日本証券金融株式会社
JAPAN SECURITIES FINANCE CO.,LTD

JSF Holds Lecture on "Financial and Securities Markets and Industry-Academia Alliance" at the Faculty of Engineering at the University of Tokyo

TOKYO, January 24, 2022 --- We are pleased to announce that on January 17, 2022, Yutaka Okada, Managing Executive Officer of Japan Securities Finance Co., Ltd. (JSF), delivered a lecture to students of the School of Engineering at the University of Tokyo on the topic of "Financial & Securities Markets and Industry-Academia Alliance ― Blockchain: Case History ―" (for the lecture materials, please see the attachment).

JSF and the Graduate School of Engineering of the University of Tokyo released "JSF and University of Tokyo Start Empirical Research on Securities Lending and Borrowing Using Distributed Ledger Technology" on June 18, 2021 and have been conducting research with Associate Professor Kenji Tanaka. This lecture mainly focused on (1) an overview of the financial and securities markets, particularly securities lending and borrowing, (2) trends in applied research on blockchain technology in the financial and securities fields, (3) an overview of research between JSF and Associate Professor Kenji Tanaka, and (4) the thoughts on industry-academia alliance.

All the students in attendance were keenly aware of recent trends in finance and securities as well as the latest technologies such as blockchain and industry-academia alliance, and held lively discussions not only on current issues but also on the future state of the industry and how it should ideally evolve.

As part of our ESG efforts to realize a sustainable society, JSF will continue to aggressively strive to create a foundation for industrial and technological innovation through industry-academia alliance to expand innovation and solve social issues.

----- end -----

<About JSF>
Japan Securities Finance Co., Ltd. (JSF) is the sole securities finance company in Japan incorporated in 1950 with a license under the Financial Instruments and Exchange Act. Its main business is the provision of funds and securities to securities companies for settlement of standardized margin transactions pursuant to the above law, and also provision of securities lending and financing. As an institution specializing in the securities finance business, JSF, with a keen awareness of this public role, has a mission of contributing to the development of the securities market by proactively meeting the diverse needs of securities and financial circles and boosting the long-term interests of securities

market participants. JSF's credit rating is AA- under both Rating and Investment Information, Inc. and Japan Credit Rating Agency, Ltd., and A under S&P Global Ratings. JSF's stock is listed on the Tokyo Stock Exchange.

For more information, visit https://www.jsf.co.jp/english/

＜Related SDGs＞

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attachment

Financial & Securities Markets and Industry-Academia Alliance – Blockchain: Case History –

Lecture held at University of Tokyo,
Faculty of Engineering, Tanaka Laboratory

17 January 2022

Yutaka Okada
Managing Executive Officer
Japan Securities Finance

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Introduction: Lecture overview

I would like to discuss the following topics today on the alliance between industry and academia.

1. Financial & securities markets and securities lending and borrowing
2. Applied research on blockchain technology in the financial & securities field
3. Tanaka Laboratory-JSF Project
4. Thoughts on industry-academia alliance

Japan Securities Finance (JSF)

- JSF was founded in 1950 to extend loan or lend stocks to securities firms for settlement of margin transactions (loan for margin transactions). It is a limited company listed on the First Section of the Tokyo Stock Exchange.
- It lends various types of stocks to a large number of securities firms, and procures stocks for this purpose from a broad range of financial institutions and institutional investors.
- It is allowed to carry out settlement using the Central Counterparty run by the Tokyo Stock Exchange pursuant to the law in order to reduce settlement risk and execute its work efficiently.
- As securities finance companies provide the infrastructure for public markets, they must be licensed by the prime minister. JSF is the only such securities finance company in Japan.

Financial & securities markets (1)

- Money markets
  - Banks and securities firms procure (demand) and invest (supply) funds for various activities
  - Institutional investors and businesses also participate in the markets in order to procure/invest funds

- Securities markets
  - Stock markets
    - Corporations issue stock to procure capital for capital expenditures (primary market)
    - Institutional and individual investors buy/sell stocks (secondary market)
  - Bond markets
    - Governments and corporations issue bonds to procure needed funds (primary market)
    - Institutional and individual investors buy/sell bonds (secondary market)

