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Original Paper

Toward a Central Bank Collateral Framework for ABMI

Gongpil Choi[1]

[1] Korea Institute of Finance, Seoul, Korea

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Abstract

The post-global financial crisis highlighted the importance of engaging in collateralized securities financing to meet the ever-increasing market needs for liquidity and risk management. Given the heavy reliance on volatile Eurodollar system and the fragmented governance and limited cross-border usability of the collateral among ASEAN+3 countries, it is important to relax prevailing constraints on collateral and mobilize cross-border transactions. To address the imperatives for securing collateral-based cross-border financial markets in the region, Asia needs the initiatives of central banks to develop a regional collateral framework for better financial plumbing. By collaborating on common grounds for cross-border collateral utilization, some of the prevailing constraints on collateral use can be relaxed. The inclusive collateral framework that incorporates CBCA (Central Bank Collateral Arrangement) would provide strong initial market support for the ABMI, thus help achieve sustainable financial stability.

Keywords

Asean+3, collateral, financial stability, repurchase agreement

1. Introduction

The use of collateral to mitigate counterparty risks has been a long-standing practice. Recurring financial crises with elevated uncertainties around counterparties' creditworthiness have re-awakened the importance of collateral. The global financial crisis has drastically incentivized market participants to actively exchange collateral across many jurisdictions, making unsecured funding increasingly difficult (BIS, 2015). However, there is structural fragility of the dollar funding market because only a few can participate in the repo market with the FED, and the role of intermediaries has become more important, yet unstable, and the FED intervention only covers a few countries. Market based operations are limited, polarized. Above all, the securitized financing manifests itself in the US FED operations, with repurchase agreement (RP) becoming the critical source of capital market liquidity. In advanced economies with proper market infrastructures, RPs play a vital role in smoothing the flow of liquidity,

and its operation has also proven essential for the conduct of monetary policy.

Given this change in funding practices in Eurodollar market, Asia faces bigger challenges to cope with rising demand for pledgeable collateral when its own usable collateral resources are very limited. Despite potentially viable resources are left underutilized, Asia cannot cope with the change that calls for increased use of cross-border collateral due to its poor recognition and inadequate market infrastructure, if not legacy rules and regulations. However, Asia has not yet recognized the importance of collateral as one of the effective policy tools. Expectedly, collateral policy transmission mechanism has not been developed in Asia despite its growing importance in financial plumbing worldwide. This is a strikingly different picture with the Eurosystem, which has been making use of collateral policy as one of the policy toolkits in extending credit to periphery countries in times of stress.

For instance, a spike in US repo markets since Sep 16, 2019 has made US Fed intervention inevitable, which only has stabilized market sentiment until after March 2020 (Figure 1). Disturbances in significant market participants' views around the repo market have initiated massive FED intervention, which has become a permanent facility, as seen by the FIMA. Actions by the FED represents loopholes in the global chain of secured funding market, where US dealer banks and pension funds carry out most of the activities. At the same time, the resulting liquidity situation only gets translated into market disturbances in FX swap markets around the world. As expected, the reliance on US funding by the periphery countries has become more significant since the old correspondent interbank model is rapidly replaced with repo and the FX swap nexus that remain fragile.

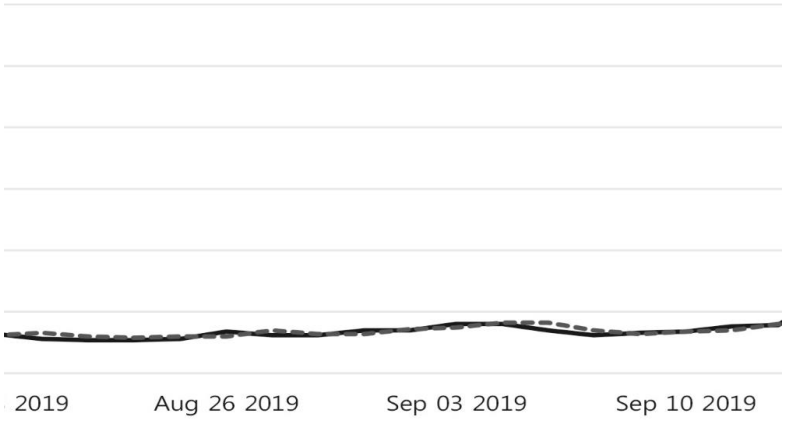

Figure 1. 2019 September US Repo Rate

Note. TGCR: Tri-Party General Collateral Rate; SOFR: Secured Overnight Financing Rate.

Source: Federal Reserve Bank of New York (2019).

The role of collateral only gets more significant, and Asia remains overly dependent on the external collateral market for their funding and other activities (Choi, 2020). The increasing gap between the world's capacities to deal with financial disturbances would again add to the uncertainty about the future, which will lead to a lop-sided burden on emerging economies. One of the region's practical and relevant responses would be to enhance the collateral resources it already has with forward-looking capital market investments to make it happen. Specifically, as unsecured funding becomes increasingly difficult, the collateral market's proper working has become essential for financial stability. The US Fed directly supplies "global collateral", and the Fed's intervention in the repo market has massively begun in the aftermath of the global financial crisis (Figure 2). As a result, lack of collateral capacity in Asia makes its financial dependency on fragile Eurodollar system more pronounced.

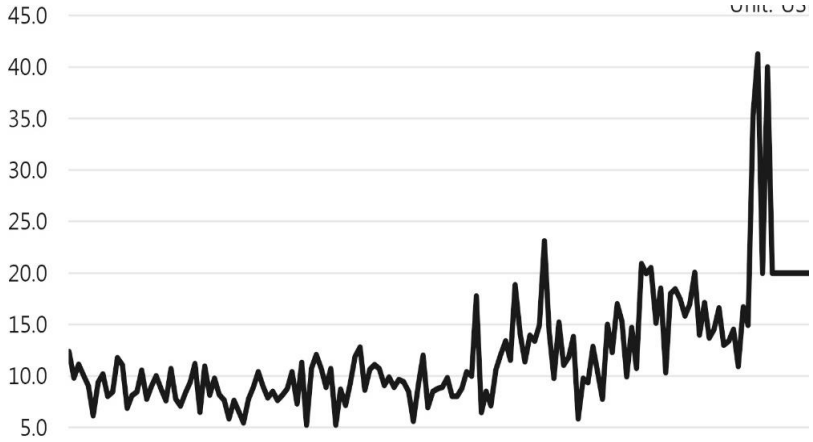

Figure 2. Repurchase Agreements: Total Securities Purchased by the FED

Source: Federal Reserve Bank of St. Louis (2020). "Total Securities Purchased by the FED".

Even after ten years since the crisis, the market makers' role has remained relatively limited, and the Fed's support has become more entrenched. Despite such structural features of global financial markets, where market liquidity is generated via repo market participation of significant players, the Asian economy continues to rely on external funding with little effort to foster internal collateral market to supply liquidity. This choice has been endogenous, and the exigencies of situations with recurrent financial shock provides small room for considering projects with long-term commitment and uncertain outcome. It would require a significant coordination among key players to build and operate a well-functioning collateral market, which would require cooperation among central banks in the region. In reality, central banks worldwide have been preoccupied with various internal mandates for financial stability and growth in the ultra-low interest rate environment. Overall, the repo operations by the FED have created extra pressure on periphery countries that rely on dollar funding, which has faced the additional burden of securing stable dollar funding via the FX swap market and central bank swap

arrangements with the FED (Figure 3). Therefore, it is common for Asia to experience market volatility of significant magnitude whenever there are external systemic shocks. It remains true that Asia has not used its own collateral resources to improve market liquidity and financial stability for lack of incentives among market participants. Heavy market investments and clear directions about future are missing, and the agenda remain difficult to pursue in the region.

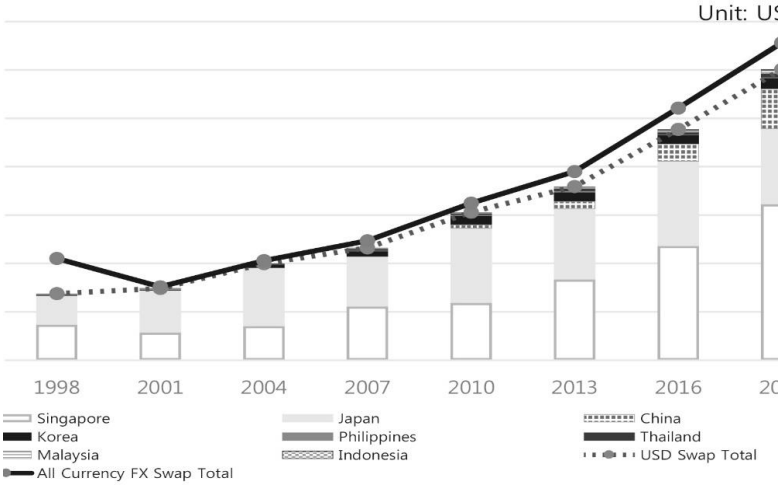

Figure 3. FX Swap Turnover in Asian Countries

Source: BIS (2020). "FX Swap Turnover".

The upper line (black) of the above figure indicates the total FX swap volume in all currencies, whereas the bottom line (red) of the model represents the total swap volume in USD. Data shows that most FX swap proportions are devoted to acquiring dollar funding, and its size is continuously expanding over the period. It is unclear how long the FED, via its forward guidance, can supply enough dollar liquidity for the world. Little progress has been made in the region to fix this externally driven funding practices that leaves uncertainty over the intermediate run. Moreover, a recent BIS report tells US dollar credit to residents of EMDEs remains strong, growing by 6% y-o-y, and reached $3.9 trillion at the end of the first quarter of 2020.

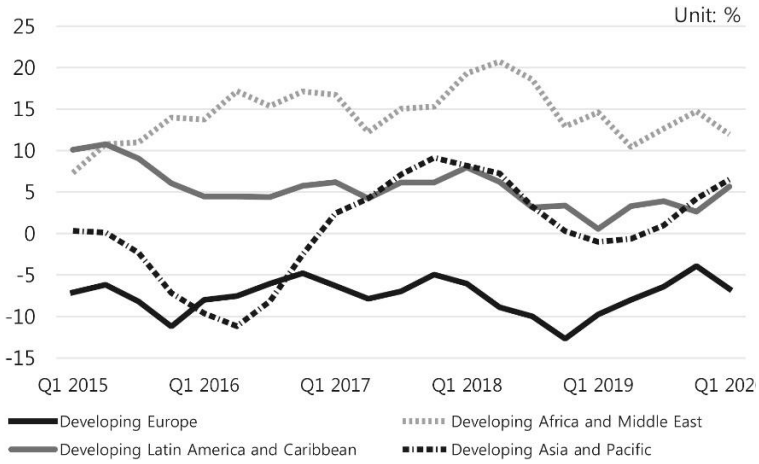

Figure 4. Change of US Dollar Credit to Developing Countries

Source: BIS (2020). "Global Liquidity Indicators".

Figure 4 indicates the annual percentage change of dollar credit to EMDE regions. The components of US dollar credit to emerging Asia-Pacific expanded at annual rates of 7%. And the emerging Asia-Pacific region accounts for the highest share of US dollar credit to EMDEs, with an outstanding $1.5 trillion stock at the end of the first quarter of 2020. Regardless, non-US financial sectors' heavy reliance on FX swaps have resulted in a persistent gap between cross-currency swap rates with Covered Interest Parity (CIP). While EM banks access to FX swap markets provides some cushion, it also acts as channels of spillovers from the US repo markets. Therefore, it still remains the most significant challenge for authorities to ensure market stability via intervention, which often overshadows market incentives for organic market development. Due to limited financial plumbing based on collateral transactions, Asian markets don't have much choice but to rely on the Eurodollar funding system without generating favorable market momentum that Asia needs.

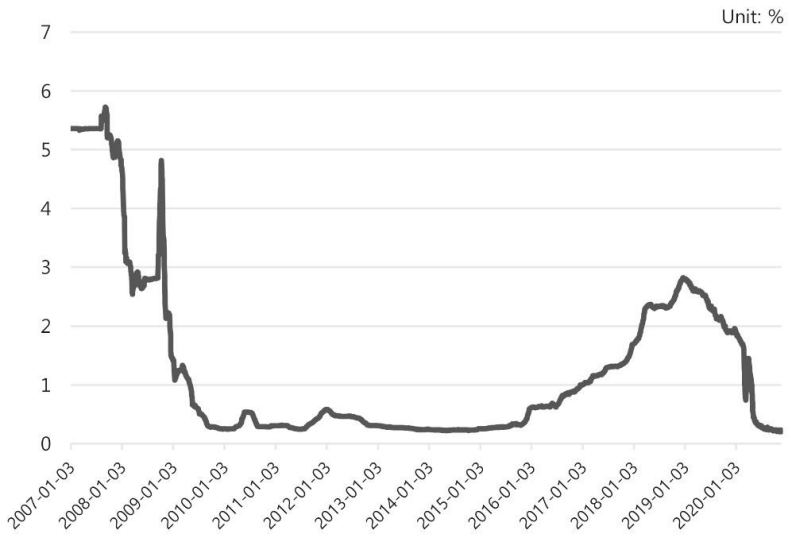

Figure 5. Three-month USD LIBOR-OIS Spread

Source: Bloomberg (2020).

