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# Are short-sales constraints binding when there is a centralized lendable securities market? Evidence from Japan<sup>☆</sup>

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## ABSTRACT

This study examines the significance of short-sales constraints in the presence of a centralized lendable securities market in Japan. We find evidence that a centralized lendable securities market experiences lower short sales constraints. The cost of borrowing stock is found to be lower in Japan's centralized lendable securities market compared with a non-centralized lendable securities market. We also find evidence that recall risk is lower in a centralized lendable securities market. Additionally, there is evidence that stocks are not systematically overvalued in the presence of the centralized lendable securities market. These results are robust when alternative measures of short-sales constraints are considered.

## 1. Introduction

The ability to sell short plays an important role in the process of efficient price determination in stock markets. One of the explanations offered by researchers for apparent mispricing is that constraints on short sales impede the reflection of new information. A market with short-sales constraints may slow recognition of negative information by excluding informed investors from the market (Miller, 1977; Diamond and Verrecchia, 1987 and Duffie et al., 2002). Short-sales constraints also slow the speed of price adjustment to private information (Diamond and Verrecchia, 1987) and may make markets more susceptible to crashes (Hong and Stein, 2003). However, concrete evidence of the negative impact of short-sales constraints is difficult to observe because of the institutional features of stock markets. Previous studies used indirect measures of short-sales constraints, such as the short interest ratio and the ownership structure of securities; these do not consider the actual cost of short sales. Although D'Avolio (2002), Geczy et al. (2002), Jones and Lamont (2002) and Beneish et al. (2015) provided evidence on the impact of short-sales constraints using the cost of borrowing, their data were collected from only a few custodial banks that did not represent the whole market. This limitation occurs because individual custodial banks conduct short-sales transactions in non-

centralized lendable securities markets. Although the total demand for short sales of stock can be found by summing individual demands from custodian banks, the actual cost of borrowing stocks is difficult to determine for three reasons. First, lack of market-wide data makes it impossible to characterize the complete schedule of demand and supply (Kolasinski et al., 2013). Second, consistent pricing of securities borrowing fees might not be possible as the securities borrowing fees could be linked to other services provided to brokers (Saffi and Sigurdsson, 2011). And third, the cost of borrowing could be higher in a non-centralized market because of higher search frictions (Jones and Lamont, 2002). To escape these limitations, we examine the significance of short-sales constraints in the presence of a centralized lendable securities market. The lendable securities market in Japan provides a unique data set upon which to conduct our analysis because the market is centrally controlled by the Japan Securities Finance Company (JSFC). All securities firms and stock lenders are connected to the JSFC to lend and borrow stocks. Although a negotiable securities borrowing system exists (with costs mutually determined by lenders and borrowers), most short sales are conducted with a standardized trading system where the JSFC charges a uniform cost of borrowing to all stock borrowers. We hypothesize that the cost of borrowing securities is low in this centralized lendable securities market because of low search frictions. We

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also hypothesize that likelihood of borrowed stock being recalled is less in this centralized lendable securities market. Thus, short sales should be less constrained in Japan's centralized lendable securities market. This suggests that superior pricing efficiency will result.

We provide new empirical evidence on the market for lendable securities in Japan. First, short-sales constraints are not generally binding in Japan; the cost of borrowing is low, demand for short-sale of stocks is also low and institutional ownership is high. Second, a near-direct comparison of the cost of borrowing securities listed on both a centralized (Tokyo Stock Exchange) and a non-centralized (New York Stock Exchange) lendable securities market shows that the cost of borrowing is lower in the centralized market. Third, the demand for lendable securities has a greater impact on the cost of borrowing. Fourth, short sellers demand the stock of large-capitalization firms and value stocks more; demand for these securities often exceeds their supply. Fifth, recall risk, a situation when lenders demand that the shorted securities be returned, is not observed in the centralized lendable securities market even when the aggregate short-sales position exceeds the supply of lendable securities. And finally, the sixth result is that overvaluation of stocks is not observed in the centralized lendable securities market even when the cost of borrowing and the short interest ratio are high.

The most closely related studies to ours are [D'Avolio \(2002\)](#) and [Beneish et al. \(2015\)](#). Both studies provided empirical evidence on the market for borrowing stocks and the determinants of the cost of borrowing. Using 18 months of data from a leading custodial bank, [D'Avolio \(2002\)](#) found that evidence of high borrowing cost and recall was rare in the U.S. but that the prevalence of short-sales increased with the divergence of opinion among investors. [Beneish et al. \(2015\)](#), on the other hand, provided evidence on the economic determinants of short-sales supply using 114 months of data from Markit Data Explorer (DXL), which provided data on lendable equity from more than 100 institutional investors. They found that the supply of lendable securities increased with the cost of borrowing and that the supply of lendable securities explained stock returns more completely when the lendable supply was binding.

