2nd APCF International Seminar

DECEMBER 11, 2018
SEOUL, REPUBLIC OF KOREA
Opening Remark

Kyung Soo Kim,

Professor, SKKU and President-elect of the Korean Economic Association
Congratulatory Address

Weon-Kyoung Jo,

Director General for G20, IMF, and ASEAN+3 in the International Finance Bureau, Ministry of Strategy and Finance
Global market for collateral: implications for Asia

Manmohan Singh
Senior Economist, IMF
Global Market for Collateral: implications for Asia

Second Asian Prime Collateral Forum
11 December 2018, Seoul, Korea

Manmohan Singh
International Monetary Fund
Views expressed are of the author and not of the IMF, its Executive Board, or IMF management
Recent views on global collateral markets

- **Reserve Bank of Australia (RBA):**
  “but it is also interesting to think of ……collateral multipliers. That is how many times do assets get recycled in the system, particularly in terms of generating funding. **Collateral multipliers don’t appear in standard textbooks.** *(Feb 2012 speech, Guy Debelle, now deputy governor/RBA)*

- There are now several Working Groups (FSB etc.), on the best **metric for collateral reuse**, including work on “**Data Gaps**”

- **CGFS:** interim report on repo markets:
  “consistent with studies that have shown that the number of **intermediary balance sheets connecting the end suppliers of cash/collateral has reduced** in recent years” –December, 2016
US Banks active in collateral market
(where are Asian banks)
European Banks active in collateral markets

(Asian banks?)
Pledged Collateral vs (relevant Money metric)

- about 25% of savings make it to financial markets – right diagram. So from a lubrication (“greasing” the global wheels of finance), pledged collateral is as important as money.
Pledged collateral received by U.S. banks

[Diagram showing pledged collateral received by major U.S. banks from 2007 to 2017. The x-axis represents different banks (Bear Stearns, Lehman, Morgan Stanley, Goldman Sachs, Merrill/BoA, JP Morgan, Citigroup) and the y-axis represents billions of US dollars.]
Pledged collateral received by European banks
(also Nomura—recall Lehman pieces; and Canadian banks)
The current global Monetary Policy

- Central banks via QE are trying to rejuvenate the credit creation engine.

- However there is “discomfort with collateral chains”. Restricting collateral re-use is a tight money policy that seems to be at odds with the current policies of key monetary authorities.

- Global demand for Safe Assets (HQLA or Prime Collateral):
  
  \[ \text{Demand} = \text{Supply} \times \text{re-use rate} \]
  
  (right hand side is “effective supply” in the global market)

- If there is cross-border demand for prime Asian collateral, this can change the global equation.
Potential for Asian Collateral

- The size of Asian local currency-denominated bond markets has grown to exceed USD10 trillion—(re: ABF’s PanAsian bondIndexFund)…

- Asia-region (unlike other parts of the world) has a bias to equity-culture—and this can be a major/diversified source for pledged collateral

- However, cross-border use is limited due to local restrictions:
  - Korean government bonds must be held at Korean Securities Depository/
  - JGBs not widely held by non-Japanese/ QQE mutes collateral reuse.
  - At present, US Treasuries preferred in Asian time zone as collateral

Suggestions to improve the ‘Asian plumbing’

- Many countries restrict the repo market access to onshore entities
- Centralized clearing preferred by investors than requiring domestic custodian
- Clarity on taxation over coupon/dividend and capital gains
- Regulation allowing for FX hedging in onshore forwards (so that the ‘gap’ in NDF market is not magnified)
Global market for collateral: implications for Asia

[Discussant]
Jaehyun Choi
CSIF specialist, ADB
Discussion of Singh’s
Global Market for Collateral: Implications for Asia

Jae Hyun Choi
ADB CSIF
December 11, 2018

Second Asian Prime Collateral Forum
Comments on Singh (2017 and today)

- Singh (2017) and today’s presentation provide a new insight into complex collateral related issues raised after the global financial crisis.
  - Concept of collateral velocity
  - Comparison of collateral reuse and money creation process
  - Collateral map- quantitative easing and regulatory changes, etc.
Discussion focus

- Focus on legal issues of reuse/rehypothecation of collateral
- Korean case of collateral issues and
- Need for promotion of cross-border repo in ASEAN+3 region
Interview results

Interviews with financial firms and relevant service providers in Korea

• “There is no overall shortage of high-quality liquid assets and no individual financial firms are facing collateral shortfalls.”
• “No financial firms may suffer shortages of specific liquid assets in the near future.”
• Only a few interviewees understood the meaning of reuse/rehypothecation of collateral.
• Global IBs in Korea and non-resident investors have raised issues of reuse of fixed income they held.
Market participants’ use of collateral

- Secured funding: Funding by pledging its securities to an investor, borrowing cash or any specific (highly liquid) securities.
  - Borrower: pays interest/fee, provides collateral as margin (“a haircut”) to protect the investor from the borrower’s default.
  - A hedge fund funding from prime broker, repo and securities lending.
Collateral rehypothecation/reuse

- Banks/Dealers may use collateral that they receive in repo, securities lending, and margin loans.
  - Banks/Dealers may repledge the collateral with other parties to raise funding.
  - Rehypothecation is a way of repledging of client assets that were posted as collateral by clients.
    - Clients who allow rehypothecation of their collateral are usually compensated by a rebate on fees or lower borrowing cost.
Securities lending

- Securities lending transaction in the international market
  - The lender gives legal title to a security to the borrower for a limited period of time, in return for legal ownership of collateral.
  - Other securities or cash can be the collateral.
  - The borrower pays a fee to the lender for the use of the loaned security.
From an economic perspective, a repo is equal to a secured loan

- The lender (buyer) in a repo receives the underlying securities as collateral while the borrower (seller) promise to buy the same asset back in the future.

- The buyer will earn a return after reselling the collateral asset back to the seller in the closing leg.
Differences in legal construction between EU and the US(1)

- In EU, a repo transfers legal title to collateral from repo seller to the buyer – a true sale.
  - As the collateral becomes the property of the repo buyer, he can sell it, pledge it, repo it out, or just hold it.
  - That is, the repo buyer can reuse the collateral to refinance itself during the life of the repo.
    - Theoretically this process could repeat several times.
Differences in legal construction between EU and the US(2)

In the US (under the New York State law), the transferring of title to collateral is not legally robust, so the collateral is pledged.