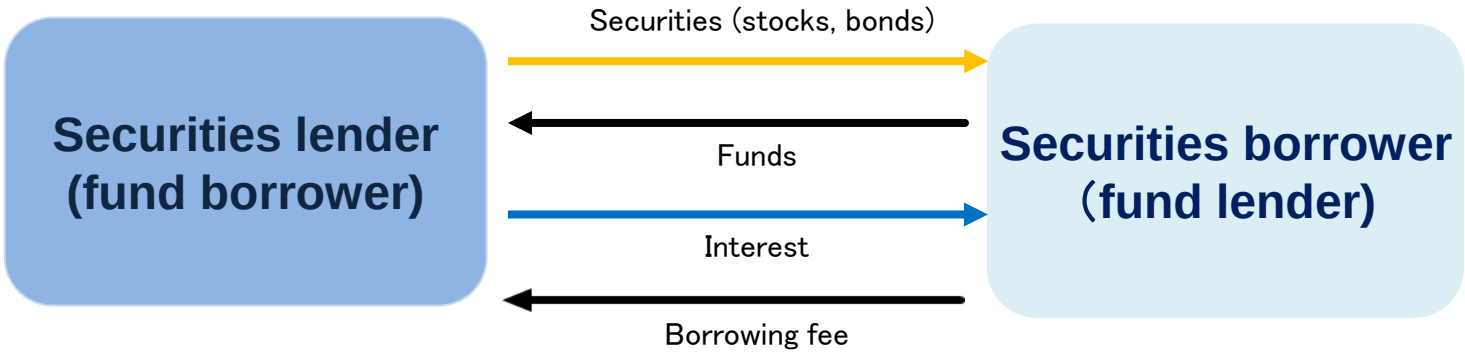
Financial & securities markets (2)

- Close link between capital markets and securities markets
  - Securities issuance and circulation involves settlement (payment/receipt) of funds via money markets.
    - Example: Investor uses stock as collateral to procure funds (money market), which are then used to purchase newly issued bonds (securities market).
  - Securities are used as collateral required for procuring funds.
  - Clearing houses and settlement institutions have been created to ensure safe settlement of funds/securities. Users pledge their funds/securities as collateral.

Role of repo transactions (1)

Repo transactions are transactions in which securities are exchanged for funds or other securities.

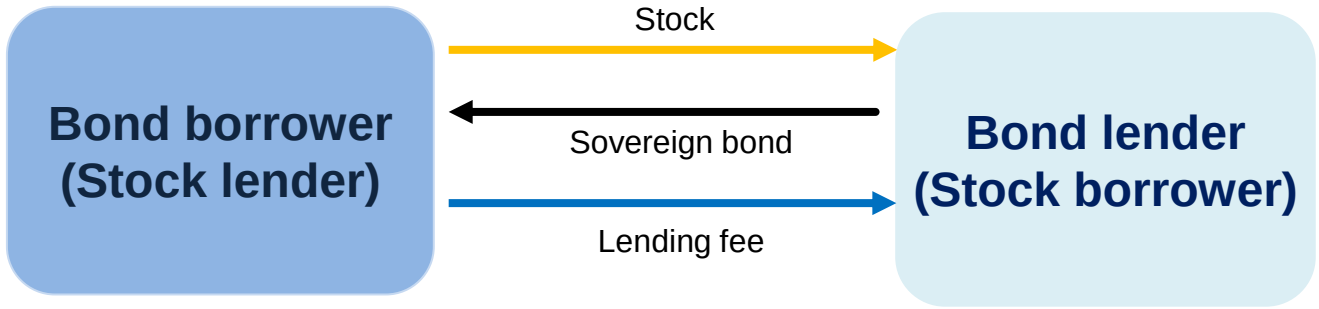
(1) Exchange of securities and funds



- Securities firm procures funds to acquire securities as inventory (securities as collateral)
- Institutional investor lends securities to utilize its securities holdings (cash as collateral)
- Securities and funds may be issued in different countries

Role of repo transactions (2)

(2) Exchange of securities and securities

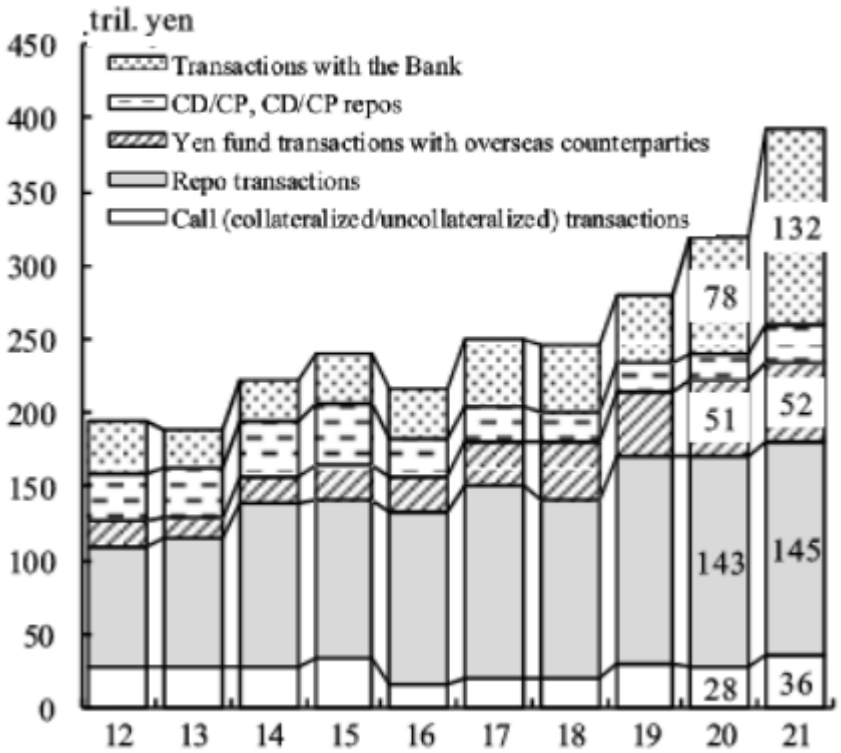


- The bond borrower (e.g., bank, securities firm) pledges stock to the bond lender (e.g., institutional investor) as collateral and pays borrowing fee.
- The borrower acquires funds using the procured bond as collateral or pledges the bond as collateral to the central bank or clearing/settlement house.
- Securities and funds may be issued in different countries