Despite this change in financial landscape, however, the repo market operation in the US is much concentrated and open to only a few players, generating severe frictions over the entire global system. As one of the prominent participants in the repo market, the increased role of hedge funds has been hampered by limited balance sheet capacity, carrying tons of Treasuries to engage in basis trading for leveraged investment (Schrimpf et al., 2020). In other words, repo markets comprise only part of the Eurodollar, i.e., offshore dollar system, which is being morphed into securitized operation from its legacy correspondent banking model. The new vacuum created by the phase-out of the correspondent banks is filled with hedge funds' active participation, which seeks the extra return from basis trading. The basis trade is a safe investment that seeks to exploit small gaps between Treasuries and futures. Somehow, the massive holdings by leveraged investors have resulted in a temporary lockup situation and necessitated the FED intervention. Given its importance in the global financial plumbing, the Eurodollar system would have resulted in a severe crisis if the FED intervention had been delayed as evidenced by the Sep 2019 and the March 2020 events. This situation is a grave concern for dollar-dependent Asian economies since their war chests of FX reserves and existing special arrangements with the FED could not be activated whenever such external shocks materialized. For Asian countries with greater vulnerability against external shocks, the current protective insurance schemes may not be enough. For instance, Brä uning and Sheremirov (2019) show that in response to a surprise increase in federal funds rate of 25 basis points, real output in 44 countries declines on average by 0.9% after three years. It needs some attention that Asia's exposure against external shock as evidenced by increasing vulnerability has been increasing, while its capacity to address the situation is quite limited due to its severely depressed collateral use. In fact, the US repo disturbances have been

channeled into the FX swap market in periphery countries, with an even more substantial impact on the overall economy. Without its own market-based operations to ease frictions, Asia can suffer even greater vulnerability against external shocks beyond their control. What can be done to deal with this situation underlies the narrative of this paper.

The rest of this paper consists of chapters on the importance of cross-border collateral mobility, which is followed by the increased role of central banks in allowing expanded market transaction opportunities via CBCA (cross-border collateral arrangement). By accepting government bonds of member countries as valid collateral, a specific central bank in the region can provide extra liquidity in local currency without going through dollar exchanges and hedging obligations. We compare collateral framework of the major economies with those of Asian countries to draw implications about possible action plans, which is discussed in Chapter V. The final chapter includes summary and conclusion.

2. Central Banks and Cross-border Collateral Mobility

To prepare something from the poor initial conditions is a huge challenge. Yet, better use of collateral resources provides necessary groundworks for growth and stability (Corradin et al., 2017; Accornero, 2020). This is especially true when the regional financial stability remains the focal policy objective. Where do we start? It is crucial to have a central bank involvement in revamping the groundwork for better collateral usage because central banks are the ultimate authority over collateral resources and policy all over the world. The question would be how we should coordinate collateral utilization such that we achieve regional financial stability without sacrificing sovereign financial stability. In Asia, where there is a loose form of coalition, the question ultimately converges to how collateral resources can be utilized in a broader context. Therefore, Asia needs to work on essential foundation of collateral to ensure balanced funding channel going forward.

Despite enormous contributions by the Eurodollar system, Asia's depressed state in collateral utilization only increases the gap between the reality of securitized finance and Asia's preparedness. As the ultimate authority on collateral globally, central banks in the region need to collaborate to make progress on this issue. Even though their mandates are about national agenda, their collaboration would provide grounds for promoting something of common interests. For collateral-related market development in the region, there is no better starting point than central banks in the region. Typically, the collateral framework of central banks allows a country or region to respond to various shocks via transactions in repo or securitized funding market. In that case, the Asian framework is hardly suitable since it is a much segmented, polarized, and tightly regulated area where usual market participants have little common interests. In Asia, the collateral framework has found itself a sideshow since most of the actions have taken place via dollar and dollar collateral. Policy objectives always include capital market development, yet it has remained a long-term plan, whose progress is limited during normal times when the stability concern subsides. In practice, there has been little room for an explicit

collateral framework for financial stability in the region, while the de facto dollar funding system is functioning as the collateral framework for Asia.

This reality needs to change for the following reasons: First, the Eurodollar system has no central authority to overlook its operation during normal times. Unless some severe disturbances occur, there is no entity to fix the possible problems ex-ante. The legacy trust in correspondent banking is no longer sustainable. We need collateral operations by many players, not just a few prime brokers and dealers around the FED desk. Second, Asia is sizable to remain a financially dependent region. Lack of profitable investment opportunities associated with export-driven economies and the chronic financial repression to create a low-interest-rate environment re-channels sizable capital flow into the US and the Euro and gets recycled into Asia as managed by hedge funds and other big players. Asia is still ill-equipped to enhance its financial capacity because potential private investors cannot win in the bureaucratic system with a very short-term policy horizon. At any rate, the only quick response to address this increasing gap with the global superpowers' increasing dominance in markets is to emulate a region-wide collateral framework with relevant institutions. In practice, Asian central banks can positively move to engage in CBCA, even on a limited scale. Compared with other options, it can be a tall order to expect any substantial changes among incumbents. Instead, some of the new elements with few track records can be put on a stage or regulatory sandbox to contemplate future linkages (Choi, 2019b). This reasoning remains the backbone for future discussions. The only sure starter for Asia to narrow the gap in the collateral capacity with other regions is to formulate a central bank-driven collateral framework so that private participants can engage in all kinds of cross-border market transactions without undue concerns about risks.

We now take a look at the interrelationship between frameworks of central banks in the collateral market (CGFS, 2015). Central banks influence the collateral market via a scarcity channel and structural channel (Figure 6). Scarcity effects result from central bank operations' impact on the prices (or collateral assets) of collateral that may arise from collateral availability changes and collateral composition in the market. Collateral availability may increase or decrease depending on whether central bank operations are collateral absorbing (outright purchases and repo or secured loans) or collateral providing (outright sales, reverse repo, and issuance of prominent bank instruments). Pure changes in collateral composition result from operations that adjust the available collateral quality in the market (collateral upgrade vs. collateral downgrade).

On the other hand, structural effects mainly include consequences from the designation of eligible securities. A decision to accept a type of asset as collateral in a central bank operation will affect its pledgeability, inducing an increased willingness of issuers to issue these assets and counterparties to hold them on the balance sheet (Nyborg, 2017). Note that the structural channel and scarcity channel may interact with each other. For example, structural effects might induce scarcity effects by influencing the collateral services provided by a given stock of collateral assets. Unlike the cases of US

and Europe, which show increased presence of central bank footprint in collateral markets, most Asian central banks have limited exposure, especially in cross-border activities (Figure 6).

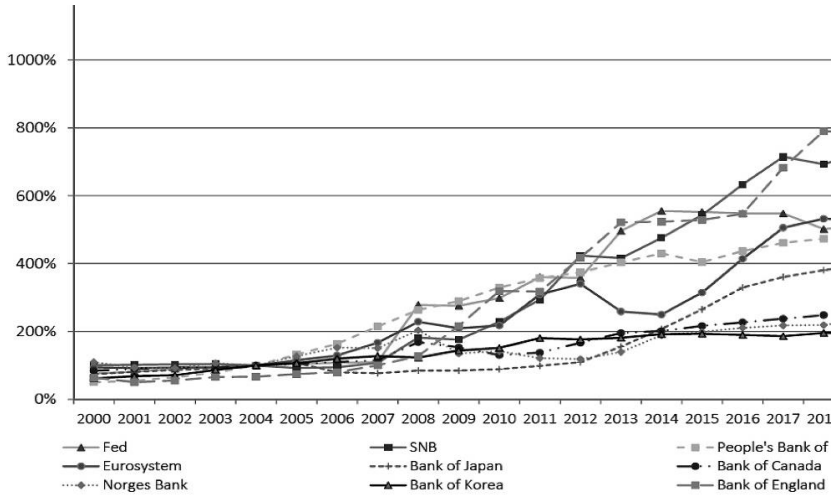

Figure 6. Central Bank Balance Sheets

Source: Kjell G. Nyborg (2020).

Central bank footprint on collateral management has been dominant even in well-established markets in Europe and the US. With the right market back up, collateral can serve as an efficient plumbing device in many jurisdictions. However, the collateral capability would remain a long-term plan in Asia since ready access to dollar funding remains challenging for most member countries. Even with all the externally driven funding market problems, however, it is essential to develop markets that can generate market information. Financial plumbing remains a 1/0 exercise, on and off-risk feature because markets cannot differentiate various risk factors due to unavoidable frictions from segmented and dislocated financial system. Without well-connected financial system with adequate liquidity, differential remains infeasible because risk factors cannot be evaluated properly in markets with significant frictions. Without such efforts, financial trilemma and associated market frictions will add to taxpayers' pressure and extra costs.

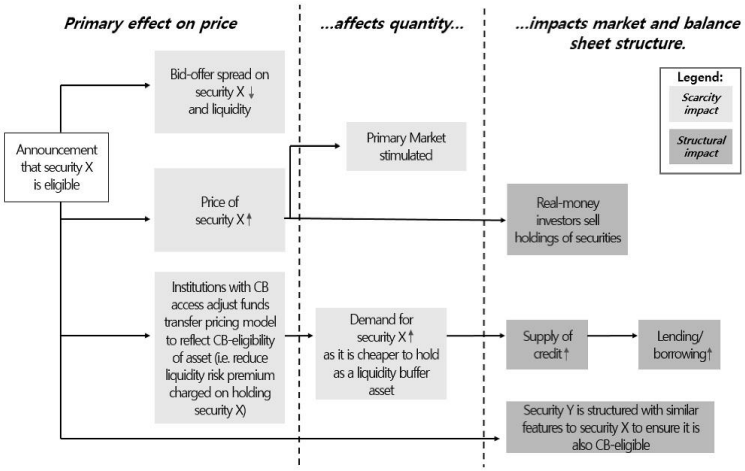

Figure 7. Impact of the Central Bank's Decision on Collateral Eligibility

Source: BIS (2015). "Central Bank Operating Frameworks and Collateral markets".

Table 1. Comparison of Credit Rating and Eligibility of Government Bond as Collateral

	Credit Rating			Collateral Eligibility	
	S&P	Moody's	Fitch	ECB	Fed
<Developed Countries>					
USA	AA+	Aaa	AAA	Yes	Yes
UK	AA	Aa3	AA-	Yes	Yes
Germany	AAA	Aaa	AAA	Yes	Yes
France	AA	Aa2	AA	Yes	Yes
<ASEAN+3>					
Singapore	AAA	Aaa	AAA	No	No
S.Korea	AA	Aa2	AA-	No	No
Japan	A+	A1	A	Yes	Yes
China	A+	A1	A+	No	No
Malaysia	A-	A3	A-	No	No
Philippines	BBB+	Baa2	BBB	No	No
Indonesia	BBB	Baa2	BBB	No	No
Thailand	BBB+	Baa1	BBB+	No	No
Vietnam	BB	Ba3	BB	No	No

Source: World Credit Ratings (2020).

Table 1 shows different eligibility of regional economies' government bonds as collateral. Except for Japan, the government issued bonds in ASEAN+3 countries that are excluded from cross-border collateral eligibility, reflecting the gap between the eligible collateral standards and the country's credit ratings. One possible reason for this is because holding FCY (Foreign Currency) denominated assets results in the higher haircuts and requires to have additional capital for banks due to compensating for Forex risk, regardless of the credit rating of the bond itself (Grandia et al., 2019).

Table 2. Cross-border Repo Markets in ASEAN+3 Countries

Country	US	EUR	ASEAN+3			Southeast Asia (ASEAN)					
			JP	CN	KR	TH	ID	MY	SG	PH	VN
Repos/ Govt Bonds	11%	18%	15%	5%	5%	<1%	<1%	<1%	<1%	<1%	<1%
Repo Type	Classic	Classic	Borrow Lend Classic (Gensaki)	Pledged (96%) Classic (4%)	Classic	Classic (mainly) Buy/Sell back	Classic Buy/Sell back (mainly)	Classic Buy/Sell back	Classic	Classic	Classic
OTC vs. Exchange (EXCH)	OTC	OTC	OTC	O.TC (mainly) EXCH	OTC (mostly) EXCH	OTC	OTC	OTC	OTC	OTC	EXCH
Foreign Market Access	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

Source: J.P. Morgan (2019). "Cross-border Triparty Repo in Asia: Impediments and Challenges".

The following chapters run some preliminary tests and analyses before suggesting possible arrangement types of CBCA, which would serve a core function in a newly contemplated regional facility.

3. Snapshot of Central Bank Collateral Frameworks

Given the characteristics of collateral available in the region and its current status, central bank collateral framework will determine its usability, especially its cross-border pledgeability. Before envisaging the machinery to activate the use of collateral, it is proper to review the existing central bank collateral framework. It is difficult to conduct vis-a-vis comparisons among central banks due to a lack of data, standards, and eligibility criteria. Yet, some anecdotal glimpse into the collateral resources would reveal potential capacity and constraints. The snapshot largely reflects the lack of data and in-depth studies on collateral issues in Asia, highlighting the needs to look into collateral capacities of the ASEAN+3 in various perspectives. Hopefully, this finding can serve as inputs to formulate the necessary framework to activate underutilized collateral resources in Asia.

3.1 The US Collateral Framework

The US is the only country other than Europe to fully utilize its assets as collateral for repo and other market transactions. Their supremacy in collateral financing remains the backbone of the current shadow financial system, often dubbed as a Eurodollar system. The upstream activities based on the repo market are intricately connected with the downstream US funding market via FX swaps, etc. The fact that the global system repo machine without proper supervision outside the US is a hidden risk for emerging economies that rely heavily on US dollar funding for their economic activities (Choi, 2020). The Fed, together with the Eurosystem, has collateral guidelines (Table 3), and a broad range of assets allow more manageable and smoother operation of liquidity supply.

