements in the real estate market have a significant impact not

only on the real economy but also on the financial sector. For this reason, to ensure the stability of financial system, it is important to assess the trends of real estate-related loans by financial institutions and funding of real estate companies on a regular basis. In the following, we explain the monitoring of financial institutions' loans to the real estate industry and funding of real estate companies.

Loans to the real estate industry by financial institutions

The Bank of Japan's "Loans and bills discounted by sector," as of 2014, shows that loans provided by financial institutions (banks and *shinkin* banks) to the real estate industry account for 23% of loans to all industries. Therefore, the real estate sector is an important borrower for financial institutions. According to the historical development of loans (Chart 10), as seen in the late 1980s and mid-2000s, real estate loans grow significantly and the growth rate tends to exceed that of loans to all industries during the period of a real estate boom. This has been different for the recent period from the periods of real estate boom in the past, as the growth of real estate loans has remained at a similar level to loans to all industries.

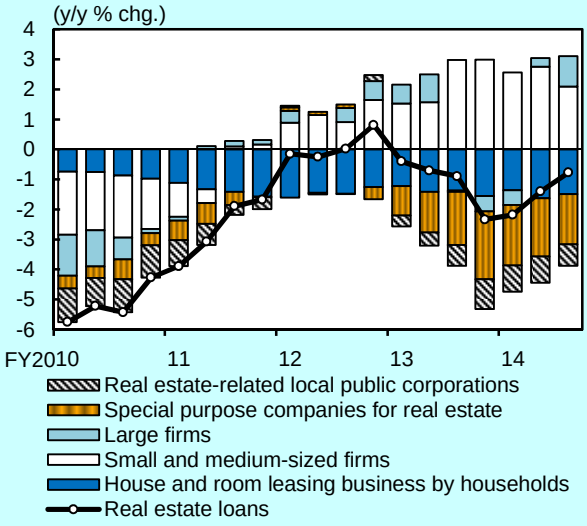
[Chart 10] Loans to the real estate industry[1]



Note: *1*. Banks and *shinkin* banks are counted. The latest data are as of end-December 2014.
Source: BOJ.

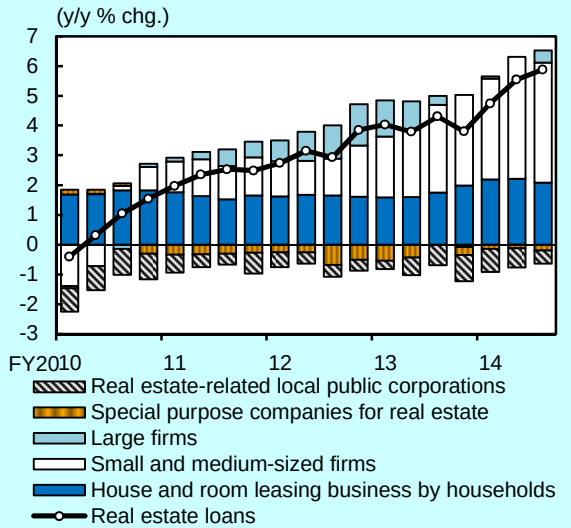
Loans to the real estate industry may differ depending on the type or area of the financial institution. The recent development shows that for major banks, though loans to house and room leasing business by households and to private offering funds are decreasing while those to large real estate companies and J-REITs (SMEs) are increasing, loans as a whole declined on a year-to-year basis (Chart 11).[10] On the other hand, loans provided by regional banks are growing at a relatively high level and the increasing trend has recently become stronger (Chart 12). The breakdown of the loans provided by regional banks show that loans to house and room leasing business by households and to asset management companies (SMEs) are increasing and some of them are recently trying to offer loans to J-REITs. Regional banks seem to have eased their credit standards to the real estate industry, from which relatively high profits can be expected, as interest rate spreads on domestic loans continue to decline.

[Chart 11] Loans to the real estate industry by major banks[1]



Note: *1*. The latest data are as of end-December 2014.
Source: BOJ.

[Chart 12] Loans to the real estate industry by regional banks[1]



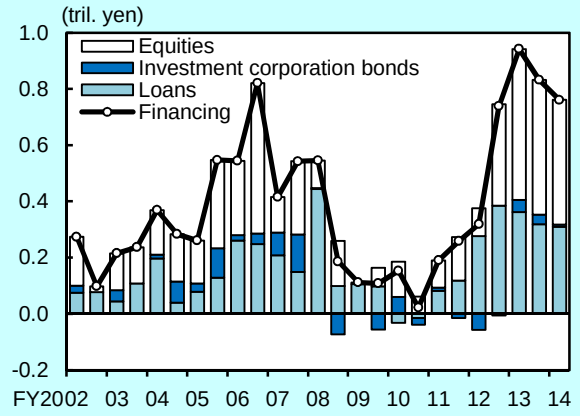
Note: *1*. The latest data are as of end-December 2014.
Source: BOJ.

