

Recent Developments in Leveraged Investment Funds

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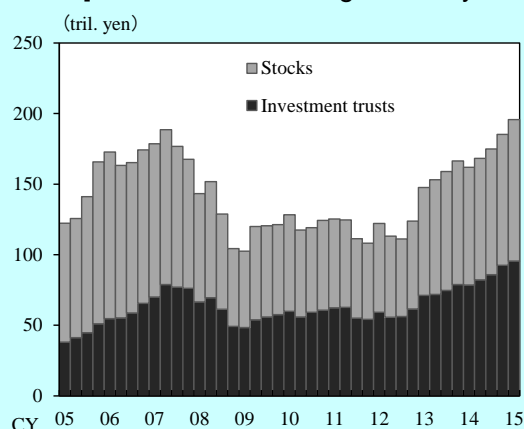
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In Japan, households have been rapidly increasing their stock investments using leveraged investment funds (leveraged exchanged traded funds [ETFs] and mutual funds). Some market participants are concerned that (1) the associated rebalancing demand may amplify the volatility in stock markets and that (2) the liquidity in the leveraged investment funds market may decline as capital flows regarding the process for creating and redeeming ETF shares become large, which creates stress on the entire stock market. Up until now, empirical evidence suggests otherwise, as the impact of rebalancing demand is curbed by capital flows on contrarian investors' fund demand, and market liquidity is maintained at a sufficiently high level. Yet, it is necessary to pay close attention to developments in leveraged investment funds, particularly their impact on financial markets during times of stress. In addition, paying such close attention would be beneficial for grasping households' risk-taking stance.

Introduction

Households in Japan have been gradually allocating a larger percentage of their investments to risky assets (Chart 1).

[Chart 1] Households' Holdings of Risky Assets



Source: BOJ, "Flow of funds accounts."

In line with this trend, some households have been active in stock investments with leverage. In addition to traditional margin trading, using leverage involves new methods, such as stock index futures and leveraged investment funds. In particular, the leveraged investment funds market has been expanding rapidly over the past few years and its net asset value recently exceeded one trillion yen. Such

market expansion warrants attention when monitoring developments in financial markets from the following three perspectives.

First, it has been pointed out that given its characteristics, expansion of the leveraged investment funds market entails the risk of amplifying stock price volatility. Leveraged investment funds seek to track a multiple of the daily performance of an underlying index such as the Nikkei 225.¹ Mechanical pro-cyclical rebalancing of leveraged investment funds could theoretically amplify stock price volatility. Some market participants often attribute large price movements in the stock market to this rebalancing demand.

The second perspective is the market liquidity issue. In this aspect, leveraged ETFs warrant attention.² Because leveraged ETFs are traded on exchanges, a number of investors seem to expect that they are able to trade at a fair value at all times. However, one should note that liquidity of leveraged ETFs in the secondary market is largely supported by ETF providers' (asset management companies that create and issue leveraged ETFs and manage them in line with the design of the funds) creation and redemption of ETF shares. Given the market structure of leveraged ETFs, their creation and redemption size are apt to be larger than that of other ETFs. Therefore, if creation and redemption becomes difficult for a

protracted period, market liquidity of leveraged ETFs may decline, which could affect the entire stock market.

The third perspective is the value of leveraged investment funds as an indicator for monitoring of households' risk-taking stance. In the Financial Activity Indexes (FAIXs) that appear in the Bank's Financial System Report, the "stock purchases on margin to sales on margin ratio" is adopted as one of the early warning indicators to gauge overheating.³ From a similar perspective, developments in leveraged investment funds have the potential to provide valuable information regarding spotting the warning signs of overheating in the stock market.

The remainder of this paper proceeds as follows. First, we review the characteristics of leveraged investment funds and investigate the much-debated pro-cyclicality of this product. Next, we describe the mechanism of how the liquidity of leveraged ETFs is maintained and discuss related issues. Finally, with a view to capturing signs of potential overheating in the stock market, we summarize the market data on leveraged investment funds and those of stock futures and margin trading.

