Current Criteria for Eligible Collaterals and Tasks to Recognize Regional Assets as Eligible Collaterals Including ASEAN+3 Sovereign Bonds

September 2016

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Ⅰ. Current Trend

Little efforts are underway in euro area and the US to recognize and utilize new eligible collaterals, where regional financial stability continues to be a priority (Levels and Capel 2012, Anderson and Joeveer 2014, Baranova, Liu and Noss 2016). As US and euro-centric systems continue to play a dominant role in global financial stability, the Asian region is hardly given a chance or means to make contributions.

In this study, we argue that a fragmented approach to enhance soundness and stability of financial systems is hardly effective, and discuss how to improve such situation.

The key issue is to resolve scarcity of eligible collaterals amid an explosive growth of collateral demand in the post-crisis period.

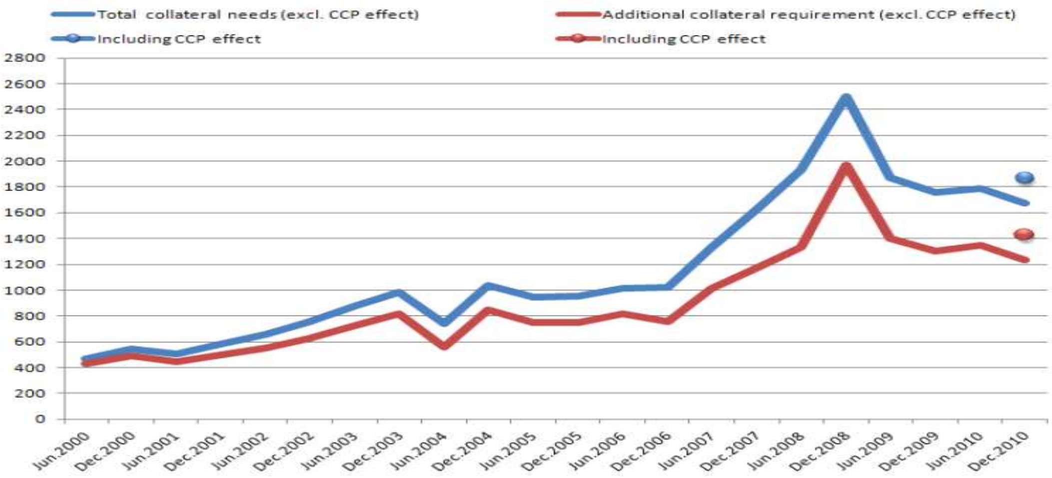
<Table Ⅰ-1> Basel Ⅲ Standards on High-quality and Liquid Assets

Theoretical Properties of High-quality and Liquid Assets	
Fundamental	**Market**
Low credit and market risk	Active and sizable market
Value should be easy to calculate	Low concentration of buyers and sellers
Low correlation with risky assets	Asset should be attractive in times of distress
Asset must be listed on developed exchange	Preferably eligible with central bank for monetary operations
Practical Classification of High-quality and Liquid Assets	
Level 1 assets: 0% haircut	**Level 2 assets: 15% haircut**
Cash	
Central bank reserves	
Marketable securities issued or guaranteed by sovereigns, other PSEs and central banks - If 0% risk weight under Basel Ⅱ (AAA to AA-)	Marketable securities issued or guaranteed by sovereigns, other PSEs and central banks. - If 20% risk weight under Basel Ⅱ (A+to A-) - Max 10% increased haircut in times of stress
Non-0% risk weighted sovereigns or central bank debt securities	Corporate bonds - Issued by non-financial institutions
- Domestic currency: currency must match country in which liquidity risk is taken, or bank's home currency	- Minimum rating AA- or PD corresponding to AA- or higher Covered bonds
- Foreign currency: to the extent that it matches FX needs	- Minimum rating AA- or PD corresponding to AA- or higher

Source: Doornbos, N. (2012), "Regulatory developments and the impact on collateral and central bank liquidity", Macedonian Financial Sector Conference on Payments and Securities Settlement Systems, Ohrid, June.

<Fig Ⅰ-1> Collateral Demand in OTC Derivatives Market

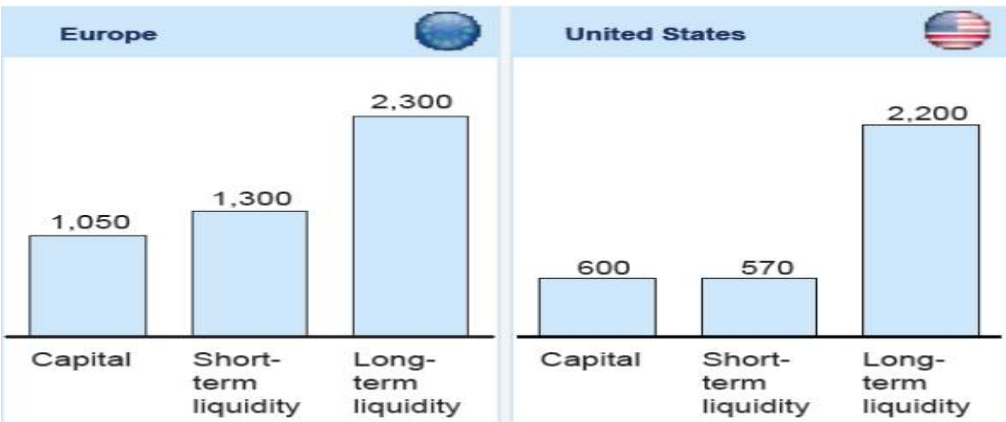
(Unit: tril. USD)



Sources: BIS statistics, ISDA margin surveys, Singh (2010), BIS (2009)

<Fig Ⅰ-2> Capital and Liquidity Shortage in 2019 (McKinsey)

(Unit: bil. USD)



Sources: Annual reports, bank findings, Global Insight, McKinsey Global Banking Pools, McKinsey analysis

We emphasize the role of Asia in strengthening global financial stability, and highlight the need to establish regional criteria for high-quality, eligible collaterals, backed by long-term policy support.

Effective use of collaterals and asset encumbrance is a prerequisite to a smooth functioning financial system (Committee on the Global Financial System (CGFS)).

<Table Ⅰ-2> Summary of Marketable Collateral Assets (Global-level Estimates)

<table>
<tr><td rowspan="3">1) Overall Collateral</td><td colspan="3">- "Overall collateral" indicates a total volume of high-quality assets worldwide that can be posted as collateral
- Estimated to be 41 trillion euro</td></tr>
<tr><td colspan="3">Sub-set of overall collateral under a given system</td></tr>
<tr><td>(i) Central bank system: 3~36 trillion euro (Eurosystem: 14 trillion euro. Marketable eligible asset);</td><td>(ii) Regulatory framework: 28~37 trillion euro (28 trillion euro is equivalent to EMIR; 37 trillion euro is equivalent to HQLA;</td><td>(iii) CCP system: 2~14 trillion euro. Marketable assets eligible as underlying assets of CCP-cleared repos; initial margin of 5~28 trillion euro</td></tr>
<tr><td>2) Available Collateral</td><td colspan="3">- "Available collateral" indicates a total volume of assets that can be easily turned to collaterals in the market
- Estimated to be 31 trillion euro
* 25% of overall collateral is unavailable due to (I) CSDs/ custodians/ held in non-actively managed portfolios</td></tr>
<tr><td rowspan="2">3) Usable collateral</td><td colspan="3">- "Usable collateral" indicates a total volume of assets that is immediately usable.
- Estimated to be 29 trillion euro</td></tr>
<tr><td colspan="3">* 6% of available collateral is hard to use due to restrictions of market infrastructure
(i) (I) An amount of unusable collateral due to inefficiency of CSDs' internal linkage: 1~1.5 trillion euro;
(ii) (I) Obligatory deposit at CSDs: approx. 0.5 trillion euro</td></tr>
</table>

Sources: IMF, 2012, CCFS 2011/2013, Bank of Canada, 2013

Collateral transformation is mostly done through securities lending, asset swaps, and repos. The current collateral scarcity and over-reliance on the legacy system puts a heavy burden on emerging markets where FX liquidity is directly tied to financial stability, and also increases stabilization costs.