Table 3. Eligible Collaterals by the Fed

Public Sector	Private Sector (Financial)	Private Sector (Non-financial)	Others
‧US Treasury ‧Fully-guaranteed agency securities ‧GSEs ‧Foreign govt guaranteed securities and Brady bonds ‧Foreign govt agencies ‧Supra-nationals (bills, notes, bonds, and zero coupons) ‧Municipal bonds	‧Corporate bonds ‧German Jumbo Pfandbriefe ‧Asset-backed securities (ABS) ‧Collateralized debt obligations (CDOs) ‧Collateralized loan obligations (CLOs) ‧Agency-backed mortgage securities ‧RMBS ‧Trust preferred securities	‧Commercial mortgage-backed securities (CMBS) ‧Certificates of Deposit (CDs) ‧Commercial paper ‧Asset-backed commercial CDs paper (ABCP)	‧Cash

·Bankers' acceptances

Source: Federal Reserve Collateral Guidelines (2018).

We look at the Tri-Party Repo market in the US in Figure 8. In a tri-party repo market, clearing banks act as intermediaries, handling the administrative details between two parties in the repo transaction (SIFMA, 2019). Notably, US Treasuries have remained as the most actively utilized collateral.

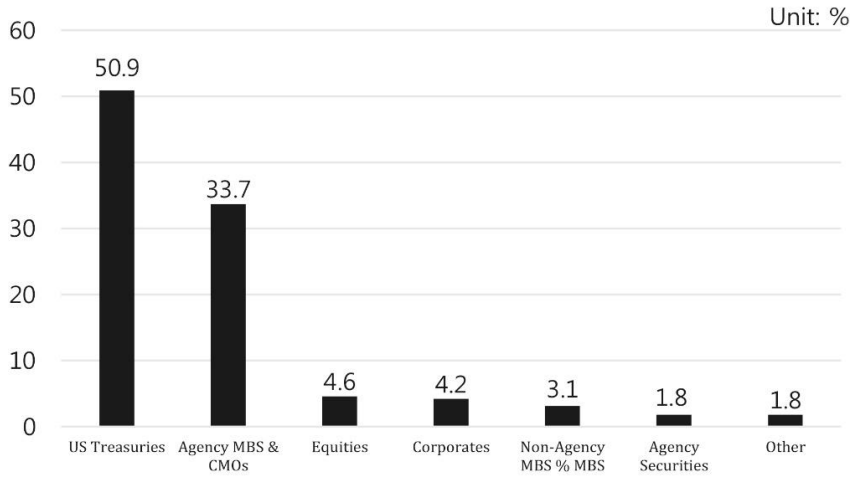

Figure 8. Tri-Party Repo by Collateral (2019)

Source: SIFMA (2019). "US Repo Fact Sheet".

3.2 The Eurosystem Collateral Framework

The collateral framework within the Eurosystem is to promote monetary policy's smooth conduct in Europe and protect the Eurosystem against losses in default by the counterparty. It is the most active region where central banks engage in collateral policy implementation. In addition to the two primary objectives of collateral frameworks, secondary objectives are also crucial, including cost efficiency, operational efficiency, simplicity, and transparency (Bindseil et al., 2017). In fact, the ECB has been the cornerstone of the European collateral system since its establishment in 1998 and the collateral policy has proven effective as policy tools. Financing has become challenging for both sovereign states and the banks, owing to investors' lack of confidence following the 2008 financial crisis. The financial institutions' funding ability, constrained by their level of unencumbered assets minus haircuts, has plunged. Nevertheless, collaterals' growing use has also caused its price to decline, and investors are consequently applying sizable haircuts to collateralized properties. Also, the resulting shortage of unencumbered assets raises borrowing rates even further, which weakens the liquidity position and brings down the ratings (Banking & Insurance, 2013). In fact, asset encumbrance has two opposing effects on liquidity risk. First, as the level of asset encumbrance increases, the bank will have fewer

unencumbered assets available to meet creditors' demands in case of stress. On the other hand, "stable funding effect of asset encumbrance" kicks in with higher levels of encumbrance because the bank has fewer liabilities subject to a run and lower liquidity risk. Overall, which effect dominates depends crucially on the costs of transferring bank's assets to the secured investors upon default (Banal-Estañol et al., 2019). This piece of market connector is missing in Asia.

Among others, the eligibility criteria of the Euro Collateral Framework are significant from the monetary policy perspective. Banks in Europe manage to pledge non-marketable assets such as credit claims for discretionary reasons. Besides, re-use and re-hypothecation of collateral have become significant European financial markets (Brumm et al., 2018). Re-use of collateral in a repo transaction refers to collateral disposal by the collateral taker. The term re-use of collateral is often used interchangeably with the term *re-hypothecation*. Re-hypothecation is an alternative for re-pledging, in which the title to collateral remains with the original collateral-giver in the repo market. We can observe some trade-off between central bank collateral policy that has emphasized regional liquidity provision for financial stability and the adverse selection toward accepting lower quality collateral.

In December 2016, the Euroclear received regulatory approval from the Securities and Exchange Commission (SEC) to expand its order to include US equities (SEC, 2016). The support cleared the way for Depository Trust & Clearing Corporation (DTCC)-Euroclear Global Collateral Ltd to launch its Inventory Management Service (IMS), covering not only US Treasuries but also equities, corporates, and asset-backed securities. IMS is a solution that connects Depository Trust Company (DTC) and Euroclear assets to Euroclear's Collateral Highway, where it can be used for triparty financing and pledge business. It provides automated transfer, recall, and substitution of assets. The idea is to ensure as broad a pool of collateral available for Over- the-Counter (OTC) derivatives margining in the US and Europe and to expand the potential pool of trading partners in the securities finance markets. Also, the launch of the Eurosystem Collateral Management System (ECMS) is planned for November 2022. It will replace the existing systems of the 19 national central bank assets used as collateral for existing systems credit operations. By all accounts, there have been accommodative as well as inclusive collateral framework in place in Europe. Overall, the Euro system has a well-established collateral framework to support the mandates by the Euro Commission. Compared to the US, Europe has been relatively discretionary and applied the collateral framework flexibly to achieve the political objective.

3.3 The Asian Collateral Capacity

3.3.1 China

In China, bonds are issued by the higher-rated government, policy banks, and state-owned enterprise dominate collaterals. Haircuts are generally higher than the equivalent stock exchange repo since the interbank market does not have any margin payment mechanism (J.P. Morgan, 2015). Structure of China repo market differs from those of Western countries where the markets are divided into bilateral and tri-party repos, governed by the Global Master Repurchase Agreement (GMRA). In China, there

are two types of repo markets: interbank and (Shanghai) stock exchange (Figure 9).

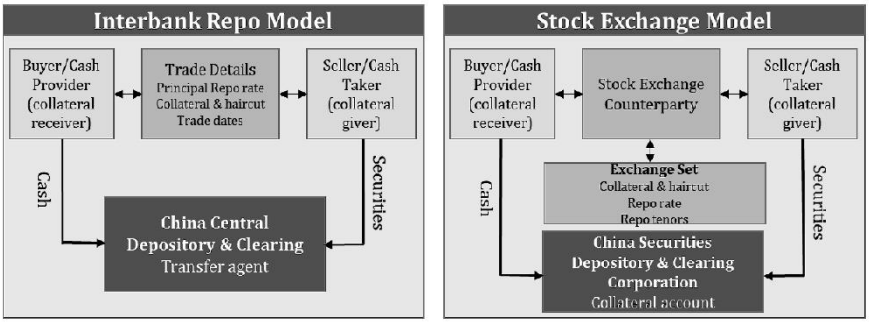

Figure 9. Chinese Repo Models

Source: J.P. Morgan Asset Management (2015). "China Repo Market".

Table 4. Comparison of Interbank and Stock Exchange Repo Markets

Characteristics	Interbank	Shanghai Stock Exchange
Repo Type	Pledged, outright (buy/sell) or X-repo	Pledged or agreement
Participants	Bank and non-bank financial institutions	Non-bank financial institutions, corporates & retail investors
Eligible Collateral	Negotiated between counterparties	Set by exchange
Haircut	Negotiated between counterparties	Set by exchange
Collateral Registration	China Central Depository & Clearing (CCDC)	China Securities Depository & Clearing Corporation (CSDCC)

Source: J.P. Morgan Asset Management (2015). "China Repo Market".

According to JP Morgan Asset Management (2015), the interbank market is regarded as a wholesale market where all market participants are institutional investors, operated on the OTC platform. Trading on the interbank market platform accounts for over 90% of total bonds outstanding, as of 2014. The interbank market allows outright repo where the ownership of collateral is transferred to the buyer and the seller, creating secondary market liquidity. Majority of collaterals used in the interbank market constitutes of high-rated government and policy bank bonds (Figure 10).

On the other hand, the stock exchange allows more diverse investor base, as any holders of Shanghai stock exchange account can participate in exchange repo transactions. Yields of stock exchange repo are significantly more volatile than interbank repo yields, leading to higher haircuts.

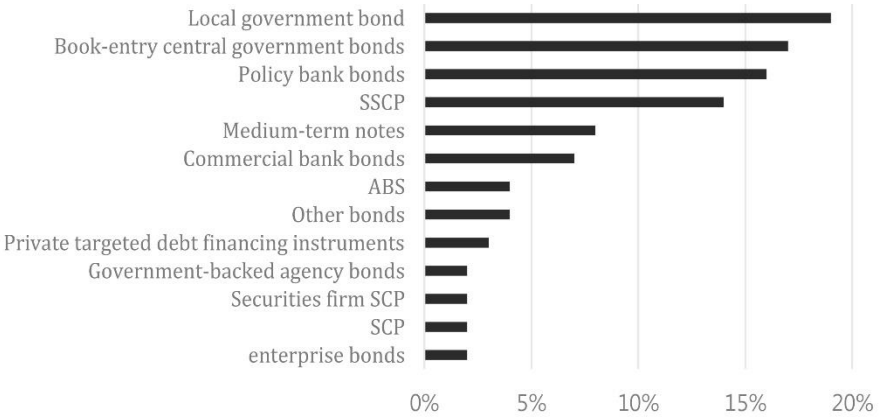

Figure 10. Bond Issuance Breakdown of Interbank Market at CCDC

Source: China Central Depository & Clearing (2020).

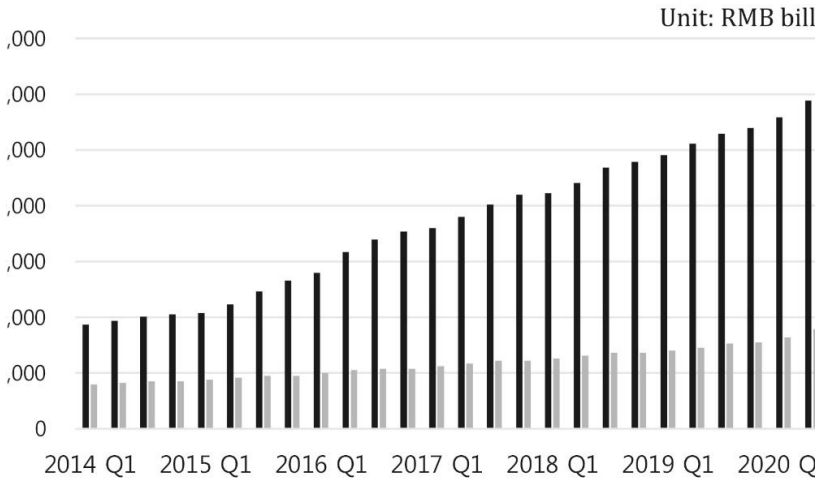

Figure 11. LCY (Local Currency) Denominated Government Bonds vs. Foreign Holdings

Source: Asian Bonds Online Data Portal (2020).

According to the ICMA (2020), the overall size of China's bond market is $19.8tn, which places second in the world followed by United States ($22.4tn). Until now, the LCY bond market in China has been dominated by domestic investors; past policies imposed complicated requirements to foreign investor registration, which acted as a barrier to bond investment (Aberdeen Standard Investments, 2018). However, there was a steady increase in foreign holdings ratio of LCY denominated government bonds, accounting for 2.04% in Q1 2014 to 9.36% in Q2 2020. As the bond market in China continues to expand, it is expected that more foreign investors will participate in the market in the future.

3.3.2 Japan

The amounts outstanding in both call and repo transactions in Japan significantly increased compared to the previous years (Bank of Japan, 2019). On the other hand, there is a sharp drop in the collateralized transactions and a constant increase in the uncollateralized transactions (Figure 12). The reason for the significant fall of the collateralized transaction rate is the introduction of the negative interest rate policy, and that it does not reflect the reversal of trend toward uncollateralized financing. The BoJ stated that there is substantial uplift in uncollateralized cash lending by investment trusts with its large surplus funds, which are from increased cash borrowing via equity repo transactions (BoJ, 2019).

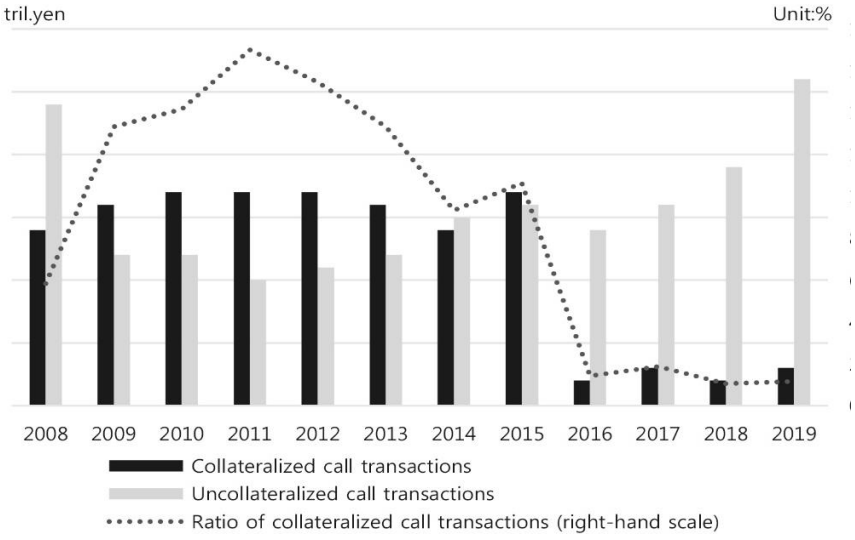

Figure 12. Amount Outstanding in the Call Market

Source: Bank of Japan (2019). "Trends in the Money Market in Japan".