Leveraged Investment Funds and their Mechanical Pro-cyclicality

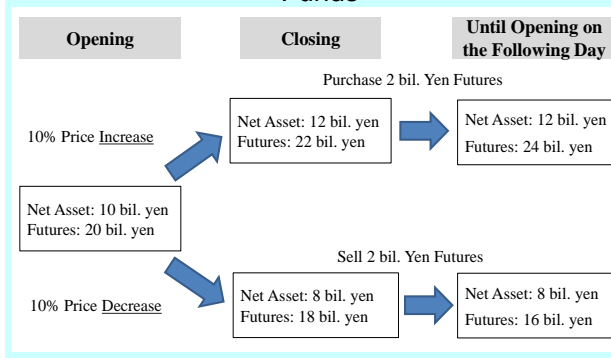
Characteristics of Leveraged Investment Funds

Leveraged investment funds -- using funds with a leverage ratio of two as an example -- are designed to double the daily performance of an underlying stock index. Importantly, the *daily* performance is doubled and not the *accumulated* price level or return.

A typical leveraged investment fund replicates a doubling of the daily return on the index by (1) purchasing stock index futures at twice the amount of the net assets when creating the fund and (2) maintaining the leverage ratio of two by mechanically rebalancing the futures position daily through trading in the same direction as the changes in the underlying stock index (Chart 2).

Rebalancing of leveraged investment funds entails pro-cyclical mechanical trading following daily stock price changes. Specifically, the larger the rate of change in stock prices, the larger the size of the rebalancing required.⁴ Economists at the Federal Reserve have indicated that (1) leveraged investment funds are similar to portfolio insurance strategies -- they lower the risk exposure to protect the portfolio value when the price of risky assets decline -- which

[Chart 2] Rebalancing of Leveraged Investment Funds



are said to have contributed to the stock market crash of 1987 (Black Monday) in the sense that a decline in stock prices automatically causes additional large sales; and (2) the recent increase in leveraged investment funds in the United States involves a higher risk than other stock investments with leverage from a financial stability perspective, in the sense that their mechanical rebalancing could amplify stock price volatility.⁵

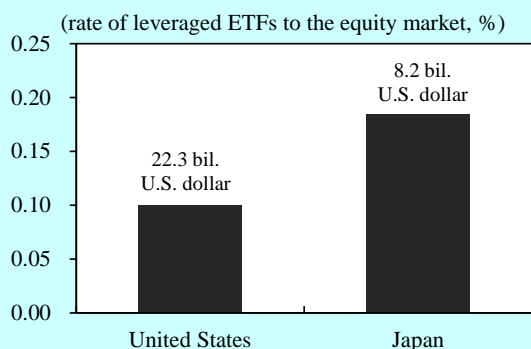
Moreover, because leveraged investment funds buy when the index goes up and sell when it goes down, the rate of decrease from an increased level tends to exceed the rate of increase from a decreased level in a range-bound market. This phenomenon indicates that neither the median nor the mode of the expected cumulative return of a leveraged investment fund can be twice the amount of a stock index's cumulative return (on the other hand, when stock prices increase steadily, the cumulative return becomes more than twice the amount from the compound effect).⁶ Thus, leveraged investment funds tend to attract short-term investors rather than middle- to long-term investors seeking to earn cumulative returns. In Japan, the ratio of leveraged ETFs to the ETF market by amount outstanding is approximately 6 percent, whereas that by the transaction amount is nearly 80 percent.⁷

Size of Leveraged ETF Rebalancing Demand in Japan

Compared with the size of the equity market, the amount outstanding in leveraged investment funds in Japan is larger than that in the United States (Chart 3). As such, it has been pointed out that recently, rebalancing demand on leveraged investment funds in Japan is amplifying stock price volatility, at least within a particular short time window.

In specific, many market participants pay attention to transactions from around 15:00 -- when the cash stock market closes (when the closing price of the

[Chart 3] Market Size of Leveraged Investment Funds



Note: Only for ETFs. Net asset value is as of end-September 2015.
Sources: Bloomberg; The Investment Trusts Association, Japan.

stock index settles) -- to 15:15 -- when the day session of stock index futures ends. This phenomenon occurs because providers of leveraged investment funds have a strong tendency to rebalance their portfolios in the stock index futures market during the aforementioned times to minimize deviations from their benchmarks.