Repo market structure（1）

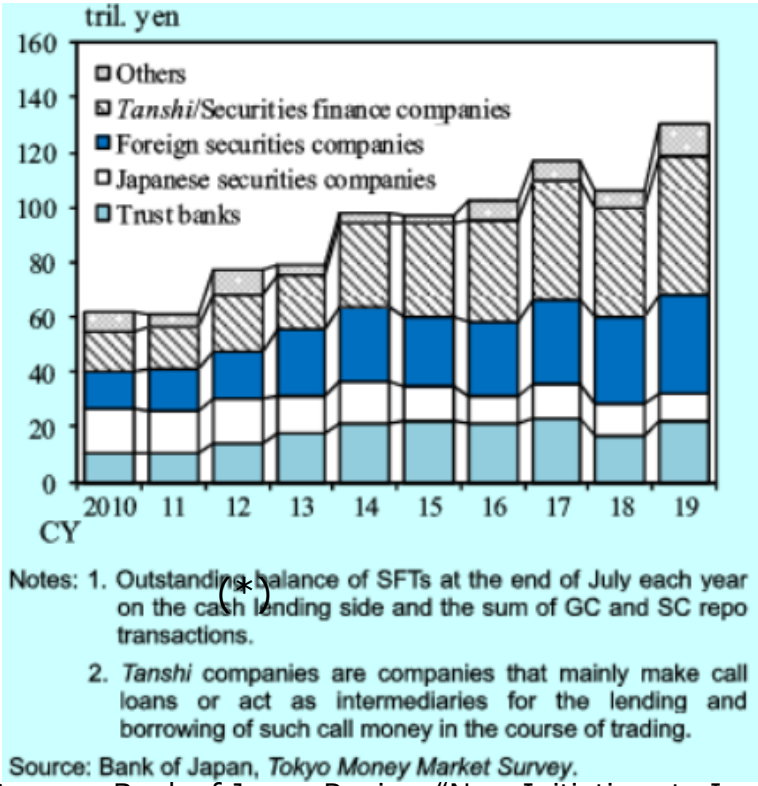
- Cash Borrowing Side

Amount Outstanding in the Money Market



Source : Bank of Japan “Trends in the Money Market in Japan”

Changes in the balance of securities financing transactions in Japan



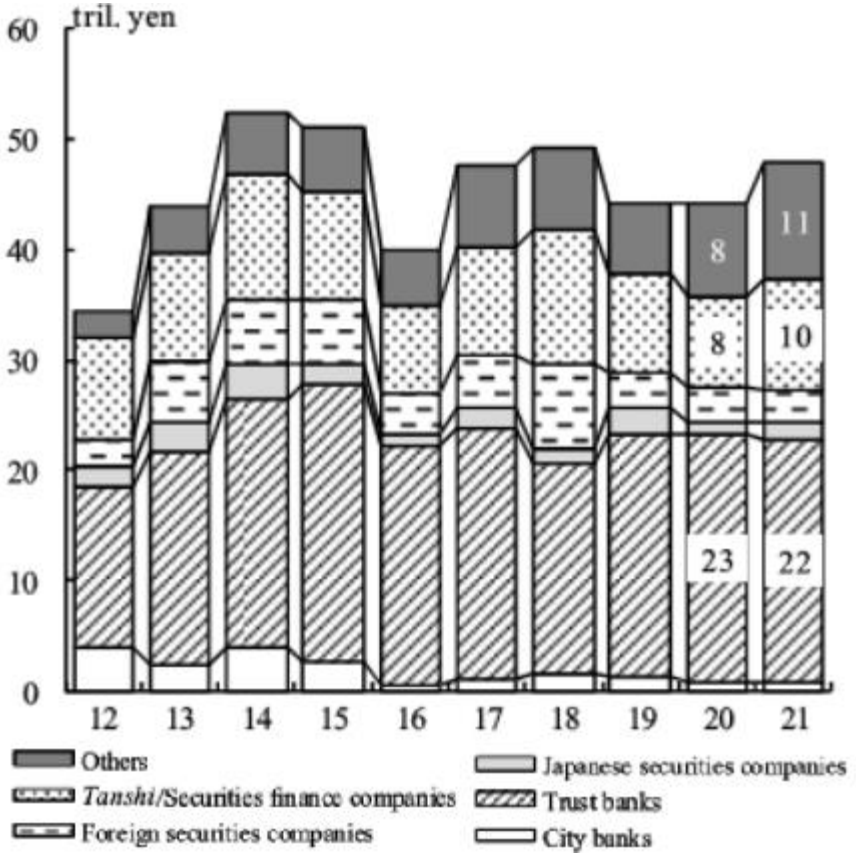
Source : Bank of Japan Review “New Initiatives to Improve the Transparency of Securities Financing Markets in Japan”

(*) Repos executed without designation of specific securities as collateral, similar to cash loans, are known as General Collateral (GC) repo transactions. Repos executed with designation of specific securities as collateral, similar to securities loans, are known as Special Collateral (SC) repo transactions.