• In the event when a repo seller becomes insolvent, there is a significant risk that the rights of the buyer to liquidate collateral could be challenged in court.
• So the seller gives the buyer: 1) a pledge, in which the collateral is transferred into the control of the buyer, and 2) the right to reuse the collateral at any time during the term of the repo, i.e., a right of rehypothecation which gives US repo the same legal effect as a transfer of title to the collateral asset.
Rehypothecation and reuse of collateral(1)

- The terms “rehypothecation” and “reuse” of assets are often interchangeably.
  
  - But sometimes they are used with different meanings in different jurisdictions and different papers.
  
  - EBA (European Banking Authority) has stated: Rehypothecation refers to the right of financial intermediaries to sell, pledge, invest or perform transaction with client asset they hold.
Rehypothecation and reuse of collateral (2)

- Rehypothecation allows prime brokers to obtain funding using their client collateral.
  - The regulation of rehypothecation differs among countries; US limit the amount of a client’s assets which a prime broker may rehypothecate to a certain level of the client’s liability to the prime broker.

- The term “collateral reuse” is usually used in more broader context than rehypothecation.
Rehypothecation of collateral in Korea(1)

- In Korea, pledge (Jil Kwon, 질권) is the common method to provide securities as collateral in financial transactions.
  - In a pledge, the ownership of pledged assets does not transfer to a secured party (collateral taker) and the secured party usually cannot rehypothecate the collateral received.

- However, in March 2017, the FSC (Financial Services Commission) and the FSS (Financial Supervisory Service) have changed the regulation on securities lending, whereby financial institutions may rehypothecate the collateral which they receive for the restricted purposes.
Rehypothecation of collateral in Korea(2)

- Only KTB (Korean Treasury Bond) and MSB (Monetary Stabilization Bond issue by the Bank of Korea) may be lent for collateral purposes under the new system.

- The purpose of the rehypothecation/reuse of collateral is limited to collateralization and repo transactions.
Cross-border repo for Korean Financial Institutions in Seoul(1)

Korean Financial Institutions in Seoul

Global IBs’ Seoul Branches / Subsidiaries

KSD

Global IBs In NY / London

- Payment and Settlement
  - Foreign currency: FOP (Free of payment)
  - Securities: DVP at KSD (Korea Securities Depository)
- Collateral (KRW-denominated): KTB (Korea Treasury Bond) and MSB (Monetary Stabilization Bond)
No big problems for Korean financial firms in normal times with the current cross-border repo method.

- However, improvements can be made in funding in preparation for potential global/regional financial crisis.
  - During the global financial crisis, many Korean financial firms suffered from funding difficulties.

- For example, establishing cross-border linkages between Korea and other economies among ASEAN+3 which help mitigate liquidity risks of the financial firms.
Cross-border DVP Link between BOJ-NET JGB Services and HKD CHATS(1)

- BOJ and HKMA have been preparing for the implementation of cross-border DVP link by linking BOJ-NET (BOJ Financial Network System) JGB Services with HKD CHATS (Hong Kong dollar Clearing House Automated Transfer System) in order to enable DVP settlement of JGBs and HKD.

  - Cross-border DVP link has been discussed in “CSIF”
  - Two institutions intend to implement the link around the spring of 2021.
(Bank of Japan)

BOJ-NET JGB Services

Financial institution A → JGB → Financial institution B

Japan

Link

DVP

DVP settlement by linking the two systems

(Hong Kong Monetary Authority)

HKD CHATS

Financial institution A ← HKD → Financial institution B

Hong Kong
Japanese financial institutions can procure Hong Kong dollars with JGBs as collateral through this network while Hong Kong financial firms will invest short-term excess money through this platform.

- Currently, most Japanese banks in Hong Kong are known to procure funds by exchanging the yen for US dollars, and then buy Hong Kong dollars using the US dollars.
Q&A
The Future of Collateral and Repo Market: Centralized Governance and Decentralized Technology

David Lee Kuo Chuen
Professor, SUSS
The Future of Collateral and Repo Market: Centralised Governance and Decentralised Technology

David LEE Kuo Chuen
Co-founder, BlockAsset Ventures
Professor, Singapore University of Social Sciences
https://www.linkedin.com/in/david-lee-kuo-chuen-%E6%9D%8E%E5%9B%BD%E6%9D%83-07750baa/
www.BlockAsset.ventures
www.Sussblockchain.com
Existing Collateral and REPO Market

• Ideally: collateral should be free of credit and liquidity risk.
• Money market securities: treasury bills (TB), certificates of deposit (CD) and commercial paper (CP).
• Credit Repo: using collateral other than high-quality government bonds (e.g., those issued by central governments in emerging markets).
• Others: Corporate Bonds, Equities, Covered Bonds, Mortgage-backed Securities (MBS), Residential MBS (RMBS), Asset-backed Securities (ABS) and re-securitisations (Collaterised Debt Obligations, Credit Linked Obligations, Credit Linked Notes, etc.), Bank Loans, Commodity etc.
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Alternative REPO and Depository Receipts

• **Crypto-Repo:**
  • Crypto assets as collateral on the blockchain

• **CryptoDepository Receipts:**
  • Mimic American Depositary Receipts (ADRs) using blockchain technology

Made Possible by Smart Contracts

• Allowing exchange of values via computer codes without an intermediary: Peer-to-Peer, Machine-to-Machine
• Executable governance – Enforced Immediately
• Imagine exchanging one crypto token or digital asset with another without human intervention through automatic execution once pre-conditions are met
• Imaging creating a collateral and REPO agreement between two parties without an intermediary and executed autonomously
Made Possible by Smart Contracts

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Adapt or Out of Business
Alternative REPO and Depository Receipts

• Crypto-Repo:
  • Crypto assets as collateral
  • Oxygen: secured digital transaction using an Ethereum-based Smart Contract
  • SALT: collateral wallet with crypto assets and regular USD repayments

• CryptoDepository Receipts:
  • Mimic American Depositary Receipts (ADRs) using blockchain technology
  • Jibrel: provides currencies, equities, commodities and other financial assets as standard ERC-20 tokens on the Ethereum blockchain
  • CryDRs can be used for remittances, global payments, trading and hedging

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The Future is Already Here – MAS Ravi Menon

Monetary Authority of Singapore FinTech Festival 2018
Threats to the Industry – Disintermediation!