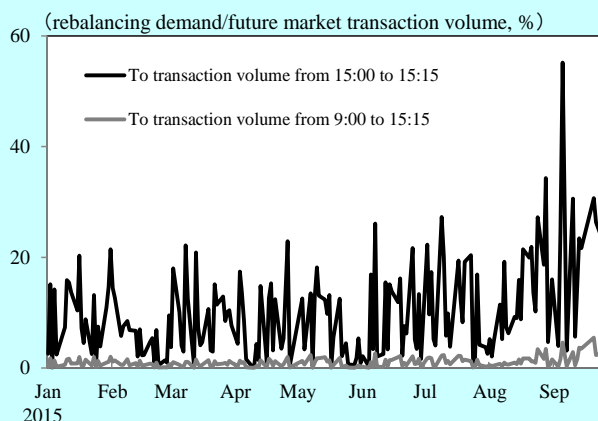
We have estimated the size of the rebalancing demand of leveraged investment funds by focusing on leveraged ETFs given data limitations. When compared with daily trading volume in the stock index futures market, the rebalancing demand appears small. However, when the trading volume is limited to between 15:00 and 15:15, the rebalancing demand often exceeds 20 percent of the trading volume in the stock index futures market. Furthermore, futures prices tend to rise/fall between 15:00 and 15:15 on days during which the Nikkei 225 rose/fell until 15:00 (Chart 4). This finding suggests that the rebalancing demand might amplify stock price volatility, at least during the period between 15:00 and 15:15.

Risk Assessment of Pro-cyclicality

However, assessing the impact of leveraged investment funds on the stock market solely from a short-term perspective, as previously described, is not necessarily appropriate. One reason is that households, which are the main investors of leveraged investment funds, have a strong tendency to practice contrarian investing. Thus, when stock prices rise/decline, redemptions/creations of leveraged investment funds increase and offset rebalancing demand (the mechanism of why creation/redemptions increase when households purchase/sell leveraged investment funds in the secondary market is subsequently discussed). The same tendency is noted to have been observed in the United States.⁸

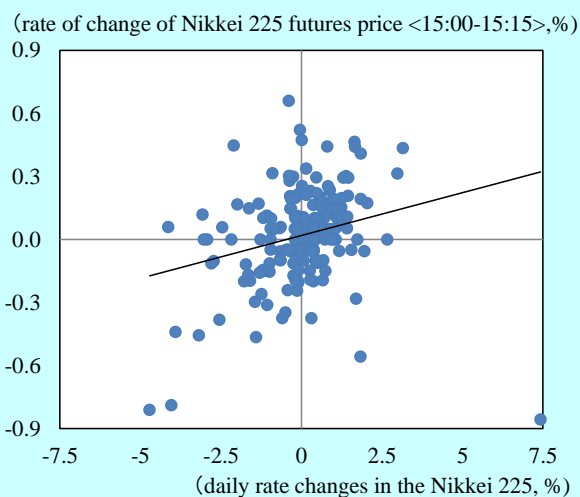
Regarding Japan, a strong correlation exists between capital flows of leveraged ETFs (a net

[Chart 4] Impacts of Rebalancing Demand (Rebalancing Demand)



Note: Only includes rebalancing demand of leveraged ETFs tracking the Nikkei 225.
Sources: Bloomberg; Authors' calculation.

(Daily Rate Changes in the Nikkei 225 and in Nikkei 225 Futures between 15:00 and 15:15)

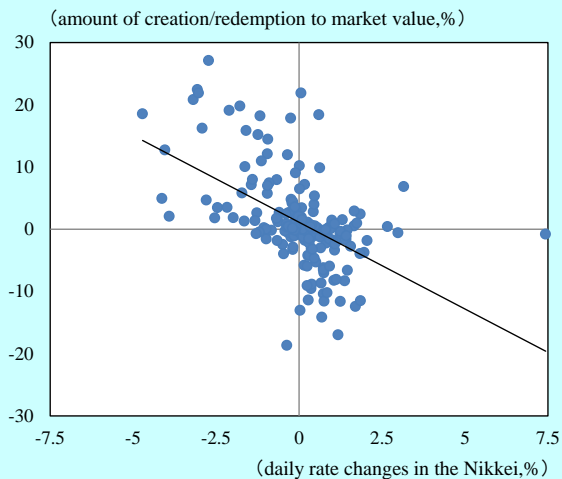


Note: Daily data from January 2015 to September 2015.
Sources: Bloomberg; Authors' calculation.