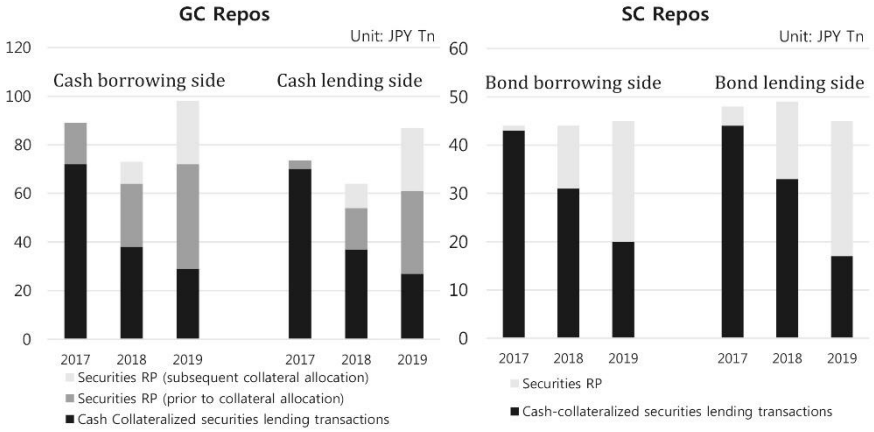

Figure 13. Amount Outstanding in the RP Market by Contract Type

Source: Bank of Japan (2019). "Trends in the Money Market in Japan".

As for the guideline on eligible collateral set by the Bank of Japan (2017), a minimal set of foreign assets are included in the pool and the collateral's eligibility is set by the assets' creditworthiness and marketability. However, the BoJ additionally notes the following criteria:

i) Collateral should be denominated in Japanese Yen.

ii) Collateral should be issued in Japan.

iii) Collateral should be governed by Japanese law.

As such, there are strict limitations on accepting foreign assets as eligible collateral. Additionally, the publicly-offered foreign bonds that satisfy the following requirements stated below in Table 5 also qualify as eligible collateral.

Table 5. Eligible Foreign Bonds Accepted by the Bank of Japan

Type of Bonds	Denominated Currency & Issuing Identity
·Treasury Bonds ·Treasury Notes ·Treasury Bills	Dollar-denominated, issued by the Federal Government of the US
·Conventional Gils ·Treasury Gils	Pound Sterling-denominated, issued by the Government of the United Kingdom of Great Britain and Northern Ireland
·Bunds (Bundensanleihen) ·Bobls (Bundesobligationen) ·Schtze (Bundesschatzanweisugen) ·Bubills (Univerzinsliche Schätzanweisungen des Bundes)	Euro-dominated, issued by the Government of the Federal Republic of Germany
·OAT (Obligations Assimilables du Trésor à taux fixe et à intérêt précompté)	Euro-dominated, Issued by the Government of the Republic of France

Source: Bank of Japan (2017). "Collateral Guidelines on Eligible Foreign Bonds".

3.3.3 Korea

Internally, the Korean collateral market locally is mainly active. However, there are rooms for improvement in the cross-border collateral market. Even the bilateral collateral arrangement with other central banks in the region has not been secured, while some of the member countries have done so as discussed in later chapters. However, the importance of the collateral framework as a policy tool has been recognized recently. With the recent outbreak of Covid-19, the Monetary Policy Committee of the Bank of Korea (MPC) decided to expand the eligible collateral pool for acquiring loans, starting Apr 1,

2020. The MPC included monetary stabilization bonds, government- guaranteed bonds, import/export financial bonds, and the Korea Housing Finance Corporation MBS in the eligible collateral pool on top of treasury bonds.

Moreover, the BoK has stated to test RP purchase implementation against non-bank financial sectors for accelerating the liquidity supply, starting in March 2020. This decision made by the BoK is expected to diversify the normal liquidity provision channel and encourage the bond issuance of various financial banks/sectors for ultimately securing monetary stability in Korea. This line of effort needs to be enabled to include other eligible assets produced in the region. Concurrent with the inclusive collateral framework lies the need for the CPMI (Committee on Payments and Market Infrastructures)-compatible infrastructure building in the area to allow efficient cross-border securities transactions. Given its sizable bond market and highly efficient market infrastructure, Korea can play a pivotal role in turning local bond markets in the region toward a robust cross-border funding market.

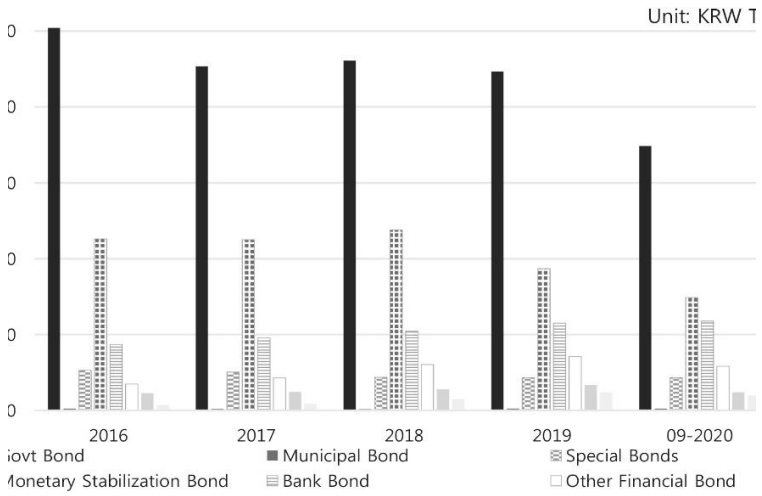

Figure 14. Traded OTC bonds in Korea

Source: KOFIA, BIS (2020).

Bonds are mainly traded in Korea's OTC market; 46% are government bonds. However, there are no standardized terms and conditions for differentiating bond types.

3.3.4 Indonesia, Malaysia and Thailand

The current status of the LCY bond market of Indonesia is shown in Figure 15. According to the Asian Bonds Online data, the LCY bond market is well frequented by foreign investors, accounting for over 38.57% of total government bonds, as of Q2 2019. Indonesia has limited opportunities to use bond holdings and repo market developments, primarily due to the prohibition of insurance firms and pension funds from engaging in repo transactions (Asian Development Bank, 2017).

Table 6. Outstanding Bonds of Indonesia

	Outstanding Amount (billion USD)						Growth Rate (%)			
	Q3 2017		Q2 2018		Q3 2018		Q3 2017		Q3 2018	
	IDR	USD	IDR	USD	IDR	USD	q-o-q	y-o-y	q-o-q	y-o-y
Total	2,426,060	180	2,611,428	182	2,764341	185	4.1	12.7	5.9	13.9
Govt	2,066,296	153	2,208,882	154	2,345,354	157	3.4	10.7	6.2	13.5
Central Govt.	2,046,933	152	2,196,915	153	2,306,641	155	4.9	17.0	5.0	12.7
of which: Sukuk	329,039	24	354,277	25	378,115	25	10.6	37.2	6.7	14.9
Central Bank Bills	19,364	1	11,947	0.8	37,713	3	(58.3)	(83.4)	223.5	99.9
of which: Sukuk	12,626	0.9	11,967	0.8	10,642	0.7	34.0	33.7	(11.1)	(15.7)
Corporate	359,763	27	402,546	28	418,987	28	8.2	25.5	4.1	16.5
of which: Sukuk	13.958	1	14.692	1	16.982	1	4.3	29.9	15.6	21.7

Note. ( )=negative, IDR=Indonesian Rupiah.

1) Calculated using data from national sources.

2) Bloomberg LP and end-of-period LCY-USD rates are used.

3) Growth rates are calculated from an LCY base and do not include currency effects.

Source: BIS. (2020).

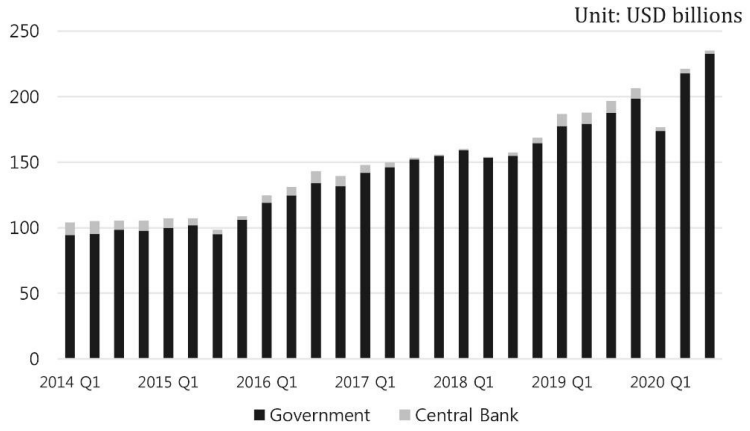

Figure 15. Outstanding LCY Denominated Bond of Indonesia

Source: Asian Bonds Online Data Portal (2020).

Indonesia launched its repo market in 2004, and all repurchase transactions benchmark the Indonesia Master Repurchase Agreement formed in 2005 which is set in Himdasun rule (Asian Development Bank, 2017).

While the Malaysian bond market is the 3rd largest in Asia, its bond repo market is much underdeveloped, compared to other ASEAN countries. The Central Bank of Malaysia (Bank Negara Malaysia, BNM) has launched new initiatives to expand its repo markets, and such efforts are expected to increase the availability of off-the-run bonds to be lent via repo (Idris, 2019). It will simplify the foreign exchange transaction and documentation process and facilitate the market-making capacity of designated overseas offices to ensure sufficient access to ringgit prices. In addition, the BNM also needs more cooperation with regulators to enhance the delivery mechanism for Malaysia's Government Securities (MGS) futures settlements.

Figure 16 represents the current situation of the bond market in Thailand. Classified by the tenor (the time remaining until the end of the contract) of bonds, the outstanding value of the short-term bond (with tenor equal or less than one year), i.e., commercial paper and treasury bill, declined 24.19% and 75.15%, respectively, from 2018 to 2019. For tenor over one year, the outstanding value of government bonds increased by 4.27% while long term bond rose by 13.13% (ThaiBMA, 2019). The exceptional of the top 5 sectors of long-term corporate bonds contributed to 60% of the total, considering well-balanced shares around 11-13%.

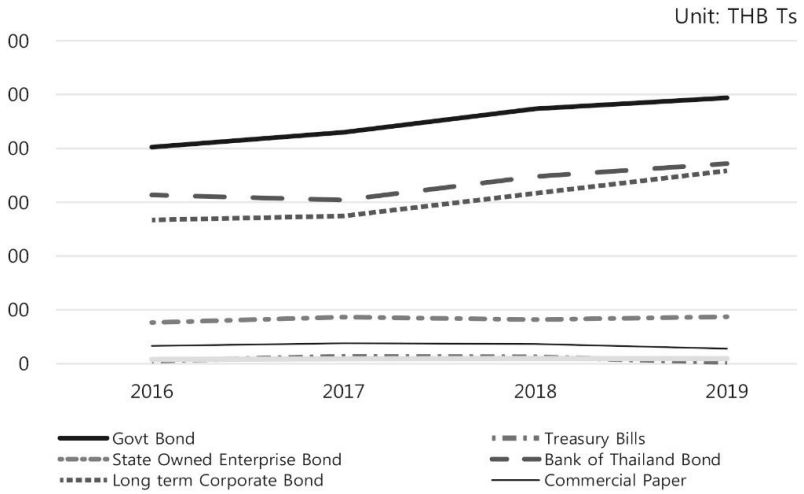

Figure 16. Outstanding amount Classified by Types of Bonds

Source: ThaiBMA (2019). "Thai Bond Market Review".

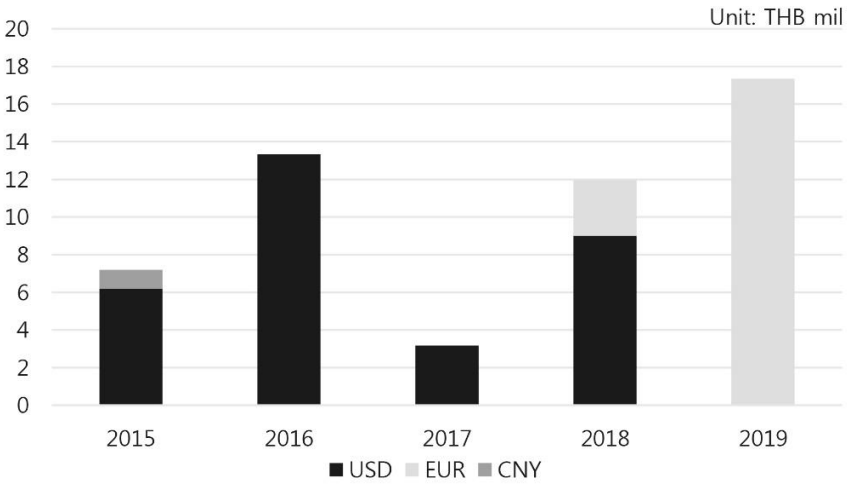

Figure 17. FCY Denominated Bond Issued by the Domestic and Foreign Entity

Source: ThaiBMA (2019). "Thai Bond Market Review".