• New Distributed Ledger Technology and Blockchain has the capability to
  • ascertain Borrowers Credit Rating Instantly
  • automate and replace Convoluted Processes performed by clearing house, back office, registries
  • tokenise currently non-securitized illiquid assets or Dead Capital
  • drive convergence of technology to replace traditional financial institution’s business model
Centralised Regulated Market Operator (RMO) Platform

Not One But 3 Prototypes!

Prototype 1
- Quorum
- Anquan
- Anquan Permissioned Blockchain

Prototype 2
- Ethereum
- Deloitte
- Hyperledger Fabric

Prototype 3
- Hyperledger Fabric
- Nasdaq
- Chain Inc.
Cross-Border Exchange of Value for Individual is Here

Singapore Leads!
But Singapore Also Shares - Government’s Open Source Codes are Available in GitHub

• https://github.com/project-ubin?tab=overview&from=2017-12-01&to=2017-12-31
Project Ubin is a MAS- and ABS-led effort with the financial industry and technology partners to experiment on the use of DLT for inter-bank payments.
Phase 1: Digitalising the SGD
In this phase, MAS and R3 explored the use of a central bank digital currency – a tokenised version of the SGD – for interbank payments.

Phase 2: Domestic Interbank transfer
In this phase, MAS and ABS explored DLT-enabled interbank transfers and examined specific RTGS functionalities, such as queue handling and payment gridlock resolution.

Phase 3: Delivery versus Payment on DLT (DvP-on-DLT)
In this phase, MAS and SGX collaborated to realise domestic DvP settlement on two separate blockchain platforms, which is the focus of this report.

Phase 4: Payment versus Payment for cross-border settlement
In this future phase, the objective is to assess the feasibility of cross-border DvP.

Phase 5: Target operating model
In this future phase, the objective is to evaluate the impact of DLT on existing regulatory framework and market processes.

Phase 6: Cross-border DvP and Payment versus Payment
In this future phase, the objective is to apply the learnings garnered to execute cross-border settlement of both payments and securities.
Phase 1: Digitalising the SGD
In this phase, MAS and R3 explored the use of a central bank-issued or tokenised version of the SGD – for interbank payments.

Phase 2: Domestic Interbank transfers
In this phase, MAS and ABS explored how DvP transfers and examined specific RTGS functionalities, such as queuing and deadlock resolution.

Phase 3: Delivery versus Payment on DLT
In this phase, MAS and R3 continued to realise domestic DvP settlement on two separate blockchain platforms in this report.

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Phase 6: Cross-border DvP and Payment versus Payment
In this future phase, the objective is to apply the learnings garnered to execute cross-border settlement of both payments and securities.
3 Most Lessons from Singapore Experience

• Resilience and Recovery
  • No single point of failure
  • Eco system approach with faster recovery
  • Combination of DLT and Cloud

• Real-Time Operations
  • Irrelevance of value-date, cut-off time?
  • Near-instant forex transactions?
  • Issues of Oracle

• LSM
  • Over-funding as a solution?
  • Scheduled gridlock resolution, predefined state or user-triggered?
  • Different endowments of nodes?
Implications for Collateral and REPO Market

- Automated
- Many Functions Disintermediated
- More Peer-to-Peer Exchanges
- Moving From Financial Engineering to FinTech Engineering
Centralised Platform ➔ Decentralised ➔ Distributed

(C) DavidKuoChuenLee
From REPO to APSC

• From RePurchase Agreement to Autonomous Repurchase Smart Contract (APSC)

• The sole difference between Collaterisation and REPO is that in (i) the asset is sold (and later re-purchased), whereas in (ii) the asset is instead pledged as a collateral for a loan;

• With Blockchain, it is not as distinct anymore because it is about digital tokens swap with smart contracts
Sustainability

• Technology is available
• Digitalisation, Disintermediation, Democratisation, Decentralisation
• New customers
• New asset classes
• New business models
5\textsuperscript{th} D – Diminished!

• Technology will co-exist with traditional businesses
• Diminishes the current players and business because of growth
• The growth is coming from convergence of technology driven by blockchain
• It lowers the costs and extend the reach of serving the new customers with new products and new business models
• It either diminishes existing business who does not embrace changes or the business diminishes itself to encourage mass adoption
• The choice is fairly obvious, but it is not without risk!
Where is the Future for Collateral and REPO Market?
World Riches 1% – In 2017

- Controlled 50% of global wealth
- Received 82% of the new wealth generated
- Low Marginal Propensity to Consume
- Leads to Margin Squeeze
- Results in Low Growth
- Where is the Future Growth?
MAJOR UNBANKED DEVELOPING COUNTRIES IN ASEAN

73% OF SE ASIA UNBANKED

438 MILLION ADULTS WITHOUT BANK ACCOUNTS

>100% MOBILE PENETRATION RATE

UNBANKED SITUATED IN 6 MAIN COUNTRIES:

Myanmar  Cambodia  Laos

Indonesia  Philippines  Vietnam

The Future is About the Convergence of ABCDE

- AI and AR/VR
- Blockchain (and Smart Contract)
- Cloud and Cyber Security
- Digital Devices (IoT), Drone and Data Analytic
- Environmental and Sustainable Technology
AID:Tech
Transparency Engine Protocol for the New Economy

t.me/AIDTech
tge.aid.technology
@aidtechnology
Problem

2.4 Billion People Lack a Legal Identity

Everyone must have a legal ID by 2030
Governments Lose Trillions Due to Lack of Transparency & Inefficiencies

2.4 Billion People Without an Identity
2 Billion People Financially Excluded

$452 bn Remittances Market - High Fees
$4.4 TRILLION Lost Each Year Due to Fraud

Remittances - USD 600bn
Welfare - USD 217bn
AID - USD 161bn
Healthcare - USD 371bn

Ownership of data
Donations

Remittances  Welfare  Aid  Healthcare

@aidtechnology  t.me/AIDTech
Blockchain Startup AID:Tech Joins Hands with PharmAccess to Improve Maternal Care in Tanzania

First Baby born On the Blockchain
Worlds 1\textsuperscript{st} Blockchain company to have two government investors

Enterprise Ireland & SGInnovate (government investment arms) investment signing May 28th 2018, Dublin, Ireland.
SENTINEL CHAIN “COW TOKEN”

Unlocking the Crypto-Economy To Serve the Under-Served

InfoCorp
CROSSPAY LIVESTOCK TAG

- Tamper-Proof
- NFC-enabled
- QR Code Registered
NEW FINANCIAL INCLUSION MODEL

- Livestock Identity Registration
- Livestock Insurance
- Livestock Collateralised Loans
- Electronic Payments & Repo
- Life Insurance
PARTNERSHIP WITH MYANMAR GOVERNMENT

MOU signing with Myanmar Insurance
The Demand For Collateral and REPO Market is in Decentralised Inclusion

• Greatest Demand: The Excluded! People and Assets!
• Converting dead assets to live digital assets
• Tokenising the non securities, and then securitised the tokens
• Fractionised and heterogenised the digital assets
• Serving the underserved
• Solving the greatest mystery of leapfrog economies
  • Cheap Capital via globalised crypto funding
  • Convergence of Tech
  • Sustainable Green Business Model
Cypherpunk Governments?