<Table Ⅰ-3> High-quality Asian Sovereign Bonds (end-2015)

(Unit: bil. USD)

Credit Rating (S&P)	Country	Amount outstanding
AAA	Singapore	75
AA+	Singapore	75
AA	Singapore, Korea	583
AA-	Singapore, Korea, China	2,976
A+	Singapore, Korea, China, Japan	11,325
A	Singapore, Korea, China, Japan	11,325
A-	Singapore, Korea, China, Japan, Malaysia	11,468
BBB+	Singapore, Korea, China, Japan, Malaysia, Thailand	11,576
BBB	Singapore, Korea, China, Japan, Malaysia, Thailand, Philippines	11,687
BBB-	Singapore, Korea, China, Japan, Malaysia, Thailand, Philippines	11,687
BB+	Singapore, Korea, China, Japan, Malaysia, Thailand, Philippines, Indonesia	11,843
Credit Rating (Moody'S)	**Country**	**Amount outstanding**
Aaa	Singapore	75
Aa1	Singapore	75
Aa2	Singapore, Korea	583
Aa3	Singapore, Korea, China	2,976
A1	Singapore, Korea, China, Japan	11,325
A2	Singapore, Korea, China, Japan	11,325
A3	Singapore, Korea, China, Japan, Malaysia	11,468
Baa1	Singapore, Korea, China, Japan, Malaysia, Thailand	11,576
Baa2	Singapore, Korea, China, Japan, Malaysia, Thailand, Philippines	11,687
Baa3	Singapore, Korea, China, Japan, Malaysia, Thailand, Philippines, Indonesia	11,843
Ba1	Singapore, Korea, China, Japan, Malaysia, Thailand, Philippines, Indonesia	11,843
Credit Rating (Fitch)	**Country**	**Amount outstanding**
AAA	Singapore	75
AA+	Singapore	75
AA	Singapore	75
AA-	Singapore, Korea	583
A+	Singapore, Korea, China	2,976
A	Singapore, Korea, China, Japan	11,325
A-	Singapore, Korea, China, Japan, Malaysia	11,468
BBB+	Singapore, Korea, China, Japan, Malaysia, Thailand	11,576
BBB	Singapore, Korea, China, Japan, Malaysia, Thailand	11,576
BBB-	Singapore, Korea, China, Japan, Malaysia, Thailand, Philippines, Indonesia	11,843
BB+	Singapore, Korea, China, Japan, Malaysia, Thailand, Philippines, Indonesia	11,843

Sources: BIS, BIS Statistics Explorer

Note: Includes central and local governments, but not financial/non-financial public corporations

Regarding the issue of insufficient infrastructure for utilizing collaterals, it is important to acknowledge contradictions of the currently fragmented collateral system, and redouble efforts to overcome them at a regional level.

Broadly speaking, the current criteria for eligible collaterals are mostly decided by central banks, and they are overly restrictive compared to other similar criteria.

<Table Ⅰ-4> Marketable Assets Eligible for Central Bank Collaterals (2013 Q3)

(Unit: bil. EUR, 2013 Q3)

Collateral	Eurosystem[1)]	UK	Sweden	Switzerland	US (temporary open market operations)	Japan
Marketable assets **Public bonds by issuer:**						
Central government						
Central bank	6,898.8	35,986.0	22,819.4	6,086.0	10,643.0	7,795.0
Public agencies other than central government						
Credit institutions (covered bond)						
Credit institutions (excluding covered bond)	1,560.6			427		

Sources: Respective central banks, BIS Debt securities statistics; European Covered Bond Council: ECBC Fact Book 2013; Securities Industry and Financial Markets Association (SIFMA).

Notes: Marketable assets, such as certain government bonds, could be eligible at multiple central banks, hence are included in the figures in multiple columns. 1) ECB website (http://www.ecb.europa.eu/paym/coll/assets/html/index.en.html)

<Table Ⅰ-5> Marketable Assets Eligible as Underlying Collateral of CCP-cleared Repos

(Unit: bil. EUR, end-2012)

Collateral	LCH. Clarnet SA		Eurex Clearing[1)]		LCH. Clearnet Ltd	
	€GC Plus basket No.1	€GC Plus basket No.2	ECB basket	ECB EXT basket	Repo Clear € GC	Repo Clear UK GC
Marketable asset **Public bonds by issuer:**						
Central government	3,913.10	6,268.48	6,222.8	9,003.6	3,584.5	1,723.5
Central bank						
Public agencies other than central government						
Credit institutions (covered bond)	1,700.9		870.3	921.2		
Credit institutions (excluding covered bond)			77.3	3,141.5		
Financial corporations other than credit institutions			65.6	1,208.7		
ABS						
Total	5,614.00	6,268.48	7,236.00	14,275.	3,584.5	1,723.5

Source: Respective websites of CCPs

Note: 1) Market value as of March 2014

In the euro area, the current collateral scarcity may be temporarily resolved by enhancing regional repo markets and infrastructure, and strengthening incentives of market practitioners; however, these are not likely to address fundamental problems in repo market.

As it is, collateral demand would inevitably grow amid strengthening liquidity regulations, and even more so if demand from derivatives transactions is also considered. As the scarcity problem can not be effectively addressed within the euro area, Asia could provide a viable alternative to enhance the global financial system. Unfortunately, global-level governance is quite weak to tackle this issue collectively, and a more practical and feasible approach would be revising global criteria for eligible collaterals to become more reasonable, and broaden pool of eligible collaterals accordingly.

Ⅱ. Problems of Criteria for Eligible Collaterals

The current criteria for eligible collaterals has a structural problem. They need to modify according to changing market conditions, and yet they are tightly bound by old customs, without reflecting a shift in foundations that create global values; thus, failing to shape a solid framework for financial stability.

The current euro area or US-centric criteria for eligible collaterals is mostly set from a standpoint of central banks, and even institutions such as ICMA do not deviate far from this.

<Table Ⅱ-1> Major Central Banks' Collateral Criteria

	Type 1	Type 2	Type 3	Type 4	Type 5
ECB	• Central government deb instruments • Debt instruments issued by NCBs	• Local and regional government debt instruments; jumbo covered bonds • Agency debt instruments • Supranational debt instruments	• Traditional covered bank bonds; debt instruments issued by non-financial corporations	• Credit institution debt instruments (unsecured) • Debt instruments issued by financial corporations other than credit institutions (unsecured)	• ABS
BoE	• Sovereign debts of 22 countries including the US, UK, Germany, Japan	• Bonds issued by G10 government agencies explicitly guaranteed by national governments	• Covered bonds with underlying assets of UK or EEA public sector debt, social housing loans or residential	• Credit institution debt instruments (unsecured) • Debt instruments issued by	• UK, US and EEA ABS backed by credit cards

		• Conventional debt issued by Freddie Mac and Fannie Mae • UK government guaranteed bonds	mortgages • UK and EEA RMBS • UK, US and EEA securitized portfolios of senior secured or on-balance sheet, corporate loans or SME loans	financial corporations other than credit institutions (unsecured)	
Fed	• US Treasuries & fully guaranteed Agencies • Foreign government, foreign government guaranteed, and Brady Bonds	• Government sponsored enterprises • Foreign government agencies • Supranationals • German jumbo Pfandbriefe • Municipal bonds • Agency-backed mortgages	• Corporate bonds • Covered bonds • AAA rated CMBS	• Certificate of deposit, bankers' acceptances, commercial paper, corporate bonds	• ABS • AAA-rated collateralized debt obligations • Trust preferred securities
Sveriges Bank	• Securities issued by central governments • Securities issued by central banks • Other claims on central banks	• Securities issued by international organizations • Securities guaranteed by central governments • Securities issued/guaranteed by local governments or so-called agencies	• Covered bonds	• Other eligible securities	• ABS
BoJ	• Government bonds (excluding floating-rate bonds, inflation-indexed bonds) • STRIPS • Foreign government bonds	• Government-guaranteed bonds • Government-guaranteed dematerialized commercial paper • Municipal bonds • FILP agency bonds	• Corporate bonds • Dematerialized commercial paper issued by domestic corporations or foreign corporations with guarantees • Bills drawn by companies	• Bonds issued by real estate investment corporations • Dematerialized commercial paper issued by real estate investment corporations • International financial institution bonds • Bills drawn by real estate investment corporations	• ABS
SNB	No distinction is made by asset class				• ABS

Source: "Collateral eligibility and availability" (ECB, Jul 2014)

<Table Ⅱ-2> Marketable Assets Eligible for CCPs Initial Margin

(Unit: bil. EUR, 2013 Q2)

	LCH Clearnet Ltd	CME Clearing Europe	Eurex Clearing	LCH. Clearnet SA	ICE Clear Europe	CC&G	MEFF	NASDAQ OMX Nordic
Eligible collateral (government bond)	27,799.20	15,690.6	28,287.8	18,890.5	20,107.7	3,296.0	17,117.2	5,728.4

Source: “Collateral eligibility and availability” (ECB, Jul 2014)

<Table Ⅱ-3> Amount of Eligible Collaterals by Framework

(Unit: tril. EUR)

Framework	**Min**	**Max**	**Estimate**
Central bank eligible assets	8	36	
Eurosystem			13(+4*)
Regulatory requirements			
CCP (EMIR)			28
Banks (BIII LCR)			37
CCP			
Collateral requirement for repos	3	7	
Initial margin	5	28	

Note: * indicates non-marketable asset
Source: “Collateral eligibility and availability” (ECB, Jul 2014)

Specifically, problems of the current criteria for eligible collaterals are that they 1) are overly tied to jurisdictions, 2) do not fully reflect market assessment (e.g. growing discrepancy with credit rating agencies’ assessment), and 3) fail to make sufficient contributions to global financial stability in light of regulatory changes and systemic risk management.