creation/redemption of ETF shares) and index returns (Chart 5). A simple linear regression shows that a 1 percent increase in a stock price results in an approximate 3 percent decrease in net ETF assets, which is equivalent to sales of stock index futures by approximately 6 percent for an ETF leveraged two times. This amount is significantly larger than the amount of purchases required to track a 1 percent rise in a stock price (futures held increase by approximately 2 percent). Thus, up until now, the amplifying effect of rebalancing demand on volatility is negligible, although a time lag exists between the timing of rebalancing trade and the creation/redemption of ETF shares. It can even be said that capital flows from contrarian investments are likely to restrain stock price volatility.

At the same time, one should note that investors of leveraged investment funds do not always use a

[Chart 5] Stock Prices and Creation/Redemption of Leveraged ETFs



Note: Daily data from January 2015 to September 2015. Redemptions are shown as negative. Settlement days are adjusted.
Sources: Bloomberg; Authors' calculation.

contrarian investment strategy. In a situation in which stocks retreat, it is highly probable that investors who were initially purchasing leveraged investment funds have no option but to rapidly unwind their positions.

Although at this stage the amplifying effect of leveraged investment funds on stock price volatility is insignificant, we should not play down the possible impact of the demand for mechanical rebalancing.

Liquidity of Leveraged ETFs

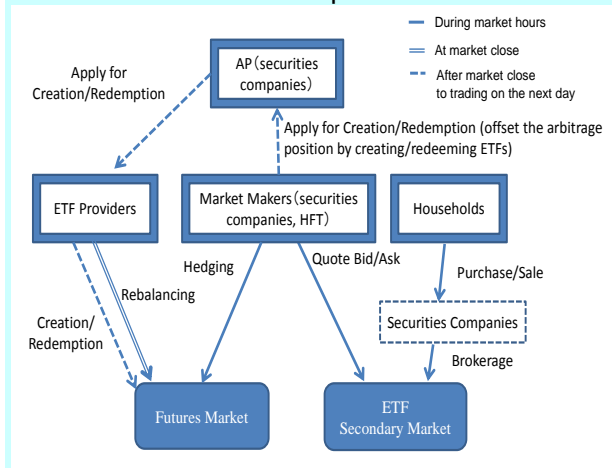
The market liquidity of leveraged ETFs is another important viewpoint.

Liquidity in ETF markets, particularly during times of stress, has drawn attention globally. Significant analyses point out liquidity risks regarding ETFs that hold illiquid assets, such as emerging market ETFs and synthetic ETFs that use OTC derivatives, including total return swaps.⁹

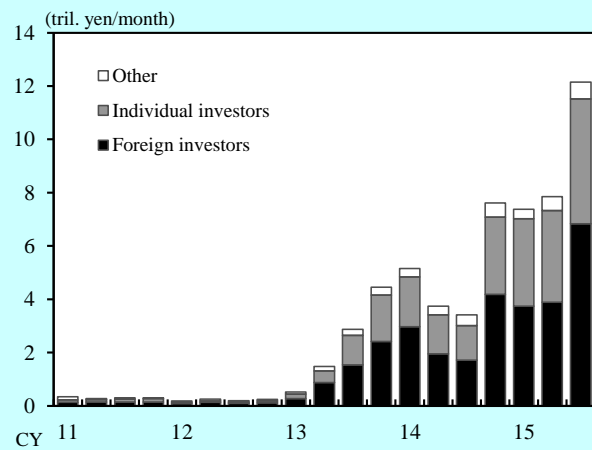
Such risks are unlikely to materialize in Japan's leveraged ETF market because it holds exchange-traded derivatives that are actively traded. Nevertheless, players in Japanese leveraged ETF markets are quite limited, which could affect market liquidity.