The total issuance of the FCY bond in 2019 was approximately THB 17,345 million, which is relatively low compared to Thai's LCY bond market size. Other than the global bond market, the Bank of Thailand has acknowledged the dominance of major currencies (e.g., USD, EUR, and JPY) in international trade and service settlements, and is looking forward to enhancing the local currency market in the ASEAN region. According to the BoT, trading share between Thailand and core markets who own those currencies have now declined their importance, while new regional trading partners, i.e., ASEAN and China, subsequently take on the growing shares. The Asian efforts to construct something like the central bank collateral framework seem far-fetched given different market development stages and socio-economic backgrounds. However, a well-prepared approach to tackle this critical plan cannot be delayed further. In recognition of the importance of central banks' collaborative efforts in the region, a separate institution-building to pursue this agenda needs some consideration. In essence, pulling together the necessary resources in Asia to identify and utilize the collateral pool is vital and essential before expecting a steady market development. The stringent set of guidelines primarily reflects a closed, fragmented view of the central bank, holding back smooth operation of the liquidity supply worldwide.

4. Checklists for Central Bank Collateral Framework in Asia

The importance of collateral in the context of central bank practices and policy choices cannot be emphasized too much in today's environment. And this provides enough rationale for central banks in the region to step up their efforts to expand their operations beyond national borders in cross-border collateral markets. As the snapshot of collateral resources reveal, however, the region's current collateral framework is silo-ed, fragmented, and idiosyncratic. Each member country has some repo market that utilizes local bonds, yet very few accept bonds from other member countries in the region.

Such a dichotomous system needs to evolve into an integrated market environment for better risk management and smoother funding exercise. By definition, central bank collateral framework provides four essential functions: First, allocating central bank money in an economy starts with the interaction of the central bank vis-à-vis banks (Nyborg, 2017). Second, the business takes place within the central bank's collateral framework. Third, there is an inverse relationship between haircuts in repo transactions with the central bank and the underlying collateral's secondary market prices. Lastly, the central bank collateral framework can be used as part of a package of unconventional monetary policies to address crises. Equipped with the relevant collateral framework, we can expect better liquidity provision, better risk management, more business opportunities, ample market information for price discovery, and the extra tool for monetary policy. Still, it can also cause market distortions and contribute to financial instability. It is the possibility of extending the central bank collateral framework from its present form to the one which is more inclusive so that the above conventional functions can improve Asia's future without incurring side-effects. The essential functions of central bank collateral framework would be revived if Asia can develop one in the future.

Given that the region-wide central bank collateral framework does not exist at present, it is evident that we do not have relevant setup for the cross-border collateral movement. Each country has its collateral framework that does not have any interoperability features for more diverse transactions. However, the reality has a spin on the possibility that cross-border transactions are possible if a regional consensus focuses on the central bank collateral framework. This chapter discusses ways to modify the current setup to connect collateral resources and the market incentives in the region for bond market development. Before considering the proposal, some of the considerations regarding the existing collateral framework need some attention. The final roadmap for the Asian collateral framework can only emerge after further discussions and analysis.

Given disparate situations regarding collateral recognition and utilization, it requires strategic and open approach to build a region-wide collateral framework for central banks. Since Asia's member countries have different non-economic backgrounds and distinct features and no central authority to pursue this agenda, it is essential to prepare a collateral framework with a loosely coordinated effort based on distributed governance. Some of the key takeaways from the preliminary analyses suggest that it requires concerted efforts by central banks in the region since they are the most trusted entities with basic data and research capacities. As documented, it is still difficult to size up the collateral capacity in the region. There are some survey results by ASIFMA (Asia Securities Industry & Financial Markets), but a regular survey is necessary to track the changes. Also, few countries in the region publish data on collateral and its use. Even the ABO (Asian Bonds Online) data portal of ADB does not carry collateral information. This scant reservoir of data needs to be improved in the near future to enhance plumbing potentials of the Asian cross-border collateral.

Also, a dedicated regional institution other than central banks is necessary to coordinate comprehensive efforts to formulate groundwork for improving the collateral use in Asia. Unlike the fully established collateral frameworks of the ECB and the FED, there is yet little foundation for dubbing it as a regional collateral framework. In reality, Asia has neither a central bank nor relevant governance to deal with region-wide issues other than the ASEAN+3, which means Asia does not have a Euro commission type of organization. However, the lack of proper authority does not spell trouble for regional financial cooperation since central banks are capable of hammering out plans to deal with big pictures. For instance, in recognition of the prevailing apparatus in the region to secure stable funding market conditions and other background information on the collateral framework, the following approach deserves careful review and inputs to activate market potentials in the region. Specifically, an arm's length approach for a triparty entity can help central banks overcome its prevailing mandates. In fact, a new institution with well-defined mandates for constructing a new market with relevant legal and regulatory support may be a better approach to develop collateral capacity than the one with extra mandates imposed on legacy institutions.

In addition to data and institution-building requirements, some of the common denominators for future discussions hinge on the following: There are needs to identify eligible collateral in the region for cross-border activities. Some countries do not have well-developed capital markets, and the Top 3 (Korea, China, Japan) can hardly cooperate without the broader participation of other member countries. For all practical purposes, we need a tiered approach to concretize goals for the Asian collateral framework further. A tiered approach is an excellent way to maintain a regional framework without worrying too much about existing constraints. In addition to usual credit ratings, some of the hidden constraints, e.g., tax and other regulatory issues, need to be identified as well. More concrete roadmaps and action plans are also necessary to meet the increased demands for treating clearing and settlement needs for securities transactions. For instance, bilateral or multilateral arrangements among banks can be prioritized according to common criteria. The resulting collateral pool can raise market liquidity in every member country in the region regardless of their current status. Some necessary transformation and guarantee facilities, e.g., CGIF (Credit Guarantee &Investment Facility), are already available within the ABMI framework to enhance the inclusiveness features. The CMIM (Chiang Mai Initiative Multilateralization) can also incorporate the bigger collateral pool for efficient activation of the liquidity facility.

As it happens, the quality of collateral depends primarily on liquidity of the securities. Therefore, the primary objective of the future efforts needs to concentrate on ensuring market liquidity of eligible collateral. Contrary to central banks, commercial banks can resell securities received as collateral to avoid a negative impact in liquidity. The so-called **re-use rate** (or velocity) of collateral is the ratio of total collateral received by large banks divided by the source' collateral (Goel & Singh, 2019). The shrinkage of re-use follows straight from the greater counterparty risk awareness the financial crisis has

raised, which is favorable to the extent that systemic risk drops. On the other side, lower collateral velocity results in more inferior liquidity of the unsecured interbank market because less re-use means less overall collateral (Sia Partners, 2013). Discussions on central bank collateral framework need to take these market features into account so that consensus on such a framework can entail improved market functioning in various contexts and backgrounds. All in all, data, institution, and arrangements for improving market liquidity related with collateral transactions are some of the key ingredients for constructing the collateral framework for central banks in the region.

4.1 Issues with the Use of Less-liquid Collateral

Central banks may influence the relative cost of utilizing liquid and less liquid eligible assets through their choice of valuation method using haircuts, initial margins, and lending facilities pricing. Under the uniform framework, haircuts or margins affect the relative cost. In contrast, an additional layer of charge can be imposed by making the facilities accept fewer liquid collaterals (Figure 18, 19). This reflects the tradeoff that exists between the quality of collateral base and the credit provision by central bank. Besides, financial sector regulations may also affect counterparties' incentive to use fewer liquid collaterals. The overall impact of regulatory changes on central bank counterparties' incentives to use different collateral types will change over time. In light of the European experience, it is crucial to incorporate an incentive mechanism to prevent adverse selection.

Table 7. Haircut Schedule for Eligible Collaterals in Eurosystem Market Operations

Category	Assets	Haircut Range
Category I	Central govt debt instruments	0.5-5.5 (fixed coupon)
	Debt instruments issued by central banks	0.5-8.5 (zero-coupon)
Category II	Local &regional govt debt instruments	-7.5 (fixed coupon)
	Jumbo covered bonds	1.0-12.0 (zero coupon)
	Agency debt instruments	
	Supranational debt instruments	
Category III	Covered bank bonds	1.5-11.0 (fixed coupon)
	Debt instruments issued by corporate & other issuers	1.5-16.5 (zero-coupon)
Category IV	Credit institution debt instruments (uncovered)	6.5-17.0 (fixed coupon)
		6.5-22.5 (zero-coupon)
Category V	Asset-backed securities	16

Note. Range of Haircuts depend on each asset's maturity and credit quality. For more information, see https://www.ecb.europa.eu/press/pr/date/2010/html/sp090728_1annex.en.pdf

Source: ECB (2020).

According to Nyborg (2017), biases exist in the collateral framework: lower quality collaterals are generally favored. To show this, we first take a look at the haircuts of each asset eligible as collateral by the ECB (Table 7).

The assets are categorized by their haircuts, which implies that Category-I is the most liquid, high-quality assets, whereas Category-V is low-quality collateral. We compare the breakdown of eligible purchases and the percentage of each asset that is used (Figure 18, 19).

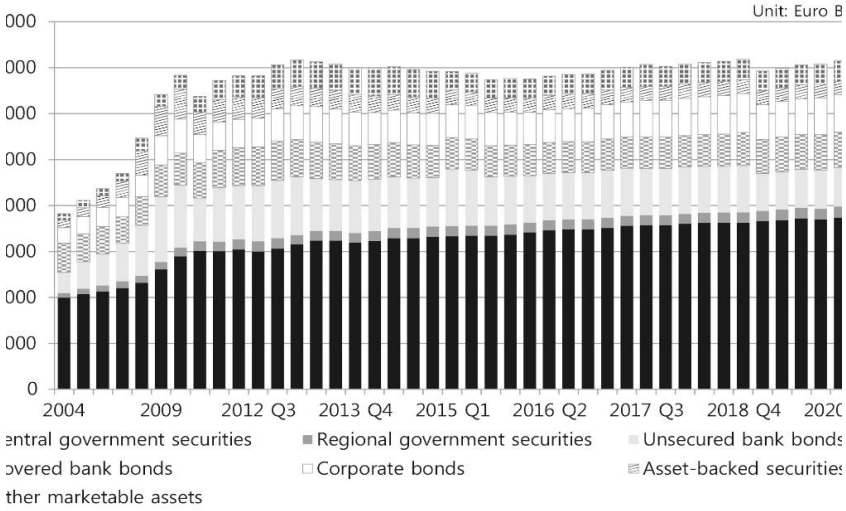

Figure 18. Composition of Eligible Marketable Collateral

EUR billion, after valuation and haircuts; use of collateral: averages of end of month data over each period; since Q1 2013, the category "Non-marketable assets" is split into two categories: "Fixed term and cash deposits" and "Credit claims".

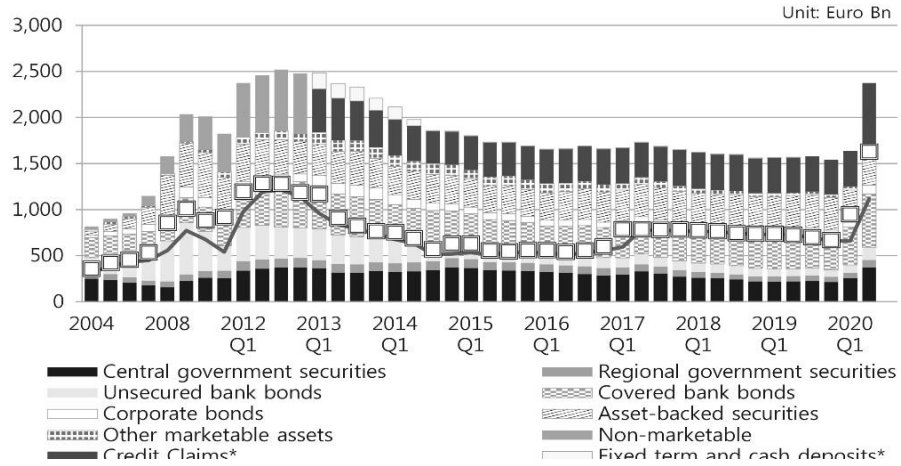

Figure 19. Composition of Used (Pledged) Collateral

Source: ECB (2020).

It is noticeable that a high proportion of credit claims and covered bank bonds are being used as collateral. However, their occupied ratio in eligible collateral (Figure 19) remains relatively low. For example, asset-backed securities account for only 3.8% of all assets in the pool of eligible collaterals. Still, their actual usage proportion accounts for 16% of used collaterals, as of Q2 2020. On the other hand, not many high-quality assets such as central government securities are pledged, compared to their sizable proportion in the eligible collateral pool. Nyborg explains that low-quality collateral group always exceeds its fraction by nominal value, and is also produced at a higher rate. Moreover, Nyborg suggests that collateral values of lower-quality collateral are relatively high, for example, because the haircuts of such collateral are relatively low for discretionary rule by the central bank. This practice sets the tone for market participants, who favor to use lower collateral to generate liquidity. Further, the G-Sibs need to maintain good collateral for regulatory purposes, prompting others to use lower-quality collateral. Policy directives determined the extent to which lower quality assets are preferred as choices for pledging with central banks. In considering central bank collateral framework, this seemingly contradictory practices need to be reviewed carefully to formulate better collateral framework for the region. Constant monitoring by central banks is required to avoid adverse selection problem in the context of regional practices.

4.2 Effects of Foreign Collateral on Bank Supervision

If central banks in the region agree on cross-border collateral transactions, there are also implications for bank supervision (Capel, 2009). A central bank's policy choice would rest on the extent to which it placed greater weight on the mitigation of liquidity risk in stress situations. For instance, cross-border use of collateral can mainly reduce the liquidity risk arising from the currency mismatch.

Manning and Willison (2006) showed that expected collateral shortfalls as measured by liquidity risk in each country were always lower when all collateral could be re-used. Likewise, the potential benefits of utilizing cross-border collateral outweigh the potential costs of adhering to the existing siloed approach. The additional market liquidity provided by various plumbing afforded by collateral arrangement and risk management choices is more significant than the other risk-mitigating activities that accompany the new efforts. Given the heightened vulnerability of restrictive dollar funding mechanism, it is time to venture into new territory for central banks and legacy systems to recognize its expanded role in extensive collateral use in capital markets worldwide. Simply, dollar-centric liquidity provision for more efficient risk management and payment would put greater pressure on emerging economies that cannot make use of its own collateral for cross-border market transactions.