Repo market structure (2)

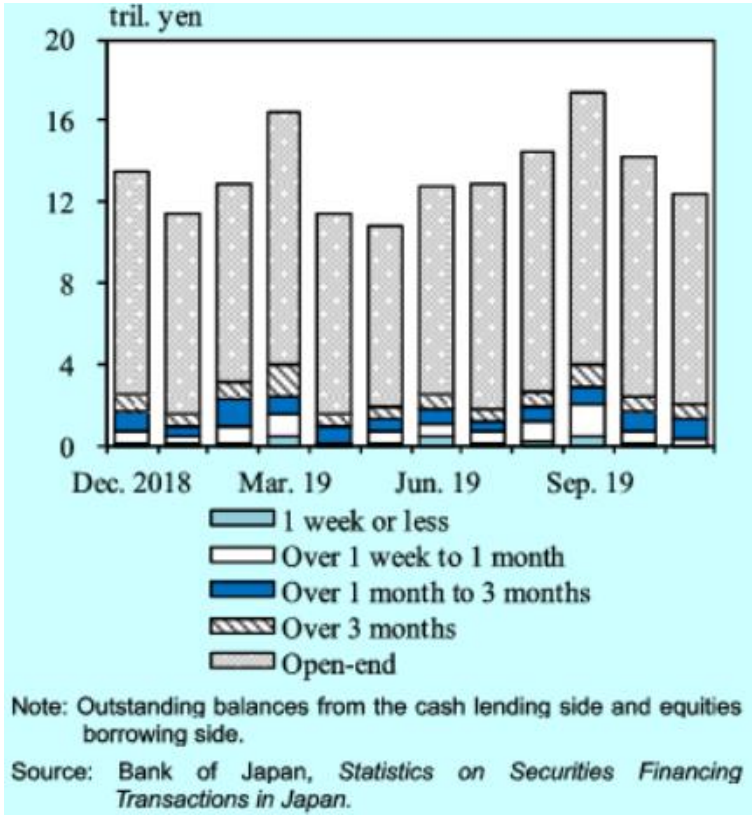
- Bond Lending Side

Amount Outstanding in the SC Repo Market by Investor Type



Source : Bank of Japan “Trends in the Money Market in Japan”

Securities Lending Transactions with Japanese Equities

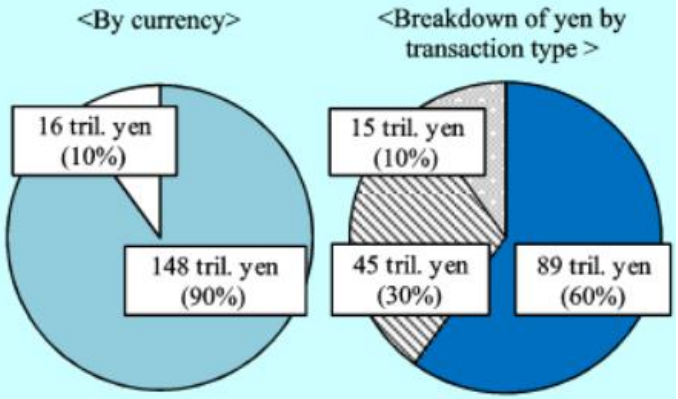


Source : Bank of Japan Review “New Initiatives to Improve the Transparency of Securities Financing Markets in Japan”

Repo market structure (3)

- Japanese repo markets are mainly yen based, centered on JGBs. Overseas transactions are mainly with Europe.

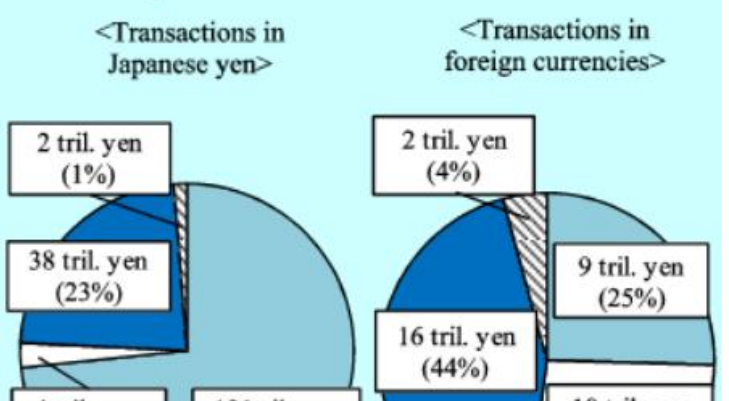
[Chart 7] Outstanding balances by currency and transaction type



Notes: 1. Outstanding balances from the cash lending side (average month-end outstanding balances from December 2018 to November 2019).
2. "Others" includes SFTs using equities, CP, and corporate bonds.