- Government Open Source Projects
  - Ubin 1: Ethereum, Sing Dollars for Interbank Payments
  - Ubin 2: Corda(UTXO), Hyperledger Fabric(Channels) and Quorum(ZKP) for Real-Time Gross Settlements on Microsoft Azure
- GeTS Open Trade Blockchain/Networked Trade Platform
- Agnostic and Harnessing the best technology!
- Expanding into the open virtual space!
- The government diminishes itself by providing infrastructure!
PIL and IBM will jointly undertake a blockchain trial to design and create an electronic bill of lading. The legal and commercial document provides evidence for the contract of carriage, receipt of goods and ownership of goods, and acts as a document of reference for banks to extend trade financing.

Traditionally, this critical document is mailed from one party to another, opening up room for fraud and loss of the document in addition to chalking up handling costs.

The latest blockchain collaboration between PIL and IBM is backed by the Maritime and Port Authority of Singapore (MPA), Singapore Shipping Association, Infocomm Media Development Authority, Singapore Customs and the Bank of China’s Singapore unit.

The Future: Cross-Border High Grade Collateral and REPO!

1. E-connectivity
2. Interoperable value transfer gateway
3. Real-time Verification
4. Strong security framework
5. Trust Distribution governance
6. Constant Traceability
7. Digital ID
8. Real-time Authentication
9. Comprehensive data and Oracle ecosystem
10. Talent, knowledge and skills
The Future of Collateral and Repo Market: Centralized Governance and Decentralized Technology

[Discussant]
Jae Bin Ahn
Professor, SNU

Asian Prime Collateral Forum
The Future of Collateral and Repo Market: Centralized Governance and Decentralized Technology by David Lee Kuo Chuen

Discussed by JaeBin Ahn (SNU, GSIS)

December 11th, 2018
2nd Asian Prime Collateral Forum (APCF) International Seminar,
Seoul, Korea
Very educational and insightful presentation!

- Overviewing blockchain technology at a glance
Very educational and insightful presentation!

- Overviewing blockchain technology at a glance
- Offering a new prospect of repo market enabled by blockchain technology
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- Overviewing blockchain technology at a glance
- Offering a new prospect of repo market enabled by blockchain technology
- Particularly rosy prospection for Asian repo markets
  - A major financial center in the region being an early adopter and leader of the technology
  - Relatively underdeveloped repo markets in the region
The Case of Mobile Banking in sub-Saharan Africa

- Underdeveloped (traditional) financial system as an opportunity for the new mobile banking technology
- Regulators’ initial blessings on experimental trials
- Greatly improved financial inclusiveness
What blockchain technology can and cannot do

Blockchain technology would

- Make repo markets accessible to the public
- Facilitate disintermediation and flourishing peer-to-peer repo contracts

Blockchain technology in and of itself cannot

- Ensure stability of underlying collateral
- Avoid potential vulnerability to counterparty default risks
Remembering “Collateral Damage” during the Global Financial Crisis (GFC)

- GFC shocks amplified by “the run on repo” as underlying collateral prices collapsed (i.e., intensifying haircuts)
- Prolonged Eurozone sovereign debt crisis due partly to increasing haircuts in repos on peripheral sovereign bonds as their yields soared
- Exceptionally volatile nature of cryptocurrency values raises doubts on near-term possibility of blockchain-based repo market
Too much transparency can be harmful...in some cases

Comparative studies have attributed relative stability of euro interbank repo market system during the GFC to centralized and anonymous features (e.g., Mancini et al., 2015)

- eliminating exposures to direct counterparty default risks
- preventing incentives to run on borrowers as well as stigma effects
Conclusion

- Blockchain-based repo market particularly promising for Asian financial system
- Important first step taken by Prof. Lee
- Further discussion should continue to ensure that we make the most of it, while minimizing potential concerns
Q&A
Expanded use of Collateral for Trust Building in Asia

Gongpil Choi
Director, KIF
Expanded Use of Collateral for Trust-Building in Asia:

Why not start unlocking the value of prime assets in Asia?

Gongpil Choi
KIF & Asian Prime Collateral Forum
Contents

1. Follow global trends
2. Hard reality delimits policy choices
3. Start from the common denominator of trust
4. Collateral use of prime assets
5. How do you achieve this?
Snapshot on Asia’s Financial System

1. Bank-dominant financial system
   - Serious regional efforts, including ABMI, CMIM, and AMF, to develop capital market after the Asian financial crisis, but only limited progress

2. Efficient Centralized Legacy System / US centric global financial system
   - Keep on doing things without changing structural parameters

3. Dislocated from Global Trends: No significant market infrastructure for diverse market participants
   - Significant entry barrier and a lack of incentives to entering the market
<table>
<thead>
<tr>
<th>Poorly Defined, Vaguely Recognized, and Passively Managed Asian Collateral Resources</th>
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<tbody>
<tr>
<td>Anemic cross-border activities</td>
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<tr>
<td>High proportion of government collateral in repo market</td>
</tr>
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<td>Low market liquidity</td>
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<tr>
<td>Disparate/non-existent criteria on prime collateral in the region</td>
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<td><strong>Limits of Fiat Trust</strong></td>
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<td>-------------------------</td>
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<tr>
<td>“Safe asset” is a stricter definition of prime assets, HQLA.</td>
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<tr>
<td>A broader definition of safe assets would include debt securities issued by supranational agencies, some quasi-sovereign entities and local governments.</td>
</tr>
<tr>
<td>Even “safe Asian assets (except for JGB)” cannot be taken as collateral for cross-border transactions</td>
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<tr>
<td>Trust among member countries is limited and hindered. No regional governance to promote this.</td>
</tr>
<tr>
<td>No official arrangement to make serious efforts going forward</td>
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<tr>
<td>The new supply and demand dynamics for safe assets point toward a steady increase in demand and a decrease in global supply.</td>
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</tbody>
</table>
Four Main Functions of Safe Assets (IMF)

1. Reliable store of value
2. Safe collaterals in repurchase and derivatives markets
3. Benchmarks to measure the relative risks of other assets
4. Ingredient to the prudency framework for banks

Global demand for safe assets related with emerging economies (domestic lack of savings vehicle, regulatory reform)
Supply of safe assets (bank deposits decline, private label debt via securitization of risky assets, Treasuries increase).
Steady income streams and ability to preserve portfolio values in international financial markets

High-quality collateral critical to private repo, central bank repo, and OTC derivatives

Integral to prudential regulations, determining the amount of safe assets on banks’ BS

Reference rates for the pricing, hedging, and valuation of risky assets

Integral part of central banks’ fireman duty in response to the crisis

Safe Assets in the World of Unknown Unknowns
Why Collateral?