1. Growing Volatility in Global Financial Market

The rigid collateral criteria has inflicted various problems. First, eligible collaterals are mostly restricted to certain regions that the innate value of collateral is largely unrecognized. Capital flows have grown global in years, but collateral criteria have been heavily restricted geographically; as a result, acceptance and utilization of collaterals are bound by the old system.

A discrepancy between global rating agencies’ ratings and criteria for eligible collaterals is another problem. The Eurosystem acknowledges BBB- or higher-rated bonds of EEA and G10 countries as eligible collateral. Among ASEAN+3 countries, sovereign bonds of Malaysia, Singapore, Korea, and China are rated higher than those of Italy and Spain, and yet they are not acknowledged as eligible collaterals in the US and the Eurosystem.

<Table Ⅱ-4> Credit Rating of ASEAN+3 and Advanced Economies' Sovereign Bonds and Collateral Eligibility

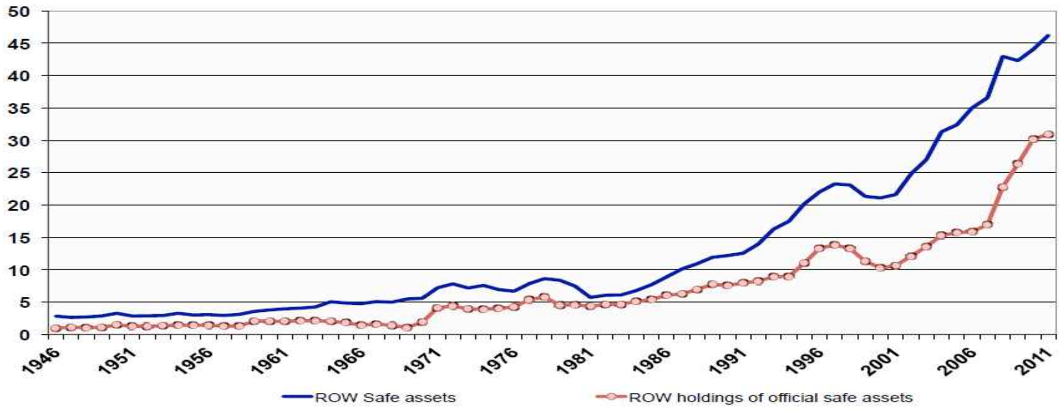
	Credit rating			Collateral eligibility (Y/N)	
ASEAN+3	**S&P**	**Moody's**	**Fitch**	**Euro system**	**US Fed**
Philippines	BBB	Baa2	BBB-	N	N
Malaysia	A-	A3	A-	N	N
Singapore	AAA	Aaa	AAA	N	N
Indonesia	BB+	Baa3	BBB-	N	N
Thailand	BBB+	Baa1	BBB+	N	N
Laos	-	-	-	N	N
Myanmar		-	-	N	N
Cambodia	N/A	B2		N	N
Vietnam	BB-	B1	BB-	N	N
Brunei	-	-	-	N	N
Korea	AA	Aa2	AA-	N	N
China	AA-	Aa3	A+	N	N
Japan	A+	A1	A	Y	Y
Advanced economies					
US	AA+	Aaa	AAA	Y	Y
UK	AA	Aa1	AA	Y	Y
Germany	AAA	Aaa	AAA	Y	Y
France	AA	Aa2	AA	Y	Y
Italy	BBB-	Baa2	BBB+	Y	Y
Spain	BBB+	Baa2	BBB+	Y	Y

Source: Trading Economics

Asian countries have hoarded safe assets for a long time, which make them vulnerable to negative spillover effects, and make little contributions to global financial stability.

<Fig Ⅱ-1> US Asset Holding in Non-US Countries

(Unit: % of US GDP)



Source: Gourinchas, P. and Jeanne O. (2012), "Global safe assets", 11th BIS Annual Conference, June.

<Table Ⅱ-5> Central Bank Holding of US Treasury Securities in Asia

(Unit: bil. USD)

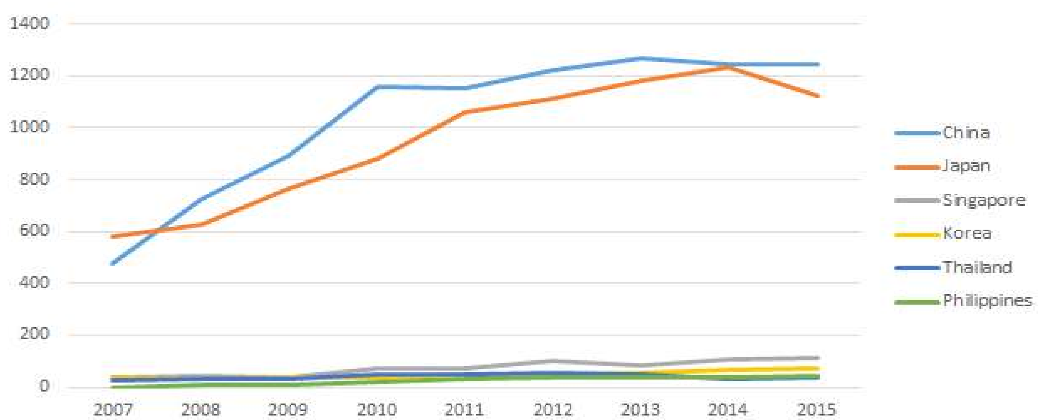
	2007	2008	2009	2010	2011	2012	2013	2014	2015
China	477.6	727.4	894.8	1160.1	1151.9	1220.4	1270.1	1244.3	1246.1
Japan	581.2	626.0	765.7	882.3	1058.1	1111.2	1182.5	1230.9	1122.4
Singapore	39.8	40.9	39.2	72.9	75.1	99.3	86.2	110.0	110.3
Korea	39.2	31.3	40.3	36.2	47.3	47.6	54.0	68.3	74.6
Thailand	27.4	32.4	33.3	52.0	51.6	53.6	51.7	33.2	39.1
Philippines	-	11.7	11.7	20.1	32.7	36.8	40.2	40.6	43.0

Sources: U.S. Department of the Treasury, Major Foreign Holders of Treasury Securities, Aug 15, 2016

Note: Hong Kong, Macao, Taiwan are not included in China

<Fig Ⅱ-2> Share of Asian Central Banks in US Treasury Securities Holding

(Unit: bil. USD)



Sources: U.S. Department of the Treasury, Major Foreign Holders of Treasury Securities, Aug 15, 2016

Note: Hong Kong, Macao, Taiwan are not included in China

Other than geographical location, collateral rating, issuer type, and collateral credit rating play a determining role in identifying high-quality collaterals. Currently, EurexRepo is the most active platform for CCP cleared transactions, and the platform reflects market participants' perceptions over asset quality.

<Table Ⅱ-6> Overview of New Global Margin Standards for Non-centrally Cleared Derivatives (BCBS-IOSCO)

Standardized Haircuts Schedule		
Asset Class	**Residual Maturity (year)**	**Haircut (% of market value)**
• Cash in same currency	n.a	0
• High-credit government and central bank securities	<1 1~5 >5	0.5 2 4
• High-credit corporate bonds	<1 1~5 >5	1 4 8
• Securities included in major indices	n.a	15
	n.a	15
• Haircut for additional assets (Derivatives requirements vary by collateral asset)	n.a	0.8

Source: "Collateral eligibility and availability" (ECB, Jul 2014)

<Table Ⅱ-7> Tri-Party Repo Haircuts

Fed Eligible Collaterals	Agency Debentures	102.1
	Agency MBS	102.0
	Agency REMIC	102.7
	Ginnie Mae MBS Pools	102.1
	Ginnie Mae REMICs	103.0
	US Treasuries and Strips	101.7
	Sub-Total	102.3
Non-Fed Eligible Collaterals	Asset Backed Securities	106.5
	Commercial Paper	103.7
	Corporate Bonds	106.0
	DTC-Other	103.4
	Equity	107.3
	Money Market	104.0
	Municipal Bonds	105.6
	Other	102.2
	Private Label CMO	108.4
	Whole Loans	110.0
	Sub-Total	105.7
All		104.4

Source: Copeland, A., Martin, A. and Walker, M. (2010), "The Tri-Party Repo Market before the 2010 Reforms", Federal Reserve Bank of New York Staff Reports, No 477, November.