Source: Bank of Japan, *Statistics on Securities Financing Transactions in Japan.*

[Chart 8] Outstanding balances by counterparty jurisdiction



Note: Outstanding balances by counterparty jurisdiction from the cash borrowing side (average month-end outstanding balances from December 2018 to November 2019).

Source: Bank of Japan, *Statistics on Securities Financing Transactions in Japan.*

Source : Bank of Japan Review “New Initiatives to Improve the Transparency of Securities Financing Markets in Japan”

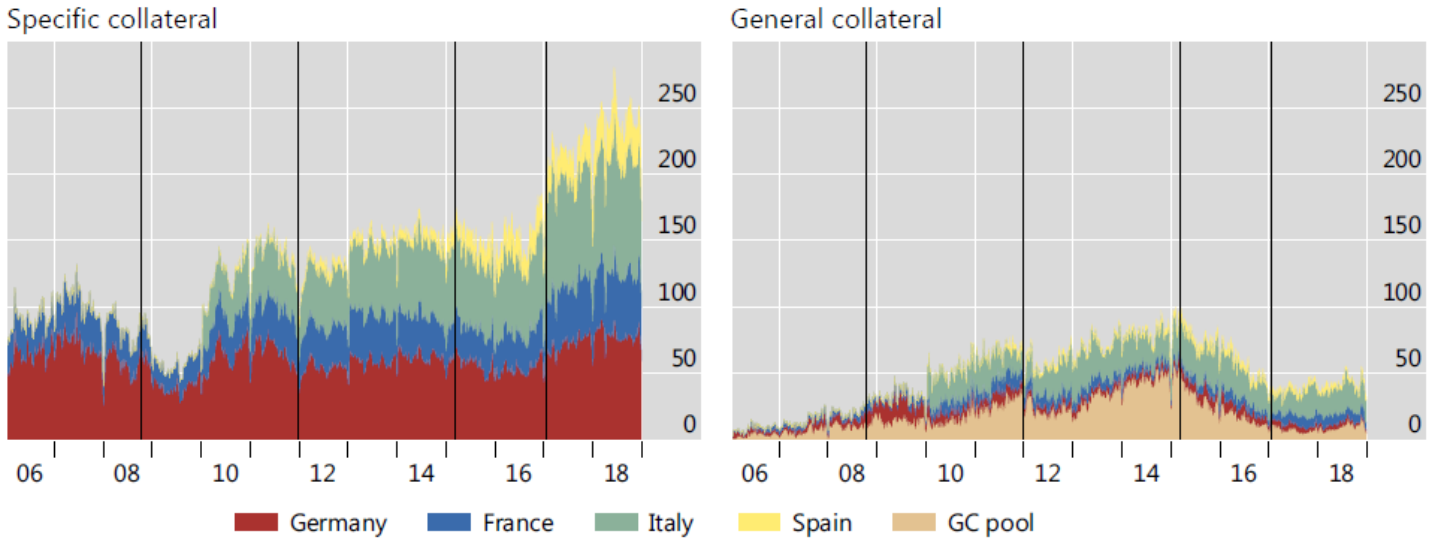
Repo market structure （4)

European repo markets

Trading activity

Turnover,[1] in billions of euros

Graph 1



The vertical lines indicate 15 October 2008 (switch to fixed rate full allotment), 21 December 2011 (LTRO), 9 March 2015 (PSPP) and 19 January 2017 (relaxation of eligibility requirements). Data from MTS Repo – which handles most of the Italian repos – are only available from 2010 onwards.

[1] Nominal amount of the cash leg of transactions settled on that day against the collateral and contract type that define the segment.

Sources: BrokerTec; Eurex Repo; MTS Repo; authors' calculations.