With no vehicle currency status, confidence building needs to start from the very basic pillar of trust.

Collateral allows financial plumbing and provides liquidity.

Expand the use of eligible assets as collateral to build trust.
Geographical Analysis of Collateral Exchanges in Asia and Europe

Within Asia:
- Domestic: 59.4%
- Cross-border in Asia: 29.6%
- Cross-border in Europe: 4.7%
- Cross-border elsewhere: 6.3%

Within Europe:
- Domestic: 25.9%
- Cross-border in eurozone: 17.1%
- Cross-border in non-eurozone: 40.5%
- Anonymous: 16.5%

Source: ASIFMA and ICMA (2017)
Importance of Asian Collateral Pool and Repo Market

Collateral and Repo market

Market liquidity

Financial stability

Corresponds to global regulatory framework
Growing Gap between Market needs and Market capabilities

Best response to *Unknown Unknowns* = Expanded market functioning

Thus, Asia needs to be prepared!
Asian Prime Collateral Forum (APCF)

Catalyst for Studies on Collateral

Develop collateral infrastructures

Encourage interactions among ASEAN+3 member countries

Promote research on global prime collateral issues

Global recognition for Asian bonds as Usable collateral
Collateral use cases of Asian assets for global acceptance

- Even though there are all sorts of bonds in Asia, one common feature is its collateral use.
- Seeks entry points toward unlocking Asia’s potential to develop financial markets given serious barriers to motivate participants with no practical roadmap and incentives.
- **Collateral is the ultimate trust** that allows any economic transactions.
- Given the heavily fragmented ecosystem regarding collateral, prevailing collateral space in Asia is very limited and trust-building has inherent limits.
- **Seeking market-driven consensus on “acceptable collateral base”** is the first step toward expanding trust.
- APCF recognizes important building blocks for capital market development in Asia.
How do we correct persistent undervaluation of Asian Assets?

How do we have our bonds used widely as collateral everywhere?
Trust-Building when consensus is hard to reach: Start from the common denominator

(Bottom-up approach in a decentralized setting)
Where Do We Start?

Start from the Base
“COLLATERAL”

- Catalyst for market liquidity and profit
- Building Blocks for trust building
- Lower initial entry level of counterparty risk
Any Chance Asia can be Safe Asset Supplier?

- If we consider safe assets to be central government debt securities rated no lower than AA category, sovereign downgrades reduced the supply during the crisis euro denominated safe assets 5.2 trillion euro in 2010 to 3.5 trillion in 2012

- US Treasury is the primary supplier of safe assets, accounting for 45% of government securities AAA-AA among vehicle currency countries. Ratings unchanged, US Treasuries net issuance USD 1.6 trillion in 2010 to USD 687 million in 2015

- Before the global financial crisis in 2008, private AAA filled the gap with devastating results

Asian prime assets are much safer and better quality than private labels
Any Chance Asia can be Safe Asset Supplier?

Decline of Safe Assets
(unit: billion)

Source: Barclays Equity Gilt Study, 2012
• **ZLB interest** cannot work in negative interest territory
  • Recession results because quantity equilibrium was reached
  • Artificial demand for safe assets

• **Equity premium** – widened even with interest rates going down
  • Shortage of “safe” assets explains the gap
  • Inflationary expectation forward guidance
  • The global financial system runs on a narrowly defined collateral based assets (Trust) and remains unstable

• **Safety Trap**: Securitization of externality that leads to under-provision of safe assets
  • Decentralized crypto assets can ease the shortage of safe assets over time if there is no contribution from Asia

**Safe Asset Shortage due to Very Limited Supplier (US, Euro)**
Crisis not as a result of policy failure or faulty regulatory regime, but global asset scarcity

- Because authorities cannot respond with increased supply of safe assets and provide something that does not respond to market needs, we end up where we are. Safety trap

**Caballero, Fahri, and Gourinchas (2013)**

- US asset demand that cannot be satisfied by US treasuries forced the US financial system to produce AAA assets

**Uncertainty forces people to retract**

- We need insurance or a guarantee to stave off tail distribution

**Shortage of FX liquidity: Optimal insurance arrangements against sudden stops**

- The global scarcity of safe assets is what created pressure and distorted incentives of the US financial system
Ultimate point is not the lack of safe assets, but the **narrowly defined and poorly utilized** Asian assets as collateral.
What are pledgeable assets in decentralized environment? Different eligibility criteria?

Legacy financial system means centralized power to regulate the entire economy.

Decentralized Financial System?
"The dispersion of distribution of functions or powers"
Eligibility of the Asian Collateral

1. What can be eligible as collateral?
   - Government bonds, MBS, covered bonds, and prime corporate bonds, digital assets, etc

2. The FX risk is regarded as the barrier
   - Limited cross-border repo transactions because of the lack of trust and infrastructure

3. However, markets have all sorts of risk mitigants and transformation services
   - Hair cuts, margin requirements in repo, hedging instruments and derivative transactions

4. True problem is our silo-ed mindset and fragmented regulatory framework
How? Get away from Improving on Trodden Path!

Three stages to develop Asian bonds as prime collateral for repo transactions

- Identify eligible assets for broader recognition vs. Improving existing market infrastructures
- Utilize the expanded pool for repo transactions via strong market incentives vs. Emphasizing re-using and greasing the existing wheels
- Seek diversity and openness in collateral operations vs. Engagement of global players in the developing market
## Assessing the Current Criteria on an Eligible Collateral