Funding by real estate companies

Now, we explain the trends of real estate companies' funding, including equity finance and bond issuance as well as borrowings. Here, we use Nikkei Financial Quest's data to classify the listed real estate companies into J-REITs and others. First, let us look

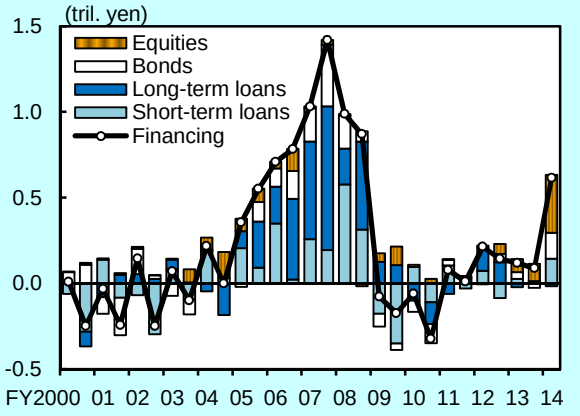
at J-REITs, and we can see that they recently increased their financing significantly to a level exceeding that in the late 2006 (Chart 13). The breakdown shows that equity finance and borrowing each account for about half and that both of them have grown significantly in the last several years. On the other hand, while real estate companies other than J-REITs have also increased their financing lately, the amount is limited compared to the level of 2007 (Chart 14). In addition, the contribution of equity finance has been relatively large, though that of borrowing has been limited.

Chart 13: Financing by J-REITs[1,2,3]



Notes: *1.* The latest data are as of the first half of fiscal 2014.
2. Financing is the sum of loans, investment corporation bonds, and equities.
3. The amount of financing for each firm is aggregated for the month during which its account is published. This chart indicates the total volume of funds raised by firms on a semiannual basis.
Source: Nikkei Needs.

Chart 14: Financing by real estate companies other than J-REITs[1,2,3]

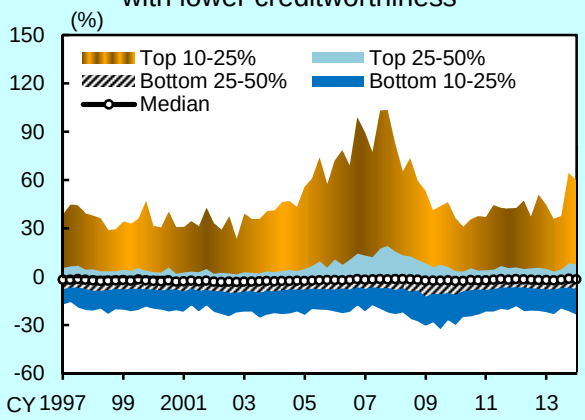


Notes: *1.* The latest data are as of the first half of fiscal 2014.
2. Financing is the sum of loans, bonds, and equities.
3. The amount of financing for each firm is aggregated for the month during which its account is published. This chart indicates the total volume of funds raised by firms on a semiannual basis.
Source: Nikkei Needs.

However, only listed real estate companies are covered here so we cannot verify the trends of unlisted real estate companies. Given the fact that regional banks are increasing loans to small- and medium-sized real estate companies, it is necessary to grasp the trends of funding by small- and medium-sized real estate companies including unlisted ones.

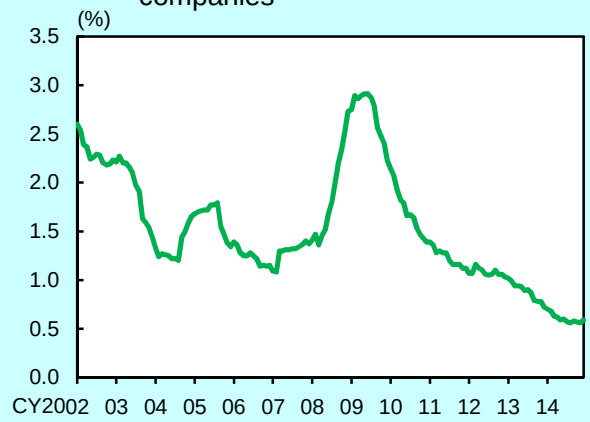
In order to confirm this point, we look at the distribution of growth in the outstanding balance of interest-bearing liabilities (on a year-to-year basis) of small- and medium-sized real estate companies with lower creditworthiness (Chart 15) using individual corporate information in the CRD Association's database, and find that the distribution clearly showed an upward expansion around 2007 and some real estate companies that were low-credit borrowers significantly increased their funding. But the upward expansion of the distribution is limited lately compared to 2007. However, the distribution is slightly expanding upward very recently, so we should maintain close observation for anticipating the future course.

Chart 15: Debt financing by real estate companies with lower creditworthiness[1,2]



Notes: *1.* The latest data are as of January-March 2014.
2. Percentage changes from the previous year in long- and short-term borrowings of real estate companies are aggregated in their account-closing month and compiled on a quarterly basis.
Source: CRD.

Chart 16: Default rate among real estate companies[1]



Note: *1.* The latest data are as of December 2014.
Source: Risk Data Bank of Japan, Ltd., "RDB enterprise default ratio."