Players in the Japanese leveraged ETF market¹⁰ are concentrated in households and foreign investors, and lack diversity. Of these, most foreign investors are high-frequency trading (HFT) firms that engage in market making by arbitraging between leveraged ETFs and stock index futures (Chart 6). Therefore, because those who actively trade with direction in the leveraged ETF market are limited to households, purchases/sales by households that increase in volume

[Chart 6] Mechanics of the ETF Share Creation/Redemption Process



(ETF Purchases by Sector)



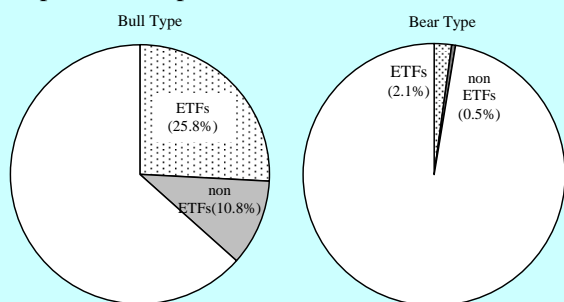
Source: Japan Exchange Group, Inc.

make finding sellers/purchasers difficult, other than market makers in the secondary market.

Under such market conditions, if households as a whole move their positions in the same direction, market makers are inclined to take opposite positions. To cover their short/long positions, market makers usually ask ETF providers for additional share creation/redemptions.¹¹

This finding suggests that in the leveraged ETF market, flexible share creation/redemptions by ETF providers in the primary market play an important role in securing market liquidity in the secondary market. Certain attention should be paid to the fact that as of end-September 2015, the outstanding amount of Nikkei 225 futures held by bull leveraged investment funds accounted for approximately 35 percent of the total open interests (Chart 7). This result suggests the possibility that if leveraged ETF markets continue to expand rapidly, conducting share creation/redemptions smoothly may become difficult. Last year, the largest leveraged ETF took a preventive

[Chart 7] Futures Holdings by Leveraged Investment Funds Tracking the Nikkei 225 (Proportion to Open Interests of Nikkei 225 Futures)



Note: Calculated on the assumption that all leveraged investment funds' positions are composed of futures. Data are as of end-September 2015.
Source: Bloomberg.

measure to temporarily pause the additional creation of shares to avoid the risk of difficulties related to smooth rebalancing. If such a measure continue to occur frequently, market making may become somewhat difficult depending on market conditions.

Households' Risk-taking Stance: From the Viewpoint of Leveraged Investment Funds

So far, we have examined the feedback effect of leveraged investment funds on the stock market. Finally, we examine leveraged investment funds as a monitoring tool of developments at large of stock investments by Japanese households with leverage.

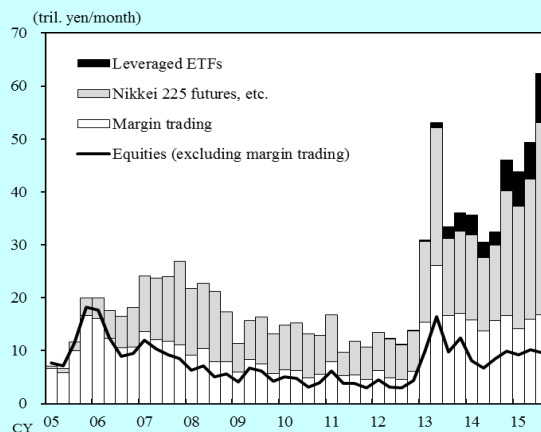
Traditionally, households have primarily used margin trading when investing in stocks with leverage. In addition, leveraged investment funds as have been discussed and stock index futures, such as Nikkei 225 mini futures introduced in 2006, have recently been popular products.

Transaction Volume and Amounts Outstanding

When looking at households' transaction volume for each product (Chart 8), the transaction amount for margin trading is close to the previous peak in 2006–2007, and transaction volume for leveraged investment funds and stock index futures have been surging.