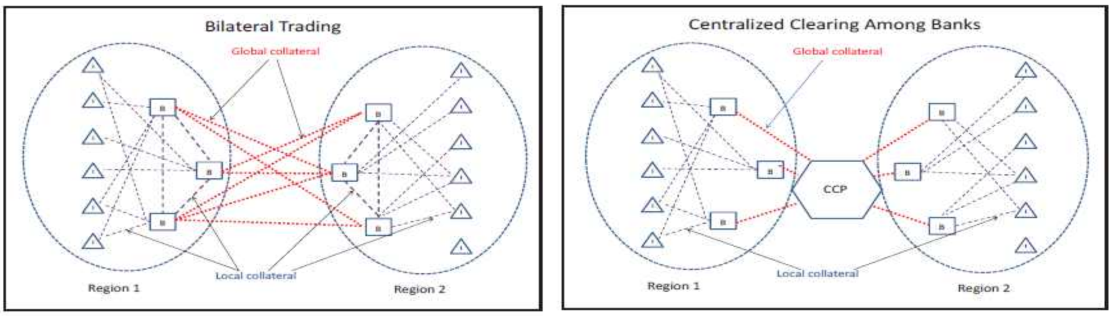
Asset category, collateral issuer, and haircut determine market perception over the quality of assets, including MBS and ABS.

<Table Ⅱ-8> Standard Agreement Documents by Collateral Type

Product Area	Description	Legal Agreement Required	Collateral Management Related Regulations
Repo (Repurchase Agreement)	Collateral in the form of bonds or equity is delivered to secure cash placements	Global Master Repurchase Agreement (GMRA) (MRA in the US)	Financial Stability Board (FSB) framework to standardize repo haircuts is yet to be fully implemented
Securities Lending	Cash or other collateral is delivered to secure a loaned security	Global Master Securities Lending Agreement (GMSLA)	FSB framework on shadow banking requirements is yet to be fully implemented
OTC Derivatives (Cleared)	Collateral in response to margin process is exchanged between trading entity and central counter parties (CCP). Includes Initial Margin (IM) and Variation Margin (VM)	CCP product specific operational legal agreement	Dodd-Frank Act/ European Regulation on OTC Derivatives (EMIR)
OTC Derivatives (Uncleared)	Collateral is moved between trading counter parties. Currently this is limited to VM but requirements for movement of IM are being introduced	ISDA Credit Support Annex (CSA) to the Master Service Agreement (MSA)	Basel Committee on Banking Supervision (BCBS)/International Organization of Securities Commissions (IOSCO)/National implementation in numerous jurisdictions
Exchange Traded Derivatives (ETD)	Collateral is delivered to/from the relevant CCP to reflect trade	Exchange-specific documents	Dodd-Frank Act/ European Regulation on OTC Derivatives (EMIR)
Cross Product Margining	Legally enforceable netting arrangements across various collateral products	MSA	Complex legal and operational requirements (Requiring client specific solutions)

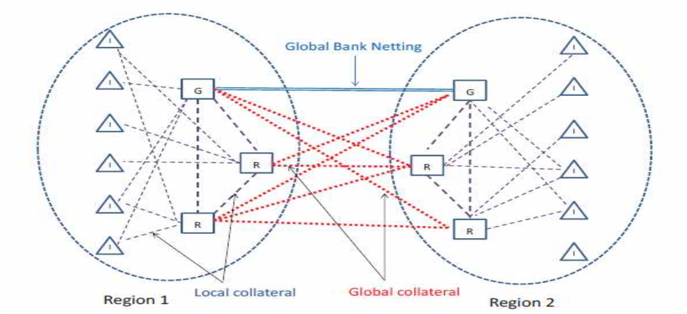
Source: “Collateral Management: A Review of Market Issues” (BNY Mellon, 2015. 10)

<Fig Ⅱ-3> Regional Model



Source: Anderson, R. & Joeveer, K. (2014), “The Economics of Collateral”, Financial Markets Group, Discussion Paper No 732, May.

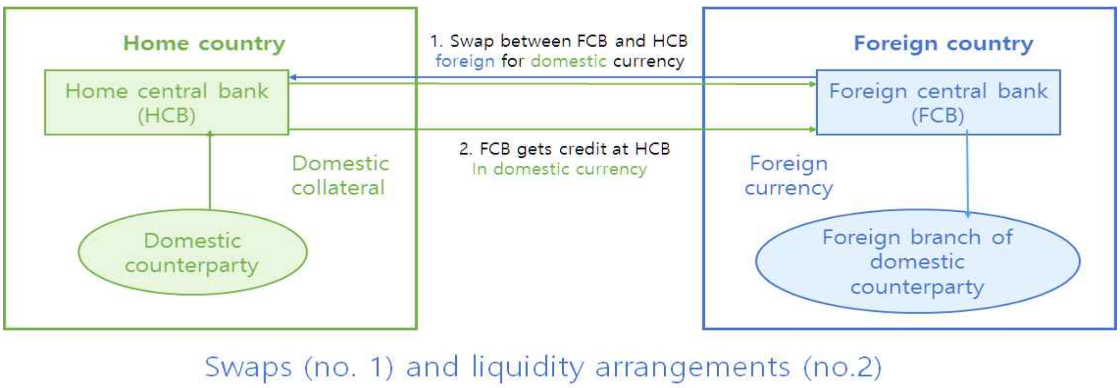
<Fig Ⅱ-4> Global Banks



Source: Anderson, R. & Joeveer, K. (2014), “The Economics of Collateral”, Financial Markets Group, Discussion Paper No 732, May.

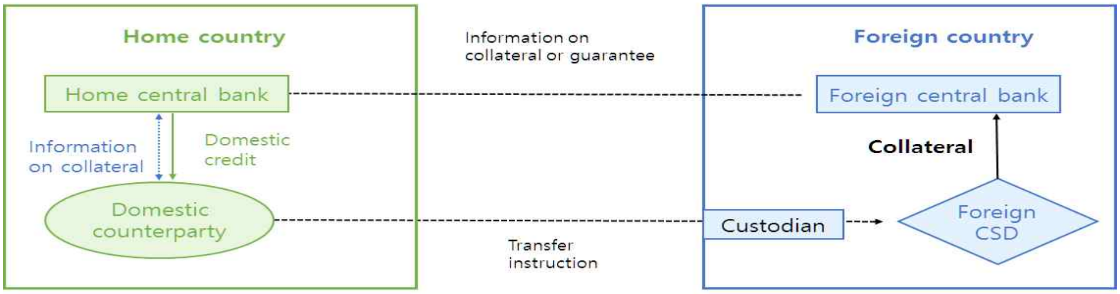
In terms of systemic risk management, a centralized platform is likely to face an even more challenging situation due to heavier collateral requirements compared to a decentralized platform.

<Fig Ⅱ-5> Central Bank Solution 1: Cash Arrangements



Source: Doornbos, N. (2012), “Regulatory developments and the impact on collateral and central bank liquidity”, Macedonian Financial Sector Conference on Payments and Securities Settlement Systems, Ohrid, June.

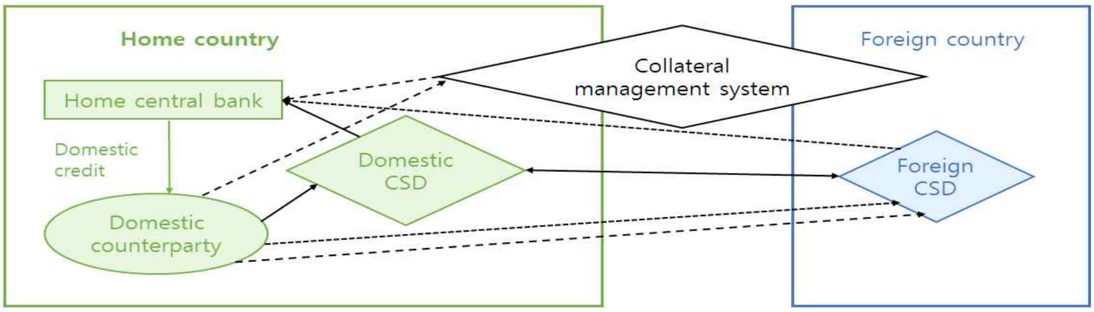
<Fig Ⅱ-6> Central Bank Solution 2: Securities Arrangements with Foreign Central Bank



Correspondent central banking and guarantee model

Source: Doornbos, N. (2012), “Regulatory developments and the impact on collateral and central bank liquidity”, Macedonian Financial Sector Conference on Payments and Securities Settlement Systems, Ohrid, June.