<table>
<thead>
<tr>
<th></th>
<th>Credit rating</th>
<th>Eligibility</th>
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<td><strong>ASEAN+3</strong></td>
<td></td>
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<td>Singapore</td>
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<td>Rep. of Korea</td>
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<td>Aa2</td>
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<tr>
<td>Japan</td>
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<td>A1</td>
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<td><strong>Developed</strong></td>
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<td>Italy</td>
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</tr>
<tr>
<td>Spain</td>
<td>BBB+</td>
<td>Baa2</td>
</tr>
</tbody>
</table>

Source: Trading Economics
Economic Impact of Developing ASEAN+3 Regional Collateral Pool

1. Enhanced Financial Stability
   • Stabilization costs can be reduced
   • Reduced dependency on FX reserves and swap arrangement
   • Financial stability can be enhanced without outsourcing regional financial resources

2. Accelerated Capital Market Development

3. Improved Market Liquidity
Possible Size of Collateral with the inclusion of ASEAN+3 bonds (Unit: billion U.S. dollars)

Current ECB: 8,996 billion U.S. dollars
ASEAN+3 with A or higher: 15,855 billion U.S. dollars
ASEAN+3 with A- or higher: 16,011 billion U.S. dollars
ASEAN+3 with BBB- or higher: 16,478 billion U.S. dollars

Source: ECB, Eurosystem Collateral data; Asian Bonds Online (2017)
Roadmap for Utilization of Collateral

- Needs for collaborative organizational effort
- Market-driven consensus

Formulate an eligibility criteria

Invigorate collateral pool and repo market via existing system

- Identify frictions and energize repo and securities lending market with tax incentives, etc

Develop repo market through employing Technologies of the Future

- Distributed Ledger Technology (DLT)
- Tokenization: It reduces barriers to cross-border financial activity
If we cannot improve with fiat assets from legacy world, can we do something differently with decentralized options?

Unlocking the value of digital assets?

New link emerges even when the potential of Asian prime assets is untapped
It is possible to monetize decentralized asset on a repo platform with smart contracts-driven transactions

Problem: Applications that store and transact with these assets are not as decentralized
Half-way Decentralization

- Country A correspondent bank
- Currency A
- Country A based bank
- Country A Central bank
- Country B correspondent bank
- Currency B
- Country B based bank
- FX transaction fee
- FX Market maker
- Currency A
- Currency B
- Buyer
- Supplier
- Process friction
- Process optimization

Source: Ripple; Celent
Digital asset collateral vs. Asian prime collateral?

- Trapped untapped assets have limited value
- Under-valued Asian prime legacy assets: Only real estates serve as safe assets
- Limited transactions: Cross-border transactions very limited
- Collateral only acknowledged within certain jurisdictions
- Most restricted types of assets even with highest quality: Government bonds

Looking at Asian or Digital assets as a new source of collateral by unlocking the value as loan collateral?
DEPO

• Depo is a Blockchain based depository service for banks and other money lending institutions to allow them to accept digital assets as loan collateral
  – Cryptocurrencies, tokens, asset tokens, tokenized shares, and digital bonds

• Currently financial institutions use depository services for real asset collateral
  – No such depository exists for digital assets

• Building digital asset depositories is difficult and expensive
  – Liquidity problem for digital assets for borrowers with legacy asset
  – Trust in underlying code that is transparent, unbiased, and incorruptible

[ How DEPO works ]

Tokens and currencies
Lenders
Depository Network Ecosystem
Exchanges
Tokenholders
DEPO vs. P2P platform

- Some platform already accepts Bitcoin and Ethereum as collateral for loans
- DEPO does not provide loans directly, but enables lenders to integrate with the Depository network and use it to accept digital assets as collateral
- DEPO is like a starship with many docking facilities: Depo provides customizable solution to broaden their loan portfolio
- Multi-platform network that enables digital assets to be used as loan collateral, which would open up billions of dollars in value
Very few platforms that claim decentralization are truly decentralized in all facets.

Existing market infrastructures cannot utilize decentralized instruments.

Collecting any data on users negates the level of data integrity a DApp should have.

Service access devices carry too much info: IP address, device ID, device settings, OS, browser type and language, and certain cookies.

Many Initial Coin Offerings (ICOs) use tiered systems based on contribution amounts give preferential treatment to the highest echelon of investors wealthy individuals (ICO scams—Pump and Dump?).
How do you recognize, store, and exchange legacy and digital assets on a unified platform?

1. Prepare for changes in legacy system due to expanded pool of assets
2. Overcome fragmented legacy system
3. Acknowledge Asian assets (including tokenized) and promote exchanges
“Prime Collateral” in the context of Decentralization and Digitalization

Avoid missing out during the digital transformation: FoMO treatment

1. Eligibility Criteria
   - Eligibility criteria for decentralized trust mechanism
   - Inclusive eligibility criteria based on expanded asset category (tokenized assets)

2. Global trend of decentralization and digitalization
   - Huge changes followed by decentralization and digitalization
   - Ecosystem building with Blockchain technology
     - E.g. Ubin Project

3. Adaptation to Technology-driven Changes
   - In-depth studies on limits and risks of adopting future technology
   - Achieve Singularity for Futuristic Adaptation
Overall Journey of the Project Ubin: Accommodation of Digital Assets

PHASE 1
- Use of digital currency in RTGS

PHASE 2
- Achieved gridlock resolution and LSM on a decentralized system without compromising on privacy

FUTURE PHASES
- Domestic Delivery vs Payment (DvP): Securities settlement
- Payment vs Payment (PvP): cross-border settlement
- Target Operating Model: processes & policy impact

ACHIEVEMENT
- Cross-border settlement of payments and securities (DvPvP)

Source: MAS (2017)
Due to the advent of Distributed Ledger Technology (DLT), it is inevitable to re-organize the existing Real-Time Gross Settlement (RTGS) system. Improvement in the system is vital to make better use of Asian prime collateral. The existing eligibility criteria must be re-examined to take the technological development into account. It is urgent to establish comprehensive criteria on Private Trust Machine. Implementing a RTGS on DLT requires us to re-examine the existing eligibility criteria. This would give Asia a better chance to prepare for the future.
Wrapping up,

• Wider market consensus to engage more in various transactions
• Official recognition of eligible collateral for lowering entry barrier
• Preferential tax treatment and other regulatory incentives
• Open exchange platform and market infrastructure
• In-depth studies and inclusive economic leadership
Conclusion

The world is changing fast
Our system is centralized and cannot identify and respond properly
We come to witness decentralized crypto assets
This decentralized distributed value cannot be merged with the centralized one easily

What we need is a new source of trust
That new trust is **prime collateral from Asian nations**
Expanded trust based on expanded collateral could evolve into a new financial system
– More distributed and decentralized!