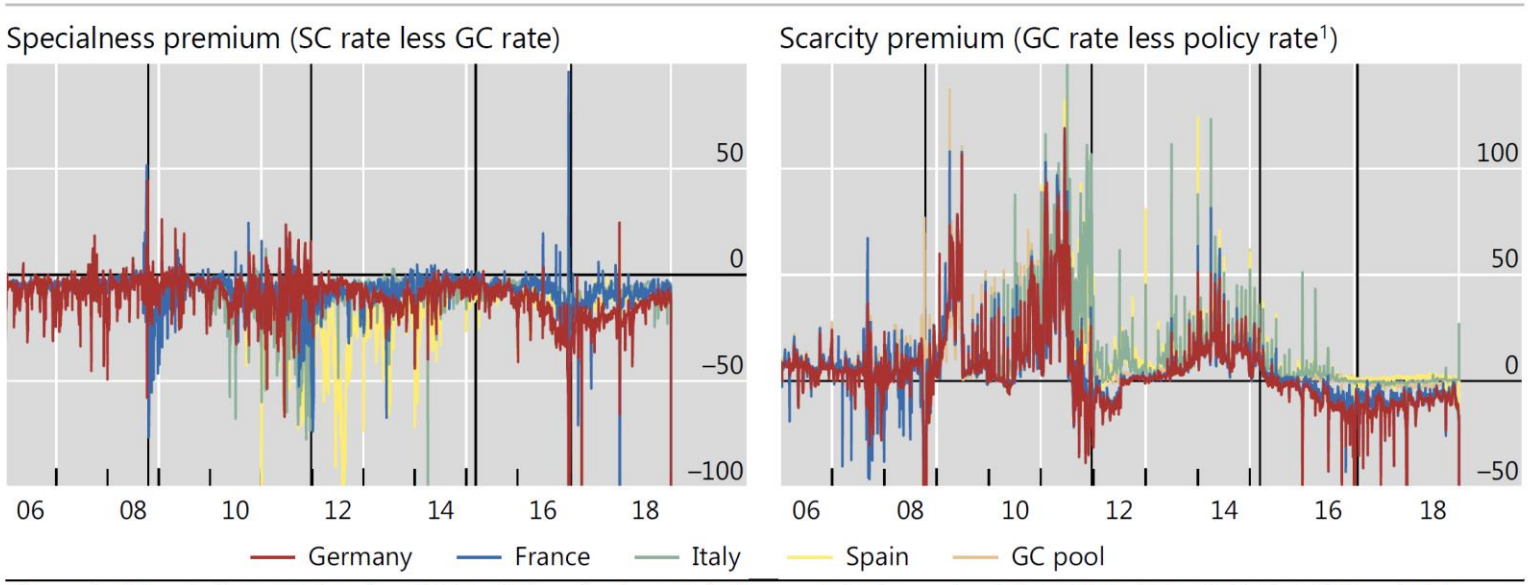
Source : "Euro Repo Market Functioning: Collateral is King" P. Schaffner et al, BIS Quarterly Review, December 2019

Repo market structure (5)

- Repo markets are expanding worldwide
- This stems from growing transactions to procure securities
  - SC transactions are on rise in both Japan and Europe.
- Rise in securities procurement trades driven by:
  - (Demand side) Transaction collateral requirements from post-Lehman regulatory tightening, greater collateral demand for pledges to clearing/settlement houses
  - (Supply side) Increasing scarcity of limited-supply securities following asset purchasing spurred by global monetary easing policies

Repo market structure（6）

- (cont'd) Example: Falling repo rate in Europe from scarcity of sovereign bonds



The vertical lines indicate 15 October 2008 (switch to fixed rate full allotment), 21 December 2011 (LTRO), 9 March 2015 (PSPP) and 19 January 2017 (relaxation of eligibility requirements).

[1] In the light of changes to the ECB's operating framework, we use the interest rate on the main refinancing operations as the policy rate prior to September 2008 and the deposit facility rate thereafter.

Sources: ECB; BrokerTec; Eurex Repo; MTS Repo; authors' calculations.

Source : "Euro Repo Market Functioning: Collateral is King" P. Schaffner et al, BIS Quarterly Review, December 2019

Role of securities lending at JSF

(1) Loan for margin transactions

Supply funds/stock liquidity to margin transaction markets and act as market infrastructure

(2) Repo transactions

Act as intermediary for repo transactions derived from (1) utilizing creditworthiness and neutrality

Applied research on blockchain technology in securities field

Blockchain technology is

- Resistant to manipulation/counterfeiting
- Resistant to damage
- More efficient processing (automation) when used with smart contracts
- These elements can help reduce settlement and business risk and should be applicable to the securities business as with other fields.

Experimental token settlements (1)

- Token as payment means
  - JPM Coin: US dollar settlement platform set up by JPMorgan Chase with client institutions. Settlement uses tokens at $1 per coin. Similar schemes have been proposed by Well Fargo and others.
  - Utilty Settlement Coin: Fnality offers 1 token per currency unit in Canada, Eurozone, Japan, UK and US, including cross-border settlements.
- DVP settlements for securities and cash (*)
  - Project Jasper: Joint project by Payments Canada and the Bank of Canada offering settlement of securities tokens and cash tokens on the same ledger through token-vs-token (TvT).
  - Project Stella: Joint ECB and BoJ project offering TvT DVP settlements.
  - Projct Ubin: TvT by Monetary Authority of Singapore and Singapore Exchange.

(*) Delivery Versus Payment (DVP) links securities delivery with payment so that neither occurs without the other.

Experimental token settlements (2)

- Actual cases
  - The World Bank and Commonwealth Bank of Australia have issued bonds on their Bond-i platform using blockchain technology.
  - Societe General has issued €100mn in covered bonds as a security token on the Ethereum blockchain.
  - Börse-HQLAx: DVP settlement for tokenized securities developed by Deutsche Börse Group and HQLAx.
- Platforms supporting tokenized securities
  - SIX Digital Exchange: An experimental settlement platform for tokenized stocks/cash run by SIX Swiss Exchange and Swiss National Bank. Cash settlements have been carried out for both wholesale central bank digital currencies and the nation's existing RTGS system.
  - Bank of England has upgraded its RTGS system to accept security tokens.