<Fig Ⅱ-7> Central Bank Solution 3: Securities Arrangements without Foreign Central Bank



Links between SSSs (solid lines), remote access (dotted lines) and collateral management system (dashed lines)

Source: Doornbos, N. (2012), “Regulatory developments and the impact on collateral and central bank liquidity”, Macedonian Financial Sector Conference on Payments and Securities Settlement Systems, Ohrid, June.

Until now, central banks collaborated and coordinated among themselves to address collateral scarcity, but it has not been fully effective.

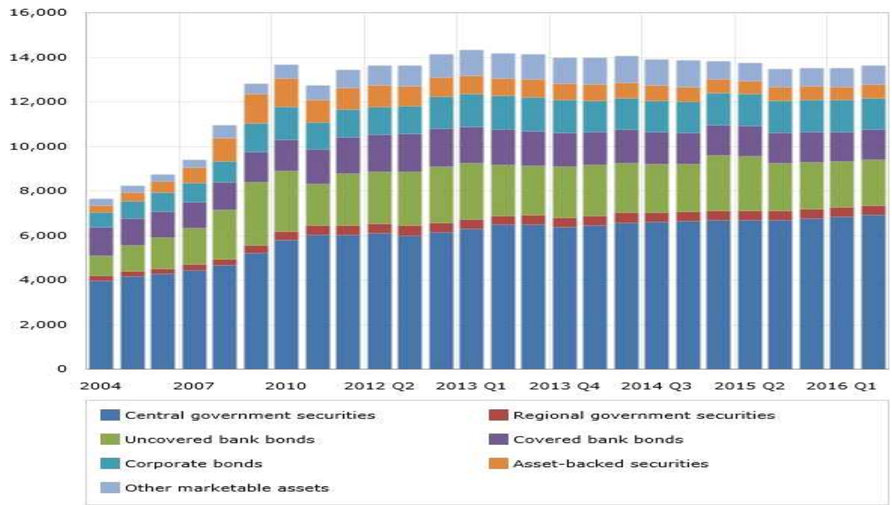
Cross-border utilization of collaterals occurs through two channels—CCP cleared and CCP uncleared—and CCPs have made little contributions curtailing collateral costs despite their benefits in settlement and clearing process.

Meanwhile, global mega banks see a growing importance of identifying and utilizing eligible assets of Asia, in preparation for a dwindling volume of super high-quality assets.

Regarding Brexit, European Commission is to decide whether GBP-denominated sovereign bonds could stay within the Eurosystem or not, and the related uncertainties might precipitate a serious market confusion in terms of global collateral management.

<Fig Ⅱ-8> Eligible Assets under Euro System

(Unit: bil. EUR, nominal amounts, month-end average)



Source: ECB, 2016.

To reiterate, rigid collateral criteria impede fuller benefits of capital markets and worsen system fragmentation. Particularly, central bank-oriented collateral criteria only acknowledge the euro area assets, severely limiting identification and utilization of collaterals at a global level, further thwarting efforts to source collaterals from other regions.

<Table Ⅱ-9> Eligible Collaterals and Euro System

<table>
<tr><th colspan="2">General Eligibility Criteria</th></tr>
<tr><td colspan="2">Debt instruments only
Denominated in Euro
Accepted credit ratings:
Step 1+2: PD≤ 0.10% over a one-year horizon (AAA to A-)
Step 3: 0.10%≤PD≤0.40% (BBB to BBB-)</td></tr>
<tr><th>Marketable Assets</th><th>Non-Marketable Assets</th></tr>
<tr><td>Issued in EEA and settled in euro area, or issued by entity resident in EEA or non-EEA G10 country</td><td>Issued in euro area</td></tr>
</table>

Traded on regulated markets, or non-regulated markets that have been approved by the ESCB	1) Credit claims *Counter party chooses assessment source* 2) Fixed term deposits
	3) Retail-mortgage backed debt instruments, A+ to A- CB assesses eligibility

Source: "Regulatory developments and the impact on collateral and central bank liquidity", (Doornbos, N., Jun 2012)

<Table Ⅱ-10> List of Assets Endorsed by Central Banks

Collateral		Eurosystem	US Fed
Marketable Assets Public Bonds by Issuer:			
	Central government	O	O
	Central bank	O	
	Public agencies other than central government	O	O
	Supranational	O	
	Credit institutions (covered bonds)	O	
	Credit institutions (excluding covered bonds)	O	
	Financial corporations other than credit institutions	O	
ABS		O	
Non-Marketable Assets			
Bank Loan		O	
Non-Marketable Retail Mortgage-backed Debt Instruments		O	
Cash			
Cash (including fixed-term deposits from eligible counter parties)		O	

Source: "Collateral eligibility requirements" (ECB, Jul 2013)

<Table Ⅱ-11> Collateral Eligibility Requirements for Marketable Assets

		Eurosystem	US Fed
Issuer/Debtor Type:	Central government	O	O
	Central bank	O	O
	Local government	O	
	Corporations	O	
	Banks	O - Excluding own use	
	Supranational	O	

	ABS	O - Only if there is a true sale of assets and a special purpose vehicle (SPV) is bankruptcy remote from originator	
Residence of issuer:	Domestic	O	O
	Overseas	O - Issuer 1):EEA or non-EEA G10; - Creditor: EEA; - Guarantor 2):EEA	O - Only limited to sovereign issuers
Seniority:	Senior	O	O
	Junior	-	
Credit standard:	Minimum Credit Rating of Issuer/Asset	Min. BBB-; Aaa at the time of issuance and A- afterwards for standard ABS	N/A
Settlement:	Domestic	O	O
	Overseas	-	
Currency:	Domestic	O	O
	Overseas	Not approved under standard structure	O

Source: “Collateral eligibility requirements” (ECB, Jul 2013)

<Table Ⅱ-12> Collateral System for CCP-cleared Repo

	LCH. Clearnet SA		Eurex Clearing			LCH. Clearnet Ltd		CC&G		MEFF
	€ GC Plus Basket No1	€ GC Plus Basket No2	ECB Basket	ECB EXT Basket	Equity Basket	Repo Clear € GC	Repo Clear £GC	№ 1	№ 2	
Marketable Assets Public Bonds by Issuer										
Central government	O	O	O	O		O	O	O	O	O
Central bank	O	O	O	O					O	
Public institutions other than central government	O	O	O	O					O	
Supranational	O	O	O	O					O	
Credit institutions (covered bond)	O	O	O	O					O	
Credit institutions (excluding covered bond)		O		O					O	
Financial corporations other than credit institutions		O		O					O	
ABS										
Equity					O					

	Money Funds										
	Gold										
Non-marketable Assets											
	Cash (including fixed-term deposits from eligible counter parties)										
	Credit claims (bank loans)										
	Non-marketable retail mortgage-backed debt instruments										

Source: “Collateral eligibility requirements” (ECB, Jul 2013)

<Table Ⅱ-13> Eurex Repo market – Euro GC Pooling segment

GC Pooling ECB Basket	GC Pooling Extended Basket	GC Pooling Equity Basket
Includes approximately 7,500 securities eligible for use in Eurosystem operations	Includes more than 23,000 securities eligible for use in Eurosystem operations	Includes the top 50 selection of the HDAX (e.g. the highest traded volume in Xetra)
Around 2,500 instruments of ○ Central banks ○ Central governments ○ Regional/local governments ○ Supranationals	Around 3,000 instruments of ○ Central banks ○ Central governments ○ Regional/local governments ○ Supranationals	Changes to the composition of the basket are announced around the 8th calendar day of each month and take effect on the 5th day
Around 5,000 traditional and Jumbo “Pfandbriefe”-style instruments of: ○ Credit institutions ○ Agency credit institutions	Around 5,000 traditional and Jumbo “Pfandbriefe”-style instruments of: ○ Credit institutions ○ Agency credit institutions ○ Corporations and other issuers	
	Around 14,000 instruments of: ○ Credit institutions ○ Agency credit institutions ○ Agency-non credit institutions ○ Corporations and other issuers	
Assets must have a minimum rating of A-/A3 (e.g. asset rating below “A-/A3” are not eligible)	Assets are rated according to the Eurosystem eligibility criteria	
Location of the bond issuance: AT, BE, DE, NL, FR, SI and international Eurobonds (XS ISINs)	Location of the bond issuance: AT, BE, CY, FT, FR, DE, IE, IT, MT, SI, ES, NL and international Eurobonds (XS ISINs)	Country of issuance: DE