The real estate companies' ability to meet debt payments tends to deteriorate sharply in a recession

period; in fact, since the financial crisis in fall 2008, the default rate of real estate companies grew rapidly (Chart 16). This should be partly a reflection of the increases in funding by lower-credit borrowers during the period before the financial crisis. In this context, it would be beneficial to confirm the trends of funding by real estate companies using individual data to monitor the trends of real estate finance in the future.

Concluding Remarks

In this article, we presented a data analysis for monitoring the real estate market in Japan. In so doing, we emphasized that it is effective to use not only summary data but also data on individual properties. However, we could only introduce limited data. In actual monitoring, it is necessary to make comprehensive judgments by using more information sets. These include more extensive indicators (e.g. vacancy rates, rents of offices, etc.) and information obtained from business interviews with companies and financial institutions. The Bank of Japan plans to evaluate real estate market trends on a regular basis in the "Financial System Report."[11]

As explained in this article, real estate-related data is being improved through the efforts of statistics producing agencies, and as a result, we can perform more detailed monitoring than before. However, for more timely and accurate monitoring, there would be rooms for improvement in terms of issues such as: 1) further enhancement of statistical data relating to real estate transactions; 2) development of a method to adjust real estate prices according to a property's attributes; and 3) reduction of the time lag associated with production or publication of the statistics.[12] The efforts of statistics producing agencies in such aspects are also beneficial from the perspective of central banks' policy making, and we look forward to further progress in the future.

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[1] With regard to the number of land transactions, the Ministry of Justice also compiles and publishes the number of registered properties whose ownership has been transferred. However, we cannot confirm the purpose or nature of the land transactions from these statistics.

[2] "Large-scale land transaction" is defined as a transaction involving land equal to or larger than 2,000 m^2, 5,000 m^2, and 10,000 m^2 for urban areas, other town planning areas, and other areas, respectively. The data of these statistics are available from 1998 onwards and have been published since 2009 on the Ministry of Land, Infrastructure, Transport and Tourism's website.

[3] Currently, we can obtain land price information on individual places from the "Land market value publication" on the Ministry of Land, Infrastructure, Transport and Tourism's website.

[4] The "Land market value publication" is the statistical data of land prices as of January 1 each year published once a year, and it has the problem that the data cannot be obtained frequently enough. In this regard, if the "Land market value publication" is combined with the "Land price survey by prefectural governments" separately published by the Ministry of Land, Infrastructure, Transport and Tourism, which represent land prices as individual prices as of July 1 each year, we can see the trends of land prices on a half-year basis. When we wrote this article, we extracted the places (in the commercial districts) covered by both the "Land market value publication" and the "Land price survey by prefectural governments" and examined the distribution of the rate of land price increase in these places; the result formed a shape almost similar to that of Chart 4.

[5] If we perform a Granger-causality test on data semi-annualized by the method in Footnote 4, we can detect that, among the samples of 1990 or later, the rate of land price increase of the highest 10% of places in the commercial districts precedes the median approximately by half a year to two and half years with a significance level of 1%.

[6] See, for example, the following literature.

Chihiro, Shimizu, and Kiyohiko G. Nishimura (2006), "Biases in Appraisal Land Price Information: The Case of Japan," *Journal of Property Investment and Finance*, 26(2), pp. 150-175.

[7] According to the Ministry of Land, Infrastructure, Transport and Tourism, the response rate of the questionnaire replies was approximately 33% as of 2009.

[8] While the expected capitalization rate declines, the government bond yield, which is the base rate, also decreases; therefore, the yield spread should not have dropped to the level of around 2007.

[9] Professor Robert Shiller who won the Nobel Prize for Economics in 2013 argues that it is beneficial to focus on investment yields in assessing the degree of overheating in asset prices (stock and real estate prices) in the following literature.

Shiller, Robert J. (2005), *Irrational Exuberance*, Princeton University, 2nd edition.

[10] Most of the loans for J-REITs are included in the loans for SMEs.

[11] This article focused on explaining how to utilize individual data to assess the degree of overheating in the real estate market; however, to understand macroeconomic overheating, another possible approach is to examine the deviations in the macroeconomic indicators (for example, the percentage of real estate investments against GDP) from the trend. In this regard, the "Financial Activity Indexes" used in the "Financial System Report" adopt some real estate-related macroeconomic indicators and proactively use their deviations from the trend as a component of a heat map. Please see the following references for the "Financial Activity Indexes."

Nakamura, Koji, and Yuichiro Ito (2015), "Detecting Financial Imbalances: Monitoring Financial Imbalances through the Financial Activity Indexes (FAIXs)," Bank of Japan Research Laboratory, No. 15-E-1.

Ito, Yuichiro, Tomiyuki Kitamura, Koji Nakamura, and Takashi Nakazawa (2014), "New Financial Activity Indexes: Early Warning System for Financial Imbalances in Japan," Bank of Japan Working Paper, No. 2014-E-7.

[12] In recent years, statistics are being developed for real estate

prices under international guidelines among G20 countries. In Japan, too, efforts are being made to produce real estate price indicators based on transaction prices led by the Ministry of Land, Infrastructure, Transport and Tourism and trial data have been published for housing prices while prices of commercial properties are now under review.

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