➢ Source: Morten Bech, Jenny Hancock, Tara Rice, Amber Wadsworth, "On the future of securities settlement", BIS Quarterly Review, March 2020

Overseas developments (1)

The aforementioned growth in collateral demand has become an acute problem in Europe, prompting a look at blockchain technology as a way to use securities as collateral more efficiently and swiftly and with low settlement risk.

- For example, the Blockbaster Project by Deutsche Bundesbank and Deutsche Börse could increase the efficiency of verification work between the collateral lender and borrower, allowing automatic delivery of collateral in near-real time all day every day. The project's utility is now being studied.
  - We should note that such projects are not intended to immediately replace existing securities settlement systems, which are highly efficient and risk controlled. Existing systems are designed to meet a variety of needs, including regulations, and any new technologies would likely be operated in parallel for a substantial period.

➢ Source: Deutsche Bundesbank, Deutsche Börse, "How Can Collateral Management Benefit from DLT?"- Project "BLOCKBASTER", January 2020

Overseas developments (2)

- It would be unrealistic at this stage to aim immediately to turn to blockchain as a replacement for existing systems, which are already efficient and realizing low settlement risk.
- Implications of experiments are as follows.
  - Blockchain technology may help streamline back-office processing and cut costs and time, such as simplifying the multiple verification procedures performed from contract to settlement. Shareholder voting, dividend payments and other corporate actions may also be automated based on ledger records.
  - Given the essential role played in existing systems by intermediaries in facilitating transactions such as supplying liquidity, especially during times of stress, it is not just a matter of simplifying the process.

Overseas developments (3)

(cont'd)

- Exchange of securities tokens and fund tokens on a blockchain is virtually immediate, but it is always essential to have gross settlement funds on hand. (To address this issue, some projects have tried connecting with existing RTGS (*) systems having liquidity-saving mechanisms.)
- Further legal consideration may be needed on measures to ensure settlement finality.

➢ Source: Morten Bech, Jenny Hancock, Tara Rice, Amber Wadsworth, "On the future of securities settlement", BIS Quarterly Review, March 2020

•(*) Real-Time Gross Settlement (RTGS) is a method of interbank fund transfers used by central banks along with Designated-Time Net Settlement (DTNS). In the latter method, transfer instructions sent by financial institutions to the central bank are stored until a specified time, at which point the difference between payments and receipts at each financial institution is settled. In RTGS, transfer instructions are instantly carried out individually as soon as they arrive at the central bank.

Tanaka Laboratory-JSF Project (1)

日本証券金融株式会社 JAPAN SECURITIES FINANCE CO.,LTD.　東京大学 THE UNIVERSITY OF TOKYO

2021年6月18日

各 位

日本証券金融株式会社
国立大学法人東京大学大学院工学系研究科

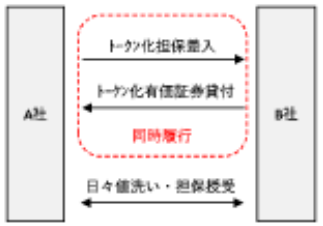
分散型台帳技術を活用した有価証券貸借取引に係る実証研究の開始について

日本証券金融株式会社（以下「日本証券金融」）と国立大学法人東京大学大学院工学系研究科（以下「東京大学」）は、株券貸借取引や債券貸借取引において、分散型台帳技術の活用により、トークン化した有価証券や担保の円滑な取引が可能かについて検証する実証研究を共同で開始いたしました。

近年、分散型台帳技術への注目が高まり、証券分野でもポストトレード処理やトークン化した有価証券の新規発行などを中心に応用可能性について議論が進展しています。
今回の実証実験は、日本証券金融の主要業務分野である有価証券の貸借に焦点を当て、分散型台帳技術の応用可能性を探るものです。東京大学では電力エネルギー分野をはじめとする分散型台帳技術の実社会インフラ分野への応用研究を行ってきましたが、それらで培った知見と成果を本実証実験へ応用することが期待されます。

具体的には、当事者を限定したうえで、トークン化された有価証券と担保を交換する取引を仮想で行うことを想定しています。これにより、①通常は時差を伴う外貨建ての有価証券や担保の授受について、ファイナルではないものの当事者間ではリアルタイムに近い同時履行が可能になる、②システムの可用性拡大や事務処理の効率化などのメリットを享受できる、③こうしたメリットを背景に、流動性の低い資産を含めた各種の資産を担保として活用できるようになる、といった可能性があるかなどを検証していく方針です。

【実証研究の概要図】



本実証実験を通じて、トークン化された有価証券と担保の貸借取引にかかる知見を得て、その可能性と課題について実用化も見据えた研究を行ってまいります。

なお、日本証券金融は研究テーマの検討・提案、関連情報の調査および開発されたシステムの検証・評価を行い、東京大学はシステムの開発および研究の統括を行います。本研究の成果は証券分野をはじめとして、今後の様々な分野への社会実装へ活かすことが期待されます。