The following are excluded (by definition): Eurosystem eligible uncovered bank bonds, corporate bonds and ABS	The following are excluded (by definition): ABS and certain groups of issuers in combination with the place of issuance being IT, IE or ES	
The bond issuer must be established in the EEA or in one of the non-EEA G10 countries (e.g. U.S., Canada, Japan or Switzerland)	The bond issuer must be established in the EEA or in one of the non-EEA G10 countries (e.g. U.S., Canada, Japan or Switzerland)	

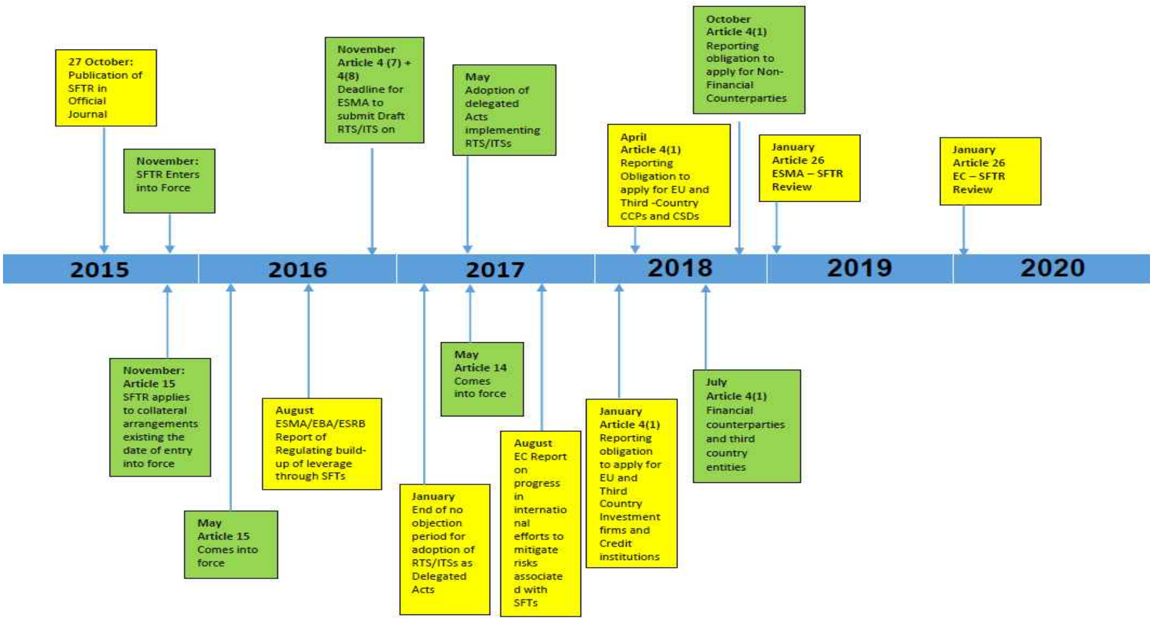
Source: "Collateral eligibility requirements" (ECB, 2013. 07.)

By applying Eurosystem criteria to Asian sovereign bonds, the pool of collaterals can be expanded and reshaped, and Brexit-induced system rigidity can be substantially alleviated.

2. Safe Asset Scarcity

Safe assets grow more popular while collateral criteria remain rigid, and this worsens scarcity of safe assets around the world. This leads to excessive demand on safe assets, resulting from a demand-supply gap and biased collateral base. Meanwhile, the international community has strengthened various regulations, particularly on shadow banking, noting growing risks of OTC derivatives.

<Fig Ⅱ-9> SFTR Implementation Plan



Source: "Securities Financing Transaction Regulation (SFTR) and Its Impact on Commodities Markets" (FIA, Oct 2015)

Use of CCPs was proposed as a means of mitigating counter party risks arising from OTC transactions, but at the same time, it resulted in increased demand for collaterals. The greatest benefit of CCP is that it facilitates multi-party position netting, but the problem is that due to its emphasis on risk management, demand for high-quality collaterals grows. As global financial uncertainties persist, the demand on a pool of safe assets continues to increase, thwarting portfolio diversification efforts in the Asian region.

<Table Ⅱ-14> Sources of Demand for High-quality Collaterals

(Unit: bil. USD)

Source	Current Demand
(i) Reverse repos by real money investors	1261
(ii) Lending of non-HQ securities against HQ collateral	184
(iii) Reinvestment of cash collateral by securities lenders	176
Total	1621

Source: Data explorers

On the supply side, a pool of collaterals remains restricted, widening supply-demand gap of safe assets across regions.

<Table Ⅱ-15> Aggregate Supply of High-quality Collaterals (Sep 2014)

(Unit: tril. USD)

Collateral	**Amount Outstanding**
AAA/AA- rated government bonds (e.g. China)	34.6
Agency MBS	6.0
Supranationals	1.3
Total	**41.8**

Sources: BIS, SIFMA, Dealogic

Note: Balances may not add up due to rounding off

<Table Ⅱ-16> Limited Supply of High-quality Collaterals

(Unit: tril USD)

Owner Type	Holdings	Amount Encumbered	Source of Encumbrance	Unencumbered Supply
Government institution	8.9	8.9	Inability to engage in securities lending	0.0
Commercial Bank	5.3	4.5	Liquid asset buffer or initial margin	0.8
Insurance company or pension fund	5.7	0.0		5.7
Central banks 1)	4.4	4.2	Mostly lending against other government bonds	0.2
Non-resident 2)	11.5	11.3	Foreign exchange reserves	0.2
Other 3)	6.0	3.5	Various	2.6
Total	**41.8**	**32.3**		**9.5**
Total post derivatives reform		**33.3**		**8.5**

Sources: BIS, SIFMA, ECB, IMF

Notes: 1) Includes securities purchased under quantitative easing

2) Indicates owner of high-quality collaterals residing outside jurisdictions where the collateral is issued

3) Includes money market funds, asset managers, non-bank financial institutions

4) Amounts may not add up due to rounding off

<Table Ⅱ-17> Securities Available for Loan by Owner Type

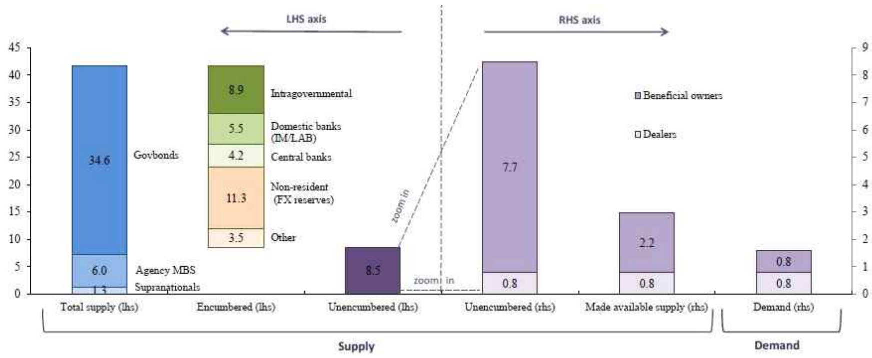
(Unit: %)

Type of owner	**Available Securities for Loan**	**Securities on loan**
Pension fund and insurers	39	34
Banks	11	15
Sovereign Wealth Funds	24	32
Asset Managers	20	12
Others Financial	4	6
Non-Financial	2	1
Total	**100**	**100**

Source: Markit

<Table Ⅱ-10> Global Demand and Supply of High-quality Collaterals

(Unit: tril. USD)

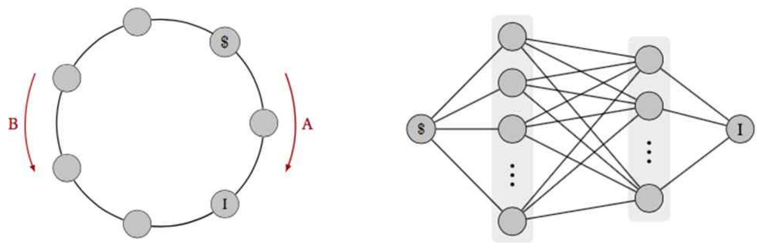


Sources: BIS, SIFMA, Data Explorers, Dealogic, ECB, IMF

Note: Amounts may not add up due to rounding off of numbers

These criticisms point to problematic market customs, but fail to acknowledge fundamental and structural issues within a larger framework. Most literature focuses on a partial solution through better utilization, management, and transformation of currently available collaterals. Extra or mandatory collateral transformation is akin to credit reinforcement or insurance, and the problem is that its demand mostly comes from the Asian region. As a result, Asian countries are contributing to profit-seeking of institutions by lending US Treasury to them. There is clearly an incentive to reduce collateral costs through financial intermediaries or CCPs, but again, the problem is that these market practitioners continue to focus on the US and euro system.