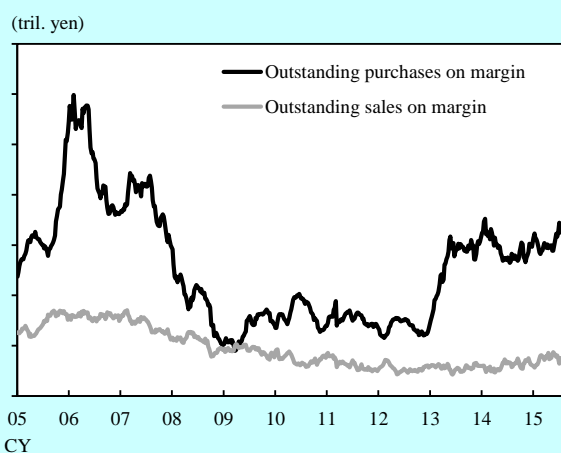
Next, the amount outstanding (Chart 9) shows that both outstanding purchases and sales on margin have been increasing but have remained at low levels compared with the previous peak in 2006–2007. In contrast, the outstanding net asset value of leveraged investment funds is surging, and households' indirect holding of stock index futures through leveraged investment funds has reached a level similar to that of outstanding net margin trading (the outstanding

[Chart 8] Investment of Japanese Households in Leveraged Stocks (Flows)



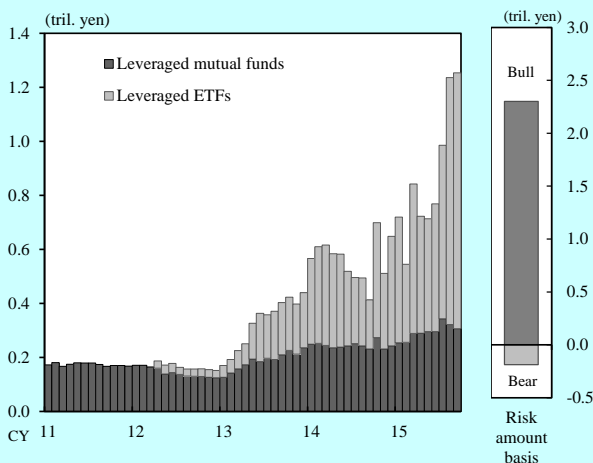
Note: On the assumption that all households' ETF transaction amounts are leveraged ETFs. The transaction amount is doubled because most leveraged ETFs have a leverage ratio of two.
Source: Japan Exchange Group, Inc.

[Chart 9] Investments in Leveraged Stocks (Margin Trading)



Source: Japan Exchange Group, Inc.

(Net Asset Value of Leveraged Investment Funds and its Risk Amount)



Note: Risk amount basis is calculated by multiplying net asset value by leverage ratio, per fund.
Sources: Bloomberg; Japan Exchange Group, Inc.; The Investment Trusts Association, Japan.

amount for stock index futures by sector is not publicly released).

These data suggest that households' trading strategy using leverage has diversified from former marginal trading to various products.

Leveraged Investment Funds as an Early Warning Indicator

From empirical experience, an increase in margin trading has been considered an early warning indicator of overheating in the stock markets of various countries, including Japan. On the other hand, whether the surge in leveraged investment funds or stock index futures trading could be regarded as an early warning indicator to gauge overheating in the stock market is still an open question, as such surges have rapidly increased only in the past few years and cannot be compared with past episodes.

Nevertheless, because the proportion of margin trading to leveraged investments among households is declining, the warning signs of overheating in the stock market could be overlooked if we only monitor margin trading.¹² To detect such signs, it is important to carefully analyze developments in stock index futures and leveraged investment funds and, in particular, to pay attention to the background to the increase.

Concluding Remarks

In this study, we have assessed the characteristics of leveraged investment funds that have markedly been increasing in the past few years and their possible impact on the stock market. We also pointed out the household sector in Japan has been diversifying their tools of investments in leveraged stocks.

Development of households' investment in leveraged stocks is one of the "heat map" indicators of the stock market. Thus, it is important to carefully monitor this indicator as well as to pay attention to newly-developed investment. It is also vital to deepen our understanding of the characteristics of these products and how they would affect markets during periods of stress.

¹ In this paper, the (leveraged) inverse investment funds that provide the opposite exposure that is a multiple of the underlying stock index are included as leveraged investment funds.

² Leveraged ETFs in Japan began their listing on the Tokyo Stock Exchange in April 2012. Unlisted leveraged mutual funds were launched in 1995, after regulations were eased to allow the use of derivatives for purposes other than to hedge exposures.