Table 8. Summary of the Effects of Foreign Collateral on Tasks of Central Bank

Type of Collateral	Foreign Currency Collateral	Collateral Issued Abroad	Collateral Located Abroad
Monetary Policy	Positive, as financial institutions can take more part in monetary operations	Positive, as financial institutions can take more part in monetary operations	Positive insofar as liquidity need can be planned, and the arrangement may be too slow, e.g., overnight facility
Payment Systems	Positive, as lower costs allow of pledging more collateral at CB so that potentially more intraday credit can be obtained	Positive, as lower costs allow of pledging more collateral at CB so that potentially more intraday credit can be obtained	Positive but less suitable for solving acute payment problems
Financial Stability	Positive, as lower costs allow of pledging more collateral at CB to absorb shock	Positive, as lower costs allow of pledging more collateral at CB to absorb shock	Ambiguous, depending on the nature of shock and degree of economizing on collateral worldwide. The emergency collateral, generally positive effect
Prudential Stability	Limited effect on account of exchange rate risk	Negative, because institution may opt for more risk-bearing financial assets	Potential negative effect if institutions economize on the global quantity of liquidity and if supervisors engage in ring-fencing
Effectiveness/Efficiency of Internal Org	Limited negative effect on account of exchange rate risk	Negative effect on account of legal complications and costs	Operational risks which may be considerable due to time zone differences, etc.

Source: DNB, Jeannette Capel (2009). “Cross-Border Collateral and its Impact on Bank Supervision”.

Further, there are concerns about accepting collateral with lower credit ratings. Even with some form of insurance and guarantee, or mutual agreements between central banks, default is not a tail event for Tier 3 countries. In case of default, it is hard to dispose of collateral for cash because of the lack of trading counterparties. Also, holding on emerging market sovereign debt raises provisioning requirements for banks, and the actual holding costs depend on haircuts or margins. For this reason, and the lack of market infrastructures, emerging market debts are avoided as cross-border collateral. And exactly for this reason, the efforts to include these assets make sense for increasing inclusiveness of pledgeable collateral.

4.3 Cross-Border Collateral for Payment Liquidity

Banks often rely on collateralized intraday liquidity from the central bank to affect payments in a Real-Time Gross Settlement (RTGS) system. When a bank holds insufficient eligible collaterals in a particular country, it may have to delay payments, increasing a liquidity risk to the system. Such an issue can be more severe for global banks as they face mismatches between collateral holdings and liquidity demands. The liquidity risk arising from such a mismatch could be mitigated by allowing cross-border collaterals' active use. This idea has experimented as part of the efforts of CBCA (Central Bank Cross-border Collateral Arrangement) monitored by the NY Fed (2008). Furthermore, the regional collateral framework needs to be linked with the global network to strengthen risk management capabilities.

Given the obvious trend of Asia leading the payment liquidity drive, adequate provision of liquidity is critically important for growth and stability. And the growing needs for payment liquidity can only be met by acknowledging member countries' government bonds as eligible collaterals (Figure 20). And the central banks in the region need to collaborate to meet the increasing needs for market liquidity via developing the inclusive central bank collateral framework. In short, collateral based on the liquidity provision would significantly contribute towards providing extra liquidity for payment needs. That is, if situations regarding the use of collateral for cross-border payment are improved, we can certainly expect smoother transactions and faster settlement because existing restrictions can be lifted via central bank cross-border collateral arrangement. Therefore, the first move by central banks in the region would set off serious changes for collateral usage across the border and its associated settlement needs.

Also, according to the recent IMF study (2020) that investigates the invoicing currencies in global trade, the globally dominant role of the US dollar remains stable despite the comparatively smaller role of the US in global trade. It also confirms that countries invoicing more in US dollars tend to experience greater sensitivity against US dollar exchange rate changes and greater pass-through to their import prices. Excessive reliance on dollar funding for risk management and payment introduces greater vulnerability on emerging economies mainly via currency mismatch. Limited cross-border asset pledgeability underscores the unavoidable vulnerability against external shocks.

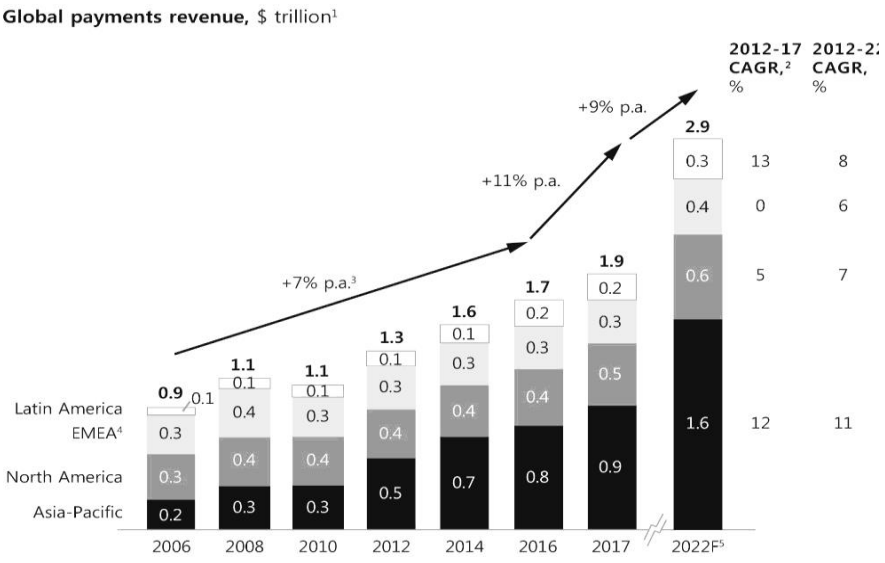

Figure 20. Global Payments Revenue ($ trillion)

Source: McKinsey & Company (2020). "McKinsey Global Payments Map".

5. The Action Plan for an Inclusive Collateral Pool

The flipside of a proposed central bank collateral framework to engage a region-wide commitment to mobilize collateral resources in Asia is a pool of eligible collateral for cross-border use. The starting point would be the eligibility criteria shared by central banks in the region and the candidate pool of collaterals for various market applications. This chapter lays out possible solutions.

Various policy tools have been applied in Asia to achieve stable market conditions where market functioning has been limited, and market dynamics have been further restricted. By all accounts, the underperformance of capital markets has its roots in the lack of eligible assets as cross-border collateral in Asia. The collateral foundation is predominantly based on FX denominated assets, especially for any cross-border activities, which restricts the capital flow in one way or the other. As noted, the underlying collateral foundation is narrowly defined and overly segmented. The enormous economic engine sits on the limited capacity of a poorly defined financial system. As a result, most anomalies appear, which are subsequently fixed via policy efforts and measures.

How should we be prepared to boost cross-border collaterals for the purpose of galvanizing capital market performance in the region? First, policymakers should shift their mindset to establish the policy framework of cross-border collateral transactions. Besides the regulatory side, openness and collaborative discussions among diverse members are required. In addition to the active conversations, the most up-to-date clearing and settlement facilities with different time zones are necessary. Lastly, technical assistance from international organizations is essential for boosting cross-border collateral transactions. Overall, the future efforts to develop central bank collateral framework would emphasize "collaborative efforts" for multilateral engagements, "third-party involvement" to allow legacy

institutions to participate in future efforts, and "open architecture" for the regional clearing and settlement infrastructure investment.

To provide a future guideline for creating the ASEAN+3 collateral framework for enhanced cross-border asset pledgeabilty, we propose the following action plan.

1) Collaboration among central banks to develop a cross-border eligible criteria and the collateral pool.

2) Uplift collaboration on joint projects for ICSD-CSD linkage and relevant capital market infrastructures via TA: develop the inclusive collateral ecosystem via transformation and guarantee services.

For the first action plan, central banks need to collaborate on eligibility criteria and build a collateral pool for cross-border transactions. It is possible to refer to existing collateral criteria of the ECB and the FED, with possible modifications to suit the needs of ASEAN+3 countries. Additionally, harmonizing supervisory regulations and guidelines to overcome existing barriers toward building the Asian collateral system. For the second action plan, providing multi-level professional training on the collateral management and repo markets are necessary. Also, exploring the feasibility of an on-site capacity-building program in collaboration with existing facilities under ABMI is essential. Focusing on the facilities and enhancing personnel exchanges, such as mutual visits and scholars' exchange, is crucial for the second action plan. The final action plan to strengthen capacity -building and professional training of APCF member countries, activating knowledge-sharing on member states' current collateral system using ABO platform, is essential. Besides the knowledge-sharing, establishing executive training courses on collateral via an alliance of training centers around the region is crucial. Online activities, such as hosting webinars with other institutions regularly, are essential as well.

In a world where centralization is a legacy system, a newly developed decentralized alternative has identical features embedded in governance. This unexpected and contradictory feature is a somewhat conflicted phenomenon, yet it poses severe challenges to those espousing decentralized options so eloquently.

5.1 Bilateral and Multilateral Asian Cross-border Collateral Arrangement (CBCA)

While the market demand for collateral is frequently increasing, the use of regional bond markets' collateral is still limited. The local central bank's collateral framework must be first revised by allowing the Cross-border Collateral Arrangements (CBCA) to break away from Asia's segmented governance. The CBCA allows regional central banks to accept foreign currency denominated bonds as eligible collateral to provide liquidity to domestic financial sectors. It also helps central banks revitalize the short-term RP market by utilizing high-quality bonds issued by other regional central banks. Potential candidate country to contract CBCA may depend on several factors, but we consider the followings between the two (or more) contracting countries:

i) investment size (FDI/bond investment)

ii) trading volume between contracting countries

iii) overseas expansion (entering) of domestic financial institutions

In addition to these criteria, the BIS considers the size and international orientation of the local financial sector/wholesale markets, size of the local payment system (relative to the size of local debt market), close links between the local banking sector, and lastly, the significant presence in the local payment system of large internationally active banks (BIS, 2006). The following figures summarize the relevant market dynamics in ASEAN+3.

Table 9. Current State of Cross-border Collateral Arrangements in the Region

Country	Signatory	Signatory Central Banks	Date of Arrangement
Singapore (Monetary Authority of Singapore)	Japan	Bank of Japan	2013.07.26
	Thailand	Bank of Thailand	2012.06.23
	Malaysia	Bank Negara Malaysia	2011.11.28
	Philippines	Bangko Sentral ng Pilipinas	2016.08.26
Japan (Bank of Japan)	Indonesia	Bank Indonesia	2013.12.13
	Thailand	Bank of Thailand	2013.11.25
	Singapore	Monetary Authority of Singapore	2013.07.26
	Malaysia	Bank Negara Malaysia	2012.02.02
Thailand (Bank of Thailand)	Singapore	Monetary Authority of Singapore	2012.06.23
	Japan	Bank of Japan	2013.11.25

Source: Asia Bond Monitor, BOJ, BNM (2020).

Table 9 shows the current state of CBCA arrangements in Asia. Most cross-border collateral arrangements are by Japan and Singapore, where they either hold key currency or have domestic bond issuance is highly active. However, this biased approach leaves out the rest of the ASEAN+3 countries, emphasizing the extra need for regional central banks to collaborate on the participation of the CBCA actively. In other words, the MOU possibilities more or less reflect similarity in collateral capacity and other economic fundamentals. The potential benefits from CBCA can be greater among countries with different backgrounds, where we can observe greater double mismatches of currency and maturity.

We look at Korea's case by collecting data on investment size, trading volume, and several foreign financial institutions branches. Due to investor privacy reasons, the Financial Supervisory Service of Korea (FSS) keeps information regarding the bond investment size of individual countries confidential

since 2016. Therefore, we refer to Foreign Direct Investment (FDI) inflow and outflow size (Figure 9) instead. While FDI related activities are most pronounced in Japan and China, trading volume with China stands out. Among ASEAN nations, Vietnam, Indonesia, and the Philippines are Korea's most active trading partners. These and other factors provide rationale for CBCA to ease payment and liquidity restrictions that often reflect different dollar funding capacity of member countries.

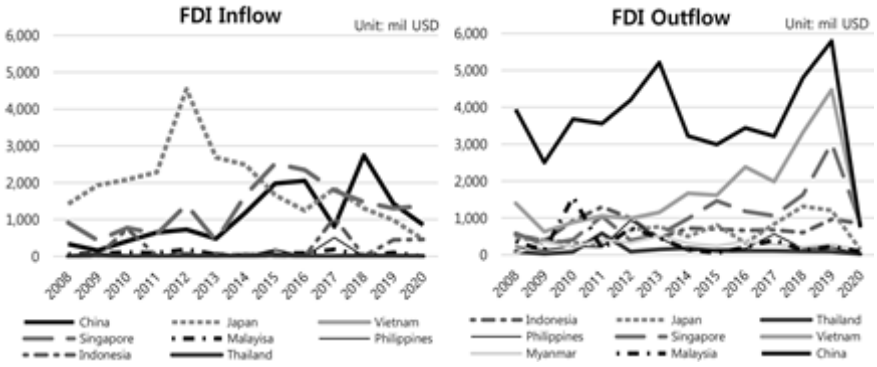

Figure 21. FDI Inflow (left) & Outflow (right) Volume in Korea

Source: Ministry of Trade, Industry, and Energy (2020).