<Fig Ⅱ-11> Two Parallel Intermediation Paths vs. A Multi-tiered Intermediation Network



Source: Di Maggio, M. & Tahbaz-Salehi, A. (2015), “Collateral Shortages and International Networks”, October

Reducing collateral cost requires lowering probability of default or narrowing spread, but both are hard to do under the current low interest rate environment. Tri-party repo market facilitates repo transactions by providing services such as collateral selection, clearing and settlement, margin management, and custodial arrangement for third parties. Meanwhile, collateral substitution is mostly undertaken by Clearstream, Euroclear, BNYM, and JPMorgan. They also provide collateral management and settlement system services for securities issued in various jurisdictions.

<Table Ⅱ-18> Composition of Tri-party Repo Collateral

(Unit: %)

Fed-eligible Collaterals	Agency Debentures	11.4
	Agency MBS	36.3
	Agency REMIC	4.6
	Ginnie Mae MBS Pools	1.2
	Ginnie Mae REMICs	0.3
	US Treasuries and Strips	28.9
	Sub-total	82.7
Non-Fed Eligible Collaterals	Asset Backed Securities	2.4
	Commercial Paper	0.3
	Corporate Bonds	5.9
	DTC-Other	0.4
	Equity	4.0
	Money Market	1.6
	Municipal Bonds	0.7
	Other	0.1
	Private Label CMO	2.0
	Whole Loans	0.1
	Sub-total	17.5

Source: Copeland, A., Martin, A. and Walker, M. (2010), "The Tri-Party Repo Market before the 2010 Reforms", Federal Reserve Bank of New York Staff Reports, No 477, November.

In terms of seeking market-oriented solution, secondary collateral market remains stagnant. Although major global banks' role can not be dismissed, their proposed solutions remain within the legacy system, limiting their contributions to global systemic risk management or financial stability.

<Table Ⅱ-19> Collateral Demand and Supply

(Unit: tril. EUR)

Increase in Collateral Utilization		Increase in Collateral Savings	
1. Derivatives market improvement			
Initial margin requirement[1)] (non-central cleared OTCD)	0.7	Reduced cost of internal division[2)]	.004 (annual)
Initial margin requirement[3)] (centrally cleared OTCD)	0.6	Liquidity/equity capital savings[4)] (convergence of cash accounts and T2S)	0.33

2. Liquidity regulation		Improvement in cross-border collateral utilization (e.g. 1/3 cut in CCP guarantee rate)	0.77–1.15
LCR requirement[5)]	1.8		
3. Capital requirement			
Call for capital demand (less exposure than covered bonds or repos)	(unknown)		

Notes:

1) BCBS-IOSCO's proposal to require initial margins in two ways leads to an increase of initial margins by up to 0.7 trillion euro (universal threshold of 50 million EURO and haircut). Without the threshold, the amount increases to 1.7 trillion euro in global markets.
2) See "Collateral Management - Unlocking the Potential in Collateral" Accenture, September 2011
3) "Collateral requirements for mandatory central clearing of over-the-counter derivatives", BIS Working papers 2012, Heller, D. and Vause, N. The IM for centrally cleared OTCD ranges from 0.1 to 0.6 depending on conditions
4) "The 300-billion-euro Question – Survey on the Benefits of TARGET2-Securities" PWC, Aug 2013
5) Singh, M. (2013), "New Regulations and Collateral Requirements – Implications for the OTC Derivatives Market", Swift Institute, Working Paper No 2012-004, October.
6) BCBS, 2013. However, the estimation should be lower, as it does not yet take into account the changes to the LCR of January 2013

<Table Ⅱ-20> Collateral Shortfall under Basel Ⅲ Liquidity Criteria

(Unit: tril. EUR)

Study	**Scope**	**LCR shortfall**	**NSFR shortfall**
BCBS (2012)	Global, 23 member countries	1.73	2.78.
CEBS study (2012)	21 European countries	1.20	1.90
McKinsey study (2010)	EU27 plus Switzerland	1.30	2.30
Extrapolation from McKinsey (2010)	Euro area	0.923	1.63

Source: "Is Collateral Becoming Scarce? Evidence for the euro area" (Levels, A. & Capel, J., 2012)

<Table Ⅱ-21> Overview of Haircuts under Basel III (LCR)

(Unit: %)

Debt instruments issued by	**Debt instruments issued by (detailed)**	**HAIRCUTS**		
		Level 1	**Level 2A**	**Level 2B**
• Central governments	• Central governments	0	15	
• Central banks	• Central banks			
• Local and regional governments	• Local and regional governments			
• Agencies	• Agencies	0		
• Supranationals	• Supranationals	0	15	
• Credit institutions (jumbo	• Credit institutions (jumbo	N.E	15	

covered bonds)	covered bonds)			
• Credit institutions (covered bank bonds)	• Credit institutions (covered bank bonds; excluding RMBS)	N.E	15	50
• Non-financial corporations and other issuers	• Non-financial corporations and other issuers			
	• Credit institutions (RMBS)			25
• Credit institutions (unsecured)	• Credit institutions (unsecured)			
• Financial corporations other than credit institutions	• Financial corporations other than credit institutions			
Asset-backed securities	**Asset-backed securities**			
Common equity shares	**Common equity shares**			50

Source: "Collateral eligibility and availability" (ECB, Jul 2014)

Regional gaps in terms of collateral holding and utilization add to global financial anxieties by prolonging the shortage of safe assets. Foundations for sustainable growth cannot be possibly built amid heavily biased capital flows and little room for diversified investment. Meanwhile, the euro area has steadily expanded a pool of eligible collaterals by mitigating their criteria and broadening the scope of qualifying regional collaterals (e.g. inclusion of assets denominated in British pound, Japanese yen, and US dollar as of April 2013). (Eberl and Weber 2014)[1].

Global efforts are underway to close the gap between credit ratings and eligible collateral criteria across the region, but regional discrepancies are actually growing as the euro and US systems refuse to acknowledge Asian sovereign bonds—except Japan.

<Table Ⅱ-22> Changes in ECB Collateral Criteria

Date	Action	Tighter	Looser
2005.05.30	Ineligibility of equities	●	
2007.01.01	Abolition of idiosyncratic eligibility criteria (introduction of Single List)	●	
2008.09.15	Collapse of Lehman Brothers		
2008.10.25	Lowering of minimum credit rating for all assets except ABSs from "single A" to "triple B"; eligibility of bank bonds traded in the STEP market		● ●
2008.11.14	Eligibility of marketable debt instruments issued in pounds sterling, yen or US dollars		●
2009.02.01	Eligibility of own-use government-guaranteed debt		●

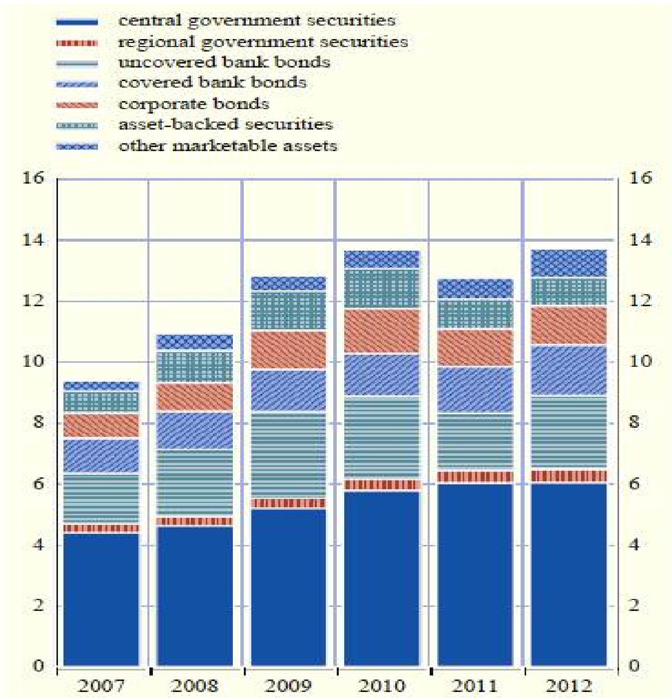
1) Eberl and Weber (2014), ECB Collateral Criteria: A Narrative Database 2001-2013. Leibniz Institute for Economic Research, University of Munich.