Asian prime collateral needs to be given renewed recognition via wider acceptance
Eventually, cryptos and other assets will be exchanged freely on a global platform
Otherwise, Asian collateral would not exist,
and our value creation would entirely depend on something else
Expanded use of Collateral for Trust Building in Asia

[Discussant]
Yeongseop Rhee
Professor, SNU
Comment on:

**Expanded Use of Collateral for Trust-Building in Asia**

(by Gongpil Choi)

2018. 12. 11

Yeongseop Rhee
MAIN ARGUMENTS

- Reality in financial markets
  - Shortage of safe assets
  - Undervaluation of Asian assets

- Potential of Asian assets as prime collateral
  - Possible size
  - Quality: credit rating

- Development of Asian assets as prime collateral
  - Key word: from centralize legacy system to decentralized system
    - Asian prime asset collateral
    - Digital asset collateral
REALITY IN FINANCIAL MARKETS

- Shortage of safe assets
  - U.S.
    - U.S. Treasury accounts for 45% of government securities
  - EU
    - Sovereign downgrading due to euro crisis
    - Safe assets of AA or better grade: EUR 5.2 trillion (2010) → EUR 3.5 trillion (2012)

- Note
  - “Crisis would occur not as a result of policy failure or faulty regulatory regime, but as a result of global safe asset scarcity”
REALITY IN FINANCIAL MARKETS

- Undervaluation of Asian assets
  - No Asian assets are accepted as eligible by the U.S. Fed and the ECB
    • Only exception: JGBs
    • Many Asian assets have credit ratings higher than JGBs and GBs of some European countries
  - Before GFC, private AAA assets filled the shortage gap of safe assets
    • Asian prime assets are much safer and of better quality than private labels
  - Main reason
    • Power concentration on the U.S. and EU under the legacy financial system
    • Narrowly defined collateral with prejudice
POTENTIAL OF ASIAN ASSETS AS PRIME COLLATERAL

- Possible size of collateral
  - ASEAN+3 bonds with A or better: USD 15.9 trillion
POTENTIAL OF ASIAN ASSETS AS PRIME COLLATERAL

- Quality: credit rating

  Many Asian assets are better than JGBs and GBs of Spain and Italy

<table>
<thead>
<tr>
<th>ASEAN+3</th>
<th>Credit rating</th>
<th>Eligibility</th>
<th>Eurozone</th>
<th>U.S. (Fed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>A-</td>
<td>A3</td>
<td>A-</td>
<td>Ineligible</td>
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<tr>
<td>Singapore</td>
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<td>BBB+</td>
<td>Eligible</td>
</tr>
</tbody>
</table>
DEVELOPMENT OF ASIAN ASSETS AS PRIME COLLATERAL

• Key word
  - From centralized legacy system to decentralized system: To overcome problems related with centralized power of the legacy financial system centered on the U.S. and EU

• Asian prime asset collateral
  
  Three stages to develop Asian bonds as prime collateral for repo transactions

  - Identify eligible assets for broader recognition vs.
    Improving existing market infrastructures
  - Utilize the expanded pool for repo transactions via strong market incentives vs.
    Emphasizing re-using and greasing the existing wheels
  - Seek diversity and openness in collateral operations vs.
    Engagement of global players in the developing market
DEVELOPMENT OF ASIAN ASSETS AS PRIME COLLATERAL

- Digital asset collateral

- Formulate an eligibility criteria
  - Needs for collaborative organizational effort
  - Market-driven consensus

- Invigorate collateral pool and repo market via existing system
  - Identify frictions and energize repo and securities lending market with tax incentives, etc

- Develop repo market through employing Technologies of the Future
  - Distributed Ledger Technology (DLT)
  - Tokenization: It reduces barriers to cross-border financial activity
Asian prime asset collateral

- Main reason that safe Asian assets are not taken as collateral for cross-border transactions: centralized power of the legacy system
  - There may be other reasons besides credit rating?

- “Seeking market-driven consensus on “acceptable collateral base” is the first step toward expanding trust”
  - Bi-lateral agreement may be a better option to start to have Asian assets used widely?
Digital asset collateral

- In terms of decentralization and dispersion of powers, it makes sense
  - But this is not an idea specified to the development of Asian financial market but a more general idea to decentralize and share powers
  - If the legacy system leads digital assets, same problem may be repeated

- A core condition of collateral is safety
  - Digital assets satisfy the condition?
Q&A
Coffee Break
Panel Discussion
Panel Discussion

[Moderator]
Seung Gwan Baek
Professor, Hongik University
Panel Discussion

Manmohan Singh
Senior economist, IMF

David Lee Kuo Chuen
Professor, SUSS

Junhwan Im
Senior research fellow, KIRI

Taeyoon Sung
Professor, Yonsei University

Kwanho Shin
Professor, Korea University
Local Currency Bond Markets and Financial Stability*

Kwanho Shin

KIF & Asian Prime Collateral Forum
December 10, 2018

Motivation

- Currency and maturity mismatches are widely viewed as a main source of financial vulnerability in developing economies.
  - If a country’s financial liabilities are denominated in a foreign currency such as the US dollars but its financial assets are denominated in domestic currency, then a sudden depreciation of the domestic currency damages its balance sheet, destabilizing the financial system and economy.
  - If the maturity of financial liabilities is shorter than that of assets, the likelihood of a crisis further increases.
  - The double mismatch of currency and maturity mismatch was a contributing factor behind the devastating Asian financial crisis of 1997-1998.
Motivation (cont.)

• In the aftermath of the Asian financial crisis, Asian countries have prioritized the development of local currency bond markets (LCBMs) as a major policy objective.
  - In light of the region’s heavy reliance on bank finance, developing LCBMs can contribute to a larger role for capital markets and a more balanced financial system.
  - The painful experience of the Asian crisis highlighted the need for the region’s bank-centered financial systems to develop LCBMs as a spare tire which would enhance resilience in the event of shocks.
• The literature points to other benefits of LCBM development in developing economies.
  - Caballero et al. (2008) argued that the chronic excess demand for U.S. assets which contributed to global imbalances is due to financial underdevelopment in emerging markets.
  - Prasad (2011) argues that a more developed financial system which effectively channels funds into productive uses and enables better risk-sharing would promote growth in Asia by encouraging more entrepreneurial activity.
  - IMF (2016) emphasizes the increasingly important role of LCBMs as a source of long-term funding for long-term investments such as infrastructure and housing.
Data for LCBMs

• Data on the amount outstanding of LCBMs are not widely available.
• While Asian Bonds Online reports time series data for the size of LCBMs, it covers only 10 Asian countries.
• We use the BIS (Bank for International Settlements) debt securities statistics in our main empirical analysis.
Data for LCBMs

• The BIS debt securities statistics reports total debt securities (TDS) issued by residents.
  ▪ TDS are divided into domestic debt securities (DDS) and international debt securities (IDS).
  ▪ Since DDS are not separately reported for different currency denominations, we assume that all DDS issued by residents are denominated in local currencies.