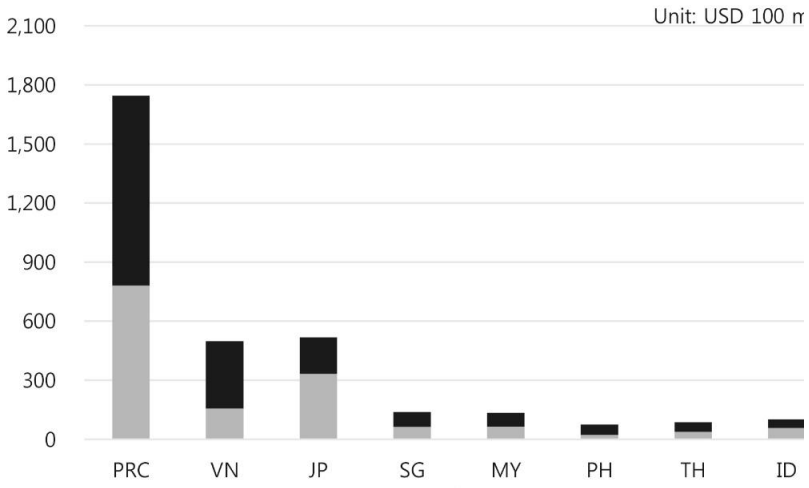

Figure 22. Breakdown of Trading Volume by Country

Note. PRC=People's Republic of China; VN=Vietnam; JP=Japan; SG=Singapore; MY=Malaysia; PH=Philippines; TH=Thailand; ID=Indonesia.

Source: Korea International Trade Association (2020).

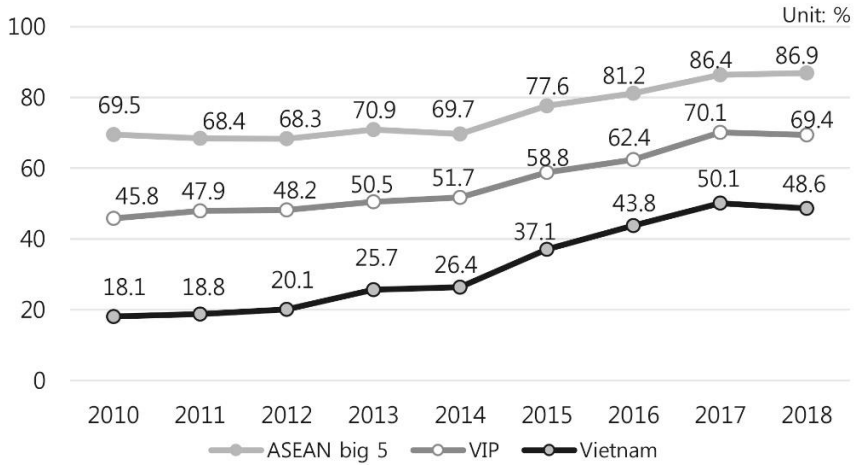

Figure 23. Korea's Export to ASEAN Countries (excl. Japan & China)

Note. VIP includes Vietnam, Indonesia, and the Philippines; ASEAN big 5 includes VIP countries with Thailand and Malaysia.

Source: Korea International Trade Association (2020).

The ASEAN has emerged as Korea's second export market after Japan and China. It is essential to reinforce the trade relationship with ASEAN member countries to avoid overly relying on exports to the US, Japan, and China. The Korean International Trade Association reported that Korea's export volume to Vietnam hit 48.6% of its total export volume to all ASEAN countries, which has doubled since 2010. On the other hand, Korea's export volume to the Big 3 (Vietnam, Indonesia, and the Philippines) countries is about 69% of ASEAN exports.

Table 10. Number of Korean Financial Institutions in the Asia Region

Country	Bank	Securities	Asset Management	Life Insurance	Non-life Insurance	Specialized Loan	Total
CN	16	14	10	4	9	6	59
VN	19	9	10	4	6	6	54
ID	8	6	-	1	4	4	30
MM	12	-	-	-	1	9	22
JP	9	2	-	4	2	1	18
SG	4	4	6	-	3	1	18
PH	7	-	-	-	-	-	7

Note. Accurate as of June 2019.

Source: Financial Supervisory Service of Korea (2019).

Based on our selection criteria for arranging CBCA with regional countries, we now take the above data and categorize them into 3 tier systems. The country with the lowest score is likely to be the most favorable country to arrange CBCA with Korea (Table 11).

Table 11. Tiered Classification of Countries Depending on CBCA Selection Criteria

	Tier 1			Tier 2			Tier 3		
	CN	JP	SG	VN	ID	MM	MY	TH	PH
FDI Inflow	3	1	2	9	5	4	6	8	7
FDI Outflow	1	5	3	2	4	7	6	9	8
Trade Volume	1	2	4	3	6	9	5	7	8
# of Fin. Inst	1	5	6	2	3	4	9	8	7
Total	6	13	15	16	18	24	26	32	30

Note. Lower total score implies higher selectivity for CBCA.

Arranging CBCA with China and Japan is prioritized when considering the size of economic trade and the level of market development. However, it is practical to pursue agreements with emerging countries such as Singapore, Vietnam, or Indonesia, from increasing collateral utilization in terms of financial integrity.

There are limited bilateral collateral arrangements among central banks in the region because trade patterns and market preparedness provide only a few beneficial pairs. Instead, it is more realistic to pursue a multilateral version with a tiered approach since the overall architecture would allow incentives for all member countries to get together for a better market position. Instead of seeking the proliferation of bilateral arrangements, which are also welcome development, forward guidance for future market positions need to be shared equally among all member countries.

5.2 CBCS+CBCA+Collateral Pool=A New Collateral Machinery

With the backdrop of cash collateral, central banks' currency swaps (CBCS) are contractual setups that deal with commercial banks' foreign liquidity risk (Destais, 2014). CBCS is a US measure to protect from global financial uncertainty, but it is contractual with significant costs involved. In fact, central bank swap arrangements worldwide have become permanent liquidity services worldwide, adding to already severe overbanking and currency mismatches. Banks expect central banks to provide them with FX under stress. On the other hand, lenders to foreign banks expect repayment with funds borrowed from the central bank. Therefore, private participants need to overcome currency mismatches through market operations, e.g., repo collateral transactions.

The ASEAN opens doors to China, Thailand, and Indonesia for an alternative to greenback. We need to uphold the rules-based multilateral trading system and open regionalism. Since Chiang Mai's backstop is secured, normal operations need to utilize cross-border collateral transactions. Cross-border collateral arrangements by central banks can boost market-based support in addition to emergency swap arrangements (Choi, 2019a).

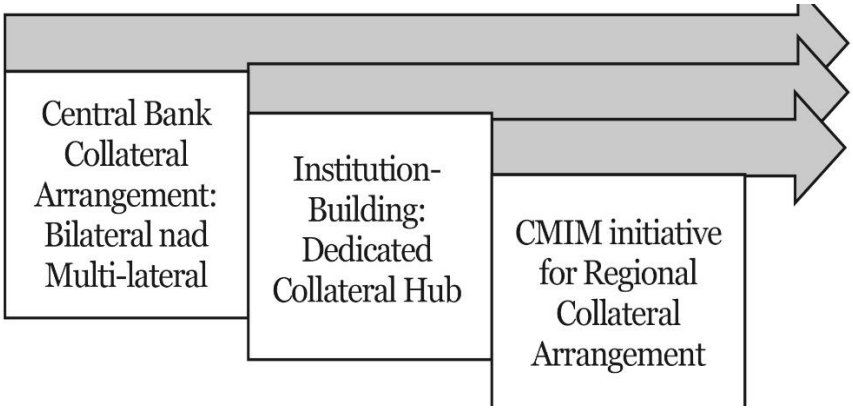

Figure 24. Roadmap for the Central Bank Collateral Arrangement

Source: Author's own.

Asia needs preparation and investment to provide grounds for market developments. Prerequisites for bond market development in Asia can be summarized as follows: The main issue regarding capital market development is constructing an environment suitable for market growth and maintaining financial stability. In the context of preemptive and proactive system-building efforts to integrate market development, including market infrastructures, streamlining regulatory guidelines, etc., are crucial. Regional economies employ the bank-dominant system, in line with the well-established bureaucratic system; in other words, capital markets were not well developed as FX stability, and secure FX liquidity is regarded as crucial for regional policy plan. In reality, shock-absorption through market functioning is absent in most emerging economies, hindering market development. There must be prioritized needs that must be satisfied in sequence before a favorable effect finally occurs. Pivoting towards a market-oriented system requires active participation from the private sector, which is rather odd in the region due to its lack of available resources for initiatives and passive mantra among constituents.

Asia is entering a new age of uncertainty with a long-term goal for bond market development. Still, it is not well-prepared with collateral as an ingredient for securing a trust base in creating a new ecosystem for the ABMI. The imbalance between the huge demand for safe assets in Asia and the limited safe asset supply mainly by the US has resulted in global imbalance, shadow banking, capital flow uphill, etc. (Caballero et al., 2017). This situation is partly Asia's adherence to US assets for building its asset

foundation without capital market development. This structural imbalance should be secured before improving infrastructures and engage in market arrangements of various types.

The need for expanded and more inclusive collateral pool stems from the fact that the overall financial system since the Bretton Woods has evolved into the Eurodollar system and shadow banking. Since so much is riding on dollar funding and the repo transactions have taken root as core liquidity facilities in the core, the overall system depends on a core repo facility that experiences frequent imbalance between collateral and cash reserves. The continued expansion of the dollar has become unavoidable to prevent a sharp increase in interest rate. Yet, this continued expansion would weaken the value of the dollar beyond a certain threshold. It is somewhat awkward to create "global liquidity" based on such a narrowly defined base money.

Given that outside dollar facilities have become essential to generate liquidity for the past two decades, it is necessary to utilize Asian assets so that no excess demand for dollar exerts undue pressure on the existing global financial system. The only way to restore equilibrium in the integrated global financial market is to expand the collateral pool to include Asian assets. If not, the world would continue to demand dollar and dollar-denominated assets, which would put lots of pressure on liquidity generating machinery of the repo market via forcing the FED to provide cash to close the demand gap. If Asian assets are included as collateral for liquidity in repo transactions, things will become less acute in financial markets, and lingering uncertainties would subside.

5.3 Pooling Eligible Collaterals for a Tiered Collateral Pool

Banks can pledge eligible collateral in a collateral pool instead of enlisting multiple accounts for each CSDs. Pooling is efficient, streamlining service coverage through integration between global collateral management, settlement, and asset servicing. It also simplifies the administration and operational processing of securities. Also, it improves the efficient use of assets as collateral, which would be trapped in a particular jurisdiction otherwise. However, there are some challenges for pooling. Developing standard requirements for eligible collaterals, such as custody segregation requirements and settlement disciplines, are hard. Developing interoperability between different collateral pools and dealing with complex legal contracts (infrastructure and custodians) are challenges that we need to tackle for efficient pooling.

Europe's OTC marketplace platform for secured funding and financing, called the Eurex Repo system, offers a general collateral pool in transactions. An available collateral pool (GC pool) refers to a set or basket of securities tradable in repos. Securities in the GC pool are interchangeable for one another, without significantly changing the repo rate. The repo transaction's potential cash lender is indifferent to the securities in a GC basket he will receive. The following figure shows the General Collateral Financing (GCF) trading system of Europe.

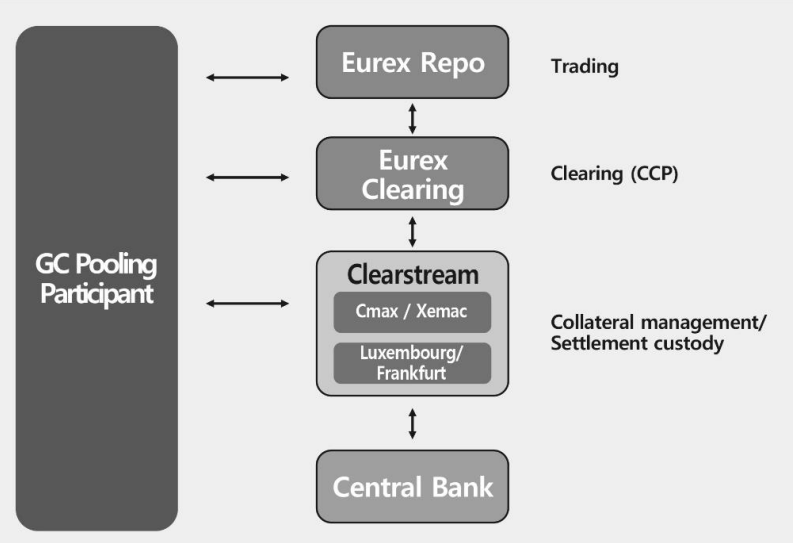

Figure 25. European GC (General Collateral) Pooling Market: Eurex Repo

Source: Author's own.

There are 5 GC Pooling Baskets in the Eurex repo, but we focus on the basket that consists of ECB's eligible securities (Table 12).

Table 12. GC Pooling Baskets Contained with ECB Eligible Collateral

Basket Type	Assets	Credit Requirement	Required Location of Bond Issuance
ECB Basket	· Central Banks · Central Govt · Regional / Locational Govt · Supranational Traditional and Jumbo Pfandbriefe style instruments of: · Credit Institutions · Agency Credit Institutions *Current basket covers	· Minimum A-(S&P)/A3 (Moody/s) · For covered bonds: minimum AA-(S&P) and fulfill the LCR HQLA requirements	In the European Economic Area (EEA) or one of the non-EEA G10 countries (i.e., US, Canada, Japan, or Switzerland) *Current basket contains bonds issued from 9countries*

	3,000 ECB eligible securities*		
ECB EXTended Basket	Instruments of ECB Basket in addition to instruments of: · Credit Institutions · Agency Credit Institutions · Agency-Non Credit Institutions · Corporate and other Issuers *Current basket covers 14,000 ECB eligible securities*	· Minimum BBB-(S&P)/Baa3 (Moody/s)	In the European Economic Area (EEA) or one of the non-EEA G10 countries (i.e., US, Canada, Japan, or Switzerland) *Current basket contains bonds issued from 13 countries*

Note. Accurate as of Sep 23, 2020.