We contribute to the existing literature on short-sales constraints in at least three ways. First, to the best of our knowledge, this is the first study that provides evidence of short-sales constraints under a centralized lendable securities market. Second, we provide evidence on short-sales constraints using daily data, which provides an opportunity to understand the daily movement of borrowing fees, the demand for borrowable securities and the supply of lendable securities. Moreover, our use of daily data is helpful in the study of short-term trading strategies. Previous studies mostly used monthly data from custodial banks. The use of monthly data fails to capture the daily movements of the cost of borrowing securities and does not permit analysis of short-term trading strategies ([Diether et al., 2009](#)). Moreover, it is also likely that some short-sales transactions are omitted from analysis when short sellers cover their positions quickly. [Diether \(2008\)](#) provided evidence that almost half of securities lending contracts close out within two weeks for the New York Stock Exchange. Third, we provide evidence on the behavior of stock returns in Japan's centralized lendable securities market.

The remainder of this study is organized as follows. [Section 2](#) provides a literature review, [Section 3](#) describes the theoretical arguments on how a centralized lendable securities system affects the cost of borrowing stocks, [Section 4](#) describes the data and the methodology, [Section 5](#) provides empirical facts on the market for borrowing securities in Japan, recall risk, and short-sales constraints, and finally [Section 6](#) concludes the paper.

## 2. Literature review

Unconstrained short sales are a precondition for most rational asset pricing theories. Short-sales constraints generally refer to the various limits, costs and risks of shorting in addition to legal and institutional

restrictions. Previous studies used several methods to measure short-sales constraints. Short interest, measured as the actual short position scaled by the number of outstanding shares, provides a demand-based measure of short-sales constraints ([Figlewski, 1981](#); [Asquith and Meulbroek, 1995](#) and [Desai et al., 2002](#)). However, [Chen et al. \(2002\)](#) argued that short interest as a proxy for short-sales constraints is flawed and suggested using breadth of ownership to measure short-sales constraints. [Chen et al. \(2002\)](#) used decline in the breadth of ownership as a proxy of short-sales constraints. [Nagel \(2005\)](#) used the variation of the ownership structure of lendable stock as a proxy, noting that large institutional investors are more likely to lend securities. Low institutional ownership thus means fewer securities can be borrowed and hence is a proxy for short-sales constraints. Demand and supply measures have been used to capture the effect of short-sales constraints. [Asquith et al. \(2005\)](#) defined short-sales constrained stocks as those having a high short interest but low institutional ownership. [D'Avolio \(2002\)](#), [Jones and Lamont \(2002\)](#), [Geczy et al. \(2002\)](#) and [Beneish et al. \(2015\)](#) used cost of borrowing securities to measure short-sales constraints. [Reed \(2015\)](#) argued that finding the incremental contribution of these various measures of short-sales constraints is a major challenge for research in this area.

Several theories and hypotheses discuss how short sales affect the pricing of securities and the efficiency of the market. [Miller \(1977\)](#) argued that heterogeneous beliefs among investors under constrained short sales keeps pessimists out of the market, so market prices only reflect optimists' valuations. As a result, stock prices become overvalued when short sales are constrained and the divergence of investors' opinions is high. [Diamond and Verrecchia \(1987\)](#) developed a model to illustrate the effect of short-sales constraints on the distribution and speed of adjustment by prices to private information. They argued that when short sales are constrained, both good news and bad news require more time to be reflected in prices but that bad news requires more time than good news. Since short-sales constraints limit trades by some informed investors, the speed of adjustment to bad news before public release of the news is expected to be less. However, stock price declines sharply when such information is made public. The rational expectations model of [Diamond and Verrecchia \(1987\)](#) also conjectured that stocks are not systematically overvalued in equilibrium when short sales are constrained. Assuming that investors are risk averse, [Bai et al. \(2006\)](#) found two possible contradictory valuation outcomes. First, uninformed investors' risk perceptions are changed by the slower price discovery, leading them to expect higher returns that cause lower prices. Second, short-sales constraints could impede investors from taking short positions to hedge risks, which in turn, could increase the demand for stocks, thus leading to price rises. [Hong and Stein \(2003\)](#) also developed a model based on the heterogeneous beliefs of investors. They argued that accumulated unrevealed negative information held by investors who are prohibited from selling short will not be reflected until prices begin to drop. The revelation of accumulated hidden negative information at the time of declining prices would aggravate market declines and ultimately lead to a market crash.

As was the case for models that attempted to predict the impact of short sales, empirical explorations have also failed to provide unambiguous evidence. In an early empirical study of [Miller \(1977\)](#), [Harrison and Kreps \(1978\)](#) argued that short-sales constraints can push securities prices above the valuation of the most optimistic investors. Since then, several empirical studies have documented that short-sales constraints as measured by high short interest actually lead to lower future returns ([Asquith and Meulbroek, 1995](#) and [Desai et al., 2002](#)). Short-sales constraints as measured by institutional ownership are also found to be associated with lower future returns ([Nagel, 2005](#) and [Asquith et al., 2005](#)). Short-sales constrained stocks are not only linked to lower future returns but are also found to be associated with even lower returns when investors' divergence of opinion is high ([Boehme et al., 2006](#) and [Blocher et al., 2013](#)). [Kato et al. \(2015\)](#) examined Japanese seasoned equity offerings (SEO) in the presence of

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