• We calculate the size of local currency bond markets by adding the amount outstanding of DDS and IDS that are denominated in local currency.
  ▪ If the amount outstanding of IDS denominated in local currency is missing, we use the amount outstanding of DDS only.
  ▪ If the amount of DDS is missing, we use the amount of TDS by residential issuers after subtracting IDS that are not denominated in local currency.
Figure 1. The Size of Local Currency Bond Markets in Percentage of GDP for Asian Countries
Figure 1

• The size of LCBMs calculated from the two sources, the Asian Bond Market and the BIS, is quite similar.
• Since the Asian financial crisis of 1997-1998, the size of LCBMs increased substantially in Korea, Thailand and China.
• The growth of LCBMs in other Asian countries is not as dramatic.
Figure 2. The Size of Bank Loans in Percentage of GDP for Asian Countries
Figure 2

- Relative size of bank loans in percentage of GDP in Asian countries has not increased much since 1998.
- Korea and China are two exceptions, but even in those countries bank loans grew more slowly than LCBMs.
Figure 3. The Size of Stock Market Capitalization in Percentage of GDP for Asian Countries
The size of stock market capitalization, as percentage of GDP has been increasing in most Asian countries. However, the region’s stock markets grew more slowly than the region’s LCBMs.
Figure 4. Growth of Local Currency Bond Markets in Various Regions
Figure 4

• Figure 4 shows the size of LCBMs, as percent of GDP in 2005 and 2015, for countries in various regions.
• While the relative size of LCBMS is larger in Asian countries, growth is comparable across regions.
• Hence we can conclude that the development of LCBMs is not an Asia-specific trend.
Figure 5. GFC vs Taper Tantrum: The Relation between Increase in the Size of LCBMs and Increase in Nominal Exchange Rate Depreciation
Figure 5: GFC vs. Taper Tantrum

- The figure presents the relation between the increase in the size of LCBMs on the horizontal axis and the increase in nominal exchange rate depreciation on the vertical axis.
- There is a clear negative relationship between the two if we exclude one outlier country, India.
Figure 6. The Size of Local Currency Bond Markets as Percentage of GDP Collected from the BIS Debt Securities Statistics
### Table 1 Growth of Local Currency Bond Markets and Exchange Rate Depreciation During Crisis Periods: India Excluded

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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<tbody>
<tr>
<td>Difference of Increase in Current Account Deficit (% of GDP)</td>
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<td>0.025***</td>
<td>0.035**</td>
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<td>Difference of Increase in Credit to GDP Ratio</td>
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<td>Difference of Log of portfolio liability</td>
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<td>Difference of Reserves/M2</td>
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<td>-0.219**</td>
<td>-0.400**</td>
<td>-0.343*</td>
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<td>Difference of Inflation (CPI)</td>
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<td>Difference of Exchange Rate Regime (Annual fine classification of Reinhart and Rogoff)</td>
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<td>-0.001</td>
<td>0.030**</td>
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<td>Difference of Total Capital Inflows</td>
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<td><strong>Difference of Size of local currency</strong></td>
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<td>0.412</td>
<td>0.251</td>
<td>0.830</td>
<td>0.860</td>
</tr>
</tbody>
</table>
Table 1

- We obtain evidence that development of LCBMs enhances financial stability
  - The coefficient of the size of LCBMs becomes statistically significant.
- However, if we look only at Asian countries, in red circles, the expansion of LCBMs did not visibly reduce exchange rate depreciation during the taper tantrum.
  - The only exception is Korea
## Table 2. Growth of Bank Loans and Exchange Rate Depreciation During Crisis Periods

<table>
<thead>
<tr>
<th>VARIABLES</th>
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<th>(6)</th>
<th>(7)</th>
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</thead>
<tbody>
<tr>
<td>Difference of Increase in Current Account Deficit (% of GDP)</td>
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<td>0.004**</td>
<td>0.001</td>
<td>0.00212</td>
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<td>0.002</td>
<td>0.00212</td>
<td>0.002</td>
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<tr>
<td>Difference of Average Annual Percent Change in Real Exchange Rate</td>
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<td>0.00250</td>
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<td>0.004***</td>
<td>0.00345**</td>
<td>0.004***</td>
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<td>0.004</td>
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In Table 2, we report regression results when we replace the difference in the size of LCBMs with the difference in the size of bank loans.

While the coefficient of it is always negative, it is statistically significant only in columns (5), (8) and (9).

- One common element of these columns is that the difference in increase in credit to GDP ratio is included.
- If the increase in the credit-to-GDP ratio before the stress period is appropriately managed, the increase in the size of bank loans itself can be stabilizing.
Table 3. Growth of Stock Market Capitalization and Exchange Rate Depreciation During Crisis Periods

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Observations: 54 27 27 25 27 27 25 25 23
E- squared: 0.262 0.027 0.086 0.205 0.303 0.155 0.127 0.362 0.601
Table 3

- Table 3 reports regression results when we replace the difference in the size of LCBMs with the difference of stock market capitalization.

- While the coefficient of the difference of stock market capitalization in percentage of GDP is always negative, it is statistically significant only in column (4).
  - The evidence of a contribution to financial stability is much weaker for stock markets than for LCBMs or bank loans.
Conclusion

• Developing LCBMs of varying maturities can mitigate the double mismatch of currency mismatch and maturity mismatch.

• In this presentation, I empirically test this conventional wisdom by analyzing and comparing financial vulnerability during two episodes of financial stress.

• There is evidence that developing economies which experienced greater expansion of their LCBMs between the two episodes experienced a greater reduction of exchange rate depreciation, a measure of financial vulnerability.

• This provides some empirical support for the notion that LCBMs protect the financial systems of developing countries from destabilizing external shocks.
Closing Remark

Gongpil Choi, APCF
Networking
Thank You