Source: Eurex Repo (2020).

Benchmarking the case of Europe, the Korea Securities Depository (KSD) implemented the GCF repo system in 2017 to reduce the over-reliance of overnight repos and stimulate term repos instead. Under this new system, the repo's maturity extended to at least two days, whereas it used to be fixed at one day before implementing the plan. The general collateral pool of KSD includes monetary stabilization bonds, government bonds, government-guaranteed bonds, and outstanding bank bonds (BoK, 2008). Figure 26 below is a suggestion to introduce an Asian regional GC trading system names "Arex", which is based on the existing Eurex Repo. It is expected that this new system will play a vital role as a regional custodian service provider.

Looking at the Eurex GC pool case, ASEAN+3 countries should collaborate on implementing a unified collateral pool containing central banks' eligible assets that are tiered against its credit ratings (e.g., baskets that range from AAA, A-, etc.). Such a collateral pool would make it available for highly liquid bonds of various regional countries to be freely traded across the border.

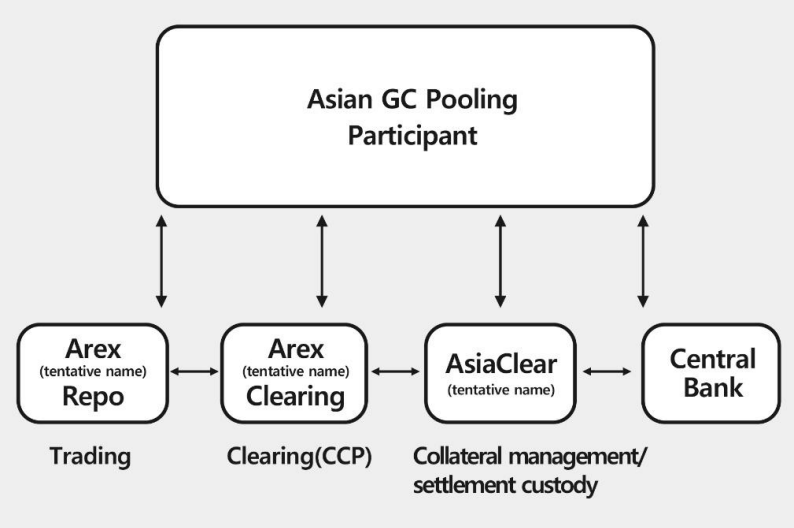

Figure 26. Suggestion of Asian GCF (General Collateral Financing) Trading System

Source: Author's own.

We can also prepare collateral indices that consist of basket of securities to improve collateral fluidity across the world. Along with pooling eligible collaterals, implementing an index on a pool of collateral such as the ETF is another possible way for encouraging the use of cross-border collateral. There is an index iSTOXX Europe Collateral, representing a diversified basket of securities that meet broadly accepted criteria for general collateral (iSTOXX Index Guide, 2020). The universe of iSTOXX Europe Collateral is defined as the STOXX Europe 600 Index composition, and the indices are weighted according to free-float market capitalization subject to a cap. Security selection is based on the calculation of the median free-float market capitalization of all the securities in the universe, and it is used to separate the securities into the respective large-cap (>=median) and mid-cap (<median) groups. All securities contained in the universe are ranked in terms of their three months daily trading volume average.

5.4 Extra Use of CBCA to Boost Intra-trade

Benefits of regional cross-border collateral utilization can be captured by tying it to Korea's New Southern Policy (NSP), a diplomatic initiative focused on reinforcing Korea's ties with Southeast Asia and Indonesia. Besides expanding trade cooperation, it is also essential to support effective financing methods by utilizing high-quality local currency bonds as collateral. We suggest the following funding models that provide guidelines for promoting CBCA between Korea and Southeast Asia (Figure 27, 28).

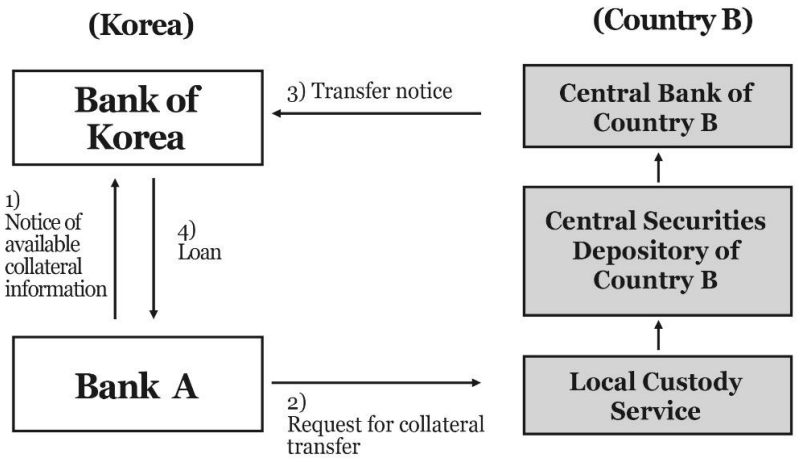

Figure 27. CBCA Model: CCBM Method

Source: Author's own.

Figure 27 suggests a method for a domestic bank to acquire loans from the local central bank by collateralizing foreign securities by benchmarking the Corresponding Central Banking Model (CCBM). To illustrate a possible scenario, we refer to Korea and Indonesia, where Bank A in Korea plans to acquire a loan from the Bank of Korea (BoK) by collateralizing Indonesian securities. To do so, Bank A files a notice to BoK that specifies information on the collateral. Next, Bank A requests the Indonesian local custody service to transfer stored asset (collateral) to the central securities depository of Indonesia (KSEI). The KSEI then transfers received collateral to the central bank of Indonesia. Confirming the transfer, the BoK provides funds to Bank A. In case of the central correspondent banking model (CCBM), a version of CBCA, the central bank that accepts foreign denominated bonds with FX risk as collateral can apply appropriate "haircut", depending on the FX volatility. The internal desk at central bank can be coordinated via a special arrangement or a dedicated institution or it can be relegated to a third-party risk transformation body. All market risks can be evaluated and assessed over appropriate time interval that are agreed upon. We also can expect ICSD-CSD linkage to expedite the cross-border collateral transactions for central banks.

Regardless of the growth paradigm, stable funding, especially FX funding channel is critical for financial stability in the region where vehicle currency countries, except for Japan, do not exist. Increased dependency on foreign branches for dollar funding also implies increased vulnerability against external shocks. Therefore, government bonds provide essential background for stable funding if its cross-border pledgeability remains effective. Given the initial conditions of limited pledgeability, confidence-building exercise needs to start from the collaboration among central banks in the region. If Korea accepts Indonesian-denominated currency -based situation, collaboration that involves CSDs is important to make it happen. Central bank-CSD connections are very important background for securitized collateral movement in Asia.

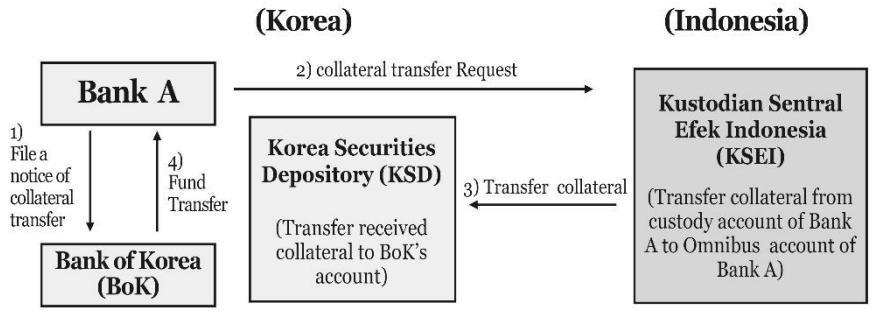

Figure 28. CBCA: Links Method

Source: Author's own.

Figure 28 is another possible suggestion for the operation method of cross-border collateral transactions. Bank A files a notice to BoK that specifies information on the collateral. Next, Bank A requests the KSEI to transfer the collateral from the custodial account to the Omnibus account of Bank A. Korea Securities Depository (KSD) then transfers the received collateral to the BoK account. Confirming the transfer, the BoK provides funds to Bank A.

As the importance of local financing grows, utilizing sovereign bonds of the region in trade partner countries would help secure liquidity in local currency. If regional central banks successfully agree on eligible collaterals' criteria and communicate them to the market, it would significantly help foster a new market. Above all, it would facilitate local financing for Korean businesses operating overseas markets as local financial firms deal in cross-border collateral services and provide liquidity, ultimately reducing reliance on US dollar funding.

6. Summary and Conclusion

During the pandemic period, adequate provision of market liquidity has proven critically important for economies to heal and recover toward a sustainable equilibrium. Given the importance of FX liquidity for emerging economies, however, it is time to recognize the underlying constraints that hinder efficient provision of market liquidity. In reality, most efforts of central banks involve extra efforts for official liquidity arrangements, e.g., central bank swap arrangement or special provision of liquidity. This paper highlights the potential role of central banks in the region in strengthening the market-based provision of liquidity via cross-border collateral transactions. When most official liquidity provision arrangements are exhausted, e.g., FIMA (Foreign and International Monetary Authorities) repo facility, the underlying capacity to make better use of its own assets for cross-border transactions still remains important. The possibility of securing extra market liquidity without going through FX swaps and other exchange operations can be enhanced if central banks accept member countries' collateral.

This paper is the first attempt to focus on the possibility that a more open central bank collateral framework to seek catalysts' role in mobilizing collateral resources. Given the long tradition and massive market infrastructures in Euro and the US, it is important to compare various features of advanced economies with the lack of those in emerging economies. The results reflect the long-held tradition of export-oriented growth paradigm that tends to result in financial repression. As the ultimate authority of collateral resources worldwide, a more open and collaborative collateral framework of central banks in the region would provide favorable conditions for market players to make better use of cross-border collateral. The extra venue for ensuring market liquidity would provide the key pillar for financial stability in the region.

Building on the review of the constraints on collateral pledgeability (Choi, 2020), this paper documents practical ways to enhance the financial stability via enhancing cross-border collateral utilization. We find that central banks in the region need to get involved in broadening the range of collateral eligibility criteria and the Cross-Border Collateral Arrangement (CBCA) with a commonly accessible collateral pool would provide groundwork for jumpstarting important market functions going forward. In other words, it is critical to develop a relevant central bank collateral framework to boost market demand for bonds in the region and encourage cross-border collateral activities by investing in relevant market infrastructure.

Based on initial studies on the fragmented and disparate collateral framework in the region, we seek to develop concrete plans with a reasonable chance of success. Specifically, the bilateral extension or multilateral engagement by central banks on collateral use relies on wider political consensus since typical central bank mandates interfere with formulating the inclusive framework for the region. At least, the rationale for financial cooperation in the region would provide rationale for stretching the traditional central bank mantra to go beyond national borders. In the context of creating bigger arena for uninterrupted financial transactions, the rationale for inclusive cross-border collateral framework remains very strong for good reasons, including stability, liquidity, and better risk management that would also allow better investment opportunities in the region.

This paper proposes ways to develop the common collateral framework for the ASEAN+3 region effectively. We explain the current snapshot of global Central Banks (CBs)' collateral framework and explore such frameworks' features and constraints. Overall, the virtually non-existent Asian collateral framework in its current form cannot help deliver cross-border transactions on collateral because of its heavy segmentation and differences in economic backgrounds among member countries. The current endogenous policy choices seem best from an individual country perspective, yet it would lead to even greater vulnerability in the region. The anomaly of policy efforts for stabilization in emerging economies stems from the repercussions from relying excessively on the Eurodollar system, which would set aside the use of local collateral resources. At the same time, its reliance on the fast-evolving external system with significant vulnerability also becomes more significant over time. The review is

followed by ways to overcome current constraints to allow more active cross-border activities in the region. Given the changes in Eurodollar system that hinges on repo market, Asian economies need to enhance capacities for market-based stabilization. Specifically, the cross-border collateral arrangement by central banks can provide needed impetus to overcome initial constraints and accelerate much needed market infrastructure investments in the region.

The first move to boost market capacity needs to start from collateral utilization. Therefore, central banks in the region need to strengthen their role to strengthen the usage of collateral, especially in a multilateral framework. Unlike central banks in other regions, Asia's central banks' collateral framework remains largely outdated and fragmented. Due to the lack of standard collateral eligibility criteria and low recognition among market participants about the asset pledgeability, cross-border transactions have also remained subdued. Such mantra has been suppressing collateral utilization for market-based funding and better risk management. With the backdrop of strong market intervention and support for exchange rate stability, FX management has been confined to the selected few. This constraint for exchange rate stability can be relaxed when the extra venue for market liquidity is secured via cross-border collateral movement. Central banks must undertake the multilateralization of bilateral collateral arrangements in the region via formulating common eligibility criteria for collateral, allowing an eligible collateral pool for cross-border transactions, and establishing cross-border market infrastructures for clearing and settlement.

The paper proposes a region-wide collateral framework with eligibility criteria such that the ASEAN+3 institution can maintain some collateral pool. Central banks can support the use of government bonds as collateral for cross-border transactions for liquidity in the form of local currencies. This collateral-based funding choices improve local financing in the context of intra-regional trade without going through dollar conversion with significant transaction costs. It can also strengthen the demand for eligible assets produced in the secondary market region to make its payment platform's frictionless functioning possible. Ultimately, it is essential that the eligibility criteria and prime asset pools can be identified and utilized by market participants to start repo and other transactions using collateral. The efforts would make Asian assets less encumbered and qualify Asian assets to be more eligible for truly cross-border transactions.

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