³ For more details on FAIXs, see: Ito et al. 2014. New

Financial Activity Indexes: Early Warning System for Financial Imbalances in Japan. *Bank of Japan Working Paper Series No.14-E-7*.

⁴ Rebalancing demand by inverse investment funds also occurs in the same direction as leveraged investment funds, as written in the text. For example, assume a case in which the stock price declines by 10 percent for a -2x leveraged inverse investment fund with a net asset value of 10 billion yen (short selling 20 billion yen in futures contracts). The net asset value becomes 12 billion yen (short selling 22 billion yen in futures contracts). Therefore, additional sales of 2 billion in the futures yen market become necessary to maintain the leverage ratio.

⁵ For details, see: Tuzun. 2013. Are Leveraged and Inverse ETFs the New Portfolio Insurers? *Finance and Economics Discussion Series*, 2013-48, The Federal Reserve Board, as well as Adrian, Covitz, and Liang. 2014. Financial Stability Monitoring. *Federal Reserve Bank of New York Staff Reports No.601*.

In the United States, new derivatives rules were proposed by the Securities and Exchange Commission (SEC) in December 2015 on the basis of discussions that not only leveraged investment funds but also the use of derivatives by investment companies to excessively increase leverage can cause issues in terms of investor protection and market stability. In a paper released with this proposal, highly leveraged products were pointed out as being observed in leveraged investment funds and managed futures funds (CTA). For details, see: Deli et al. 2015. Use of Derivatives by Registered Investment Companies. *White Paper*, U.S. Securities and Exchange Commission.

⁶ For example, assume a case in which a stock price of 100 yen increases by 10 percent but declines by 10 percent on the following day. Although the stock price will be $100 \times 1.1 \times 0.9 = 99$ yen, the value of a leveraged investment fund designed to double the return of a particular index on a given day will be $100 \times 1.2 \times 0.8 = 96$ yen. Thus, the rate of decline in the leveraged investment fund for the two days will be 4 percent, larger than that calculated by simply doubling the 1 percent decline in the stock price.

⁷ The same trend can be observed globally. Ramaswamy (2011) pointed out that the ratio of leveraged ETFs to the global ETF market by amount outstanding is about 3 percent, whereas that by transaction volume is nearly 20 percent. For details, see: Ramaswamy. 2011. Market Structures and Systemic Risks of Exchange-Traded Funds. *BIS Working Papers No.343*.

⁸ For details, see: Ivanov and Lenkey. 2014. Are Concerns about Leveraged ETFs Overblown? *Finance and Economics Discussion Series* 2014-106, The Federal Reserve Board.

⁹ Such liquidity risks surrounding ETFs have been discussed among international organizations, including the IMF, FSB, and BIS since the financial crisis (see, for example, the aforementioned Ramaswamy [2011]).

¹⁰ According to the trading volume of ETFs by investor type, approximately 50 percent of the trading is made by foreign investors and approximately 40 percent of the trading is made by individual investors. Because the trading volume of ETFs that are not leveraged is small, this volume is almost equivalent to the trading volume of leveraged ETFs.

¹¹ Foucher and Gray (2014) examined a case in which smooth ETF share creation/redemptions were not made in the U.S. ETF market, and stresses that ETFs entail liquidity risk. For details, see:

Foucher and Grey. 2014. Exchange-Traded Funds: Evolution of Benefits, Vulnerabilities and Risks. *Financial System Review*, December 2014, pp.37-46, Bank of Canada.

¹² One should also note that holders of leveraged ETFs remain

small compared with holders of margin trading account when using developments in leveraged ETFs to grasp households' risk-taking stance. According to the "ETF Beneficiary Survey" released by the Japan Exchange Group, Inc.(JPX), as of July 2015, 300,000 individuals hold ETFs that track Japanese equity indices. Considering that this number (1) includes holders of unleveraged ETFs (the number of individuals who held ETFs in July 2012, when leveraged ETFs were rarely traded, was approximately 220,000); and (2) is a simple total of issues that households hold (if the same person holds three issues, it is counted as three people), holders of leveraged ETF are likely quite limited. In contrast, according to a study by the Japan Securities Dealers Association (JSDA), the number of accounts for online margin trading as of March 2015 is 1.14 million (of which there are 740,000 accounts with a balance).

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