以 上

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Tanaka Laboratory-JSF Project (2)

- JSF and University of Tokyo released a report on 18 June 2021 entitled “JSF and University of Tokyo Start Empirical Research on Securities Lending and Borrowing Using Distributed Ledger Technology”.
- The research is set in securities lending and borrowing in the secondary securities market. In this sense, the research is rare in Japan, and we are trying to make it as unique as possible in light of the aforementioned global developments.
- Special features
  (1) Limited to specific parties
    - This is not a public trading system but a system to verify bilateral transactions as often seen in securities lending and borrowing (Gensaki) transactions.
  (2) Test of transactions exchanging collateral for tokenized securities
    - We deal explicitly with cases where the collateral is securities rather than funds. We seek to verify its applicability in view of the increasing demand for goods (securities) in recent years.

Tanaka Laboratory-JSF Project (3)

(cont'd)

(3) Transfers of foreign-currency-denominated securities and collateral, which usually involve a time difference, can be performed simultaneously between the parties in near-real time, though the result is not final.

- For securities and collateral issued in different countries, the final settlement will be carried out in each country, resulting in a time difference. For this reason, there is a risk (Herstatt risk) that securities may be delivered without collateral.

(4) It offers other benefits such as increased system availability and more efficient business processing.

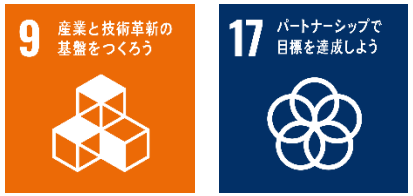
(5) Against these merits, we examine whether various assets, including low-liquidity assets, can be used as collateral.

- Issuance of unlisted securities (e.g., venture company stocks) has become popular worldwide in securities markets in recent years.

Thoughts on industry-academia alliance (1)

- For over a year, participants in the Tanaka Laboratory-JSF Project (Tanaka Laboratory, JSF, USD [system development firm]) have carried out individual tests and held monthly meetings targeting an active exchange of opinions and progress management reports.
- Active involvement of the university for social implementation of its academic achievements and knowledge will
  - offer scientific backing for business
  - contribute to resolution of social issues
  - allow companies to make use of difficult basic research results
- It will also contribute significantly to the S (Society) portion of ESG, a set of criteria for corporations toward solving social issues such as climate change. (*)

(*) Among the 17 sustainable development goals (SDGs) for transforming the world, the following two items apply.
GOAL 9: Industry, Innovation and Infrastructure
GOAL 17: Partnerships for the Goals



Thoughts on industry-academia alliance (2)

(cont'd)

- The company's role is to examine and propose research themes, investigate related information, and verify and evaluate the developed system. The university side is in charge of system development and research.
- Even if the company is not a specialist in the field, it must try to understand the university's research results as much as possible and help clarify the experimental concept for actual social implementation.
- Blockchain and AI are used in various fields other than finance, such as electric power trading at Tanaka Laboratory. That is, new technologies can become a link between finance and various fields.

Thoughts on industry-academia alliance (3)

(cont'd)

- We hope to continue developing collaborative relationships between universities and companies through concrete projects.

Reference materials (main)

1. Japanese developments

- BoJ Financial Markets Department, “Trends in the Money Market in Japan - Results of the Tokyo Money Market Survey (August 2021) -”, December 2021
- Nobukazu Ono, Kouga Sawada, Akira Tsuchikawa, “Toward Further Development of the Repo Market”, BoJ Review, April 2015
- Sasamoto Kana, Nakamura Atsushi, Fujii Takanori, Semba Takashi, Suzuki Kazuya and Shinozaki Kimiaki, “New Initiatives to Improve the Transparency of Securities Financing Markets in Japan: Publication of Statistics on Securities Financing Transactions in Japan” (BoJ Review, February 2020)
- Tanaka Shuichi, Soejima Yutaka, “Attempt to construct securities value chain with distributed ledger technology -trends in security token in major countries-” (BOJ Reports & Research Papers, August 2020) (*)

(*) Available only in Japanese

Reference materials (cont'd)

2. Overseas developments

- Shimamura Yuko, Nakamura Shintaro, Ishizaka Shingo, Hideshima Hirotaka, "Trends in global government bonds repo market" (BoJ Review, June 2017) (*)
- Patrick Schaffner, Angelo Ranaldo, Kostas Tsatsaronis, "Euro repo market functioning: collateral is king", BIS Quarterly Review, December 2019
- Morten Bech, Jenny Hancock, Tara Rice, Amber Wadsworth, "On the future of securities settlement", BIS Quarterly Review, March 2020
- Deutsche Bundesbank, Deutsche Börse, "How Can Collateral Management Benefit from DLT?"- Project "BLOCKBASTER", January 2020

(*) Available only in Japanese

Thank you for your attention.