	instruments; DBRS accepted as fourth ECAI		●
2009.03.01	Increase of minimum credit rating for ABSs from "single A" to "triple A" at issuance	●	
2010.05.06 2011.04.01 2011.07.07 2013.05.03 2013.05.09	Suspensions of minimum credit rating for debt instruments issued or guaranteed by the governments of Greece, Ireland, Portugal; later by governments under an UN/IMF program and Cyprus		●
2011.12.19	Idiosyncratic acceptance of credit claims by NCBs; lowering minimum credit rating for specific ABSs from "triple A" to "single A" at issuance		● ●
2012.07.29	Lowering of minimum credit rating for all ABSs from "single A" to "triple B" at issuance and over lifetime		●
2013.01.03	Ineligibility of heterogeneous ABSs	●	

Source: "ECB Collateral Criteria: A Narrative Database 2001-2013" (Eberl and Weber, 2014)

<Fig Ⅱ-12> Volume of Marketable Assets Eligible as Collaterals

(Units: tril. EUR, nominal amounts, month-end)



Source: "The Eurosystem collateral framework throughout the Crisis" (ECB, Jul 2013)

Underdeveloped market in Asia and the lack of infrastructure is an urgent task to tackle. Particularly, establishment of a regional collateral system is of paramount importance along with establishment of eligible collateral criteria.

<Fig Ⅱ-13> Volume of Sovereign Bonds Qualifying as Eligible Collaterals

(Units: bil. USD, nominal amounts, month-end)

Sources: BIS, BIS Statistics Explorer; ECB, Eurosystem Collateral Data

Notes: end-2015, Average USD/EUR exchange rate in 2015 (0.937) was used.

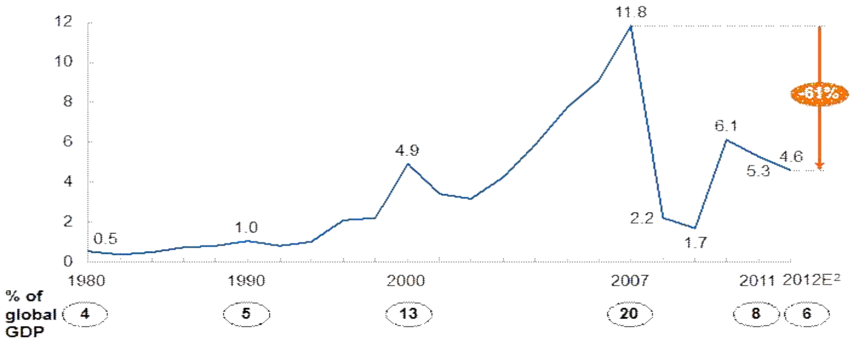
Prior to building a regional infrastructure, visible efforts need to be made within the legacy system to expand the pool of eligible collaterals and utilize them.

3. Uphill Capital Flows and Secular Stagnation

Global capital flows heavily from safe asset providers to recipients as emerging economies spend a majority of trade surpluses to hoard sovereign bonds of advanced economies. Accordingly, uphill capital flows deepen, investment diversification is thwarted, and the ultra-low interest rate environment settles in. Guidelines for global financial stability actually widen this regional discrepancy and add to market uncertainties. That is, emerging markets are putting too much of their financial resources in euro and US-centric financial systems, virtually handing over their capacities for market access and stability to advanced financial systems.

<Fig Ⅱ-14> Global Cross-Border Capital Flows

(Unit: tril. USD)



Sources: IMF Balance of Payments, Institute of International Finance, McKinsey Global Institute Analysis

Notes: 1) Capital flows include FDI, FX bonds and securities trading, cross-border lending and deposits

2) As for the time of exchange rate, Q3 2011 rate was used for major economies, and Q2 2011 for other advanced economies and developing countries.

3) Where quarterly data was unavailable, trend data of Institute of International Finance was used

Between 2007 and 2011, the volume of safe asset supply fell from 37% to 18% relative to global GDP.

<Table Ⅱ-23> Dwindling Global Safe Assets for 2007-2011 Period

(Units: bil. USD, % of world GDP)

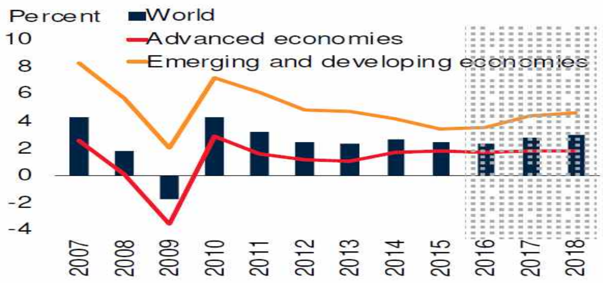
	Amount		% of world GDP	
	2007	2011	2007	2011
US Federal government debt held by the public	5,136	10,692	9.2	15.8
Held by the Federal Reserve	736	1,700	1.3	2.5
Held by private investors	4,401	8,992	7.9	13.3
GSE obligations	2,910	~~2,023~~	5.2	~~3.0~~
Agency- and GSE-backed mortgage pools	4,464	~~6,283~~	8.0	~~9.3~~
Private-issue ABS	3,901	~~1,277~~	7.0	~~1.9~~
German and French government debt	2,492	3,270	4.5	4.8
Italian and Spanish government debt	2,380	~~3,143~~	4.3	~~4.7~~
Safe assets	20,548	12,262	36.9	18.1

Source: Barclays Equity Gilt Study, 2012.

The ECB and US Fed have overly emphasized market stability to the extent of worsening uphill capital flows. In integrated market environments, geographically biased recognition and use of eligible collaterals obstruct cross-border utilization; without addressing the bias toward key currency countries, it would be hard to achieve global financial stability.

<Fig Ⅱ-15> **World Economic Growth**

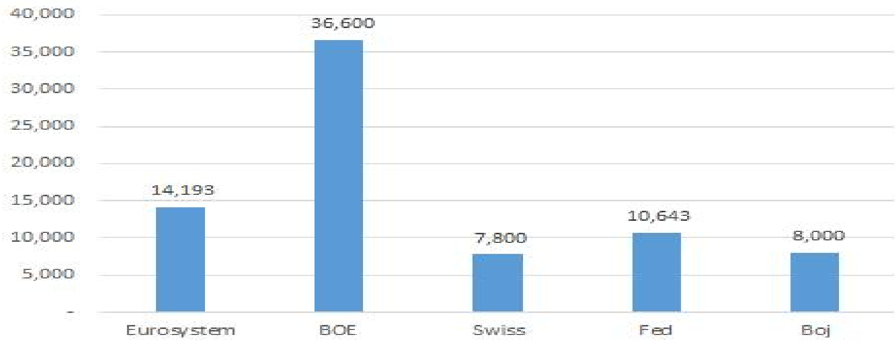
(Unit: %)



Sources: World Bank, Haver Analytics

<Fig Ⅱ-16> **Aggregate Volume of Marketable Eligible Collaterals**

(Unit: bil. USD, 2013)



Sources: Fed, BIS, ECB, BoE, Bank of Japan and Swiss National Bank.

Amid a delayed economic recovery, the importance of brisk investment is growing, but this is hindered by biased capital flows. Under a changing regulatory environment, eligible collaterals play a pivotal role in financing, and serve as a basis for various asset valuation. Faced with explosive global demand, quality of so-called safe assets is deteriorating in providing countries, while recipient countries only achieve superficial stability.

These suggest that current ailments of global financial system are largely due to a fundamental problem of collateral system, specifically, turning a blind eye to use of underqualifying collaterals in repo transactions.

Ⅲ. Tasks Ahead

The current criteria for eligible collaterals transmit these problems through various channels. The first step toward improving the criteria would be to include strong Asian sovereign bonds in the pool of eligible collaterals. Either an alternative might be sought within the current framework, or a comprehensive criteria need to be newly established.

1. Strategy to Recognize Asian Sovereign Bonds as Eligible Collateral

If AA- or higher rated Asian sovereign bonds can be recognized as eligible collaterals, the pool of eligible collaterals would be expanded by USD 583 billion (Fitch) ~ USD 2.976 trillion (S&P, Moody's). As global financial uncertainties persist, the demand for eligible collaterals rise, but old-fashioned US and euro-centric criteria continue to be applied. The gap between soundness and liquidity requirements and actual liquidity availability in the market widens, and liquidity supply continues to be obstructed despite a very low interest rate.

To address this issue, a large portion of ASEAN+3 sovereign bonds need to be incorporated into the pool of eligible collaterals as an instrument for increasing market liquidity. Given that infrastructure building is a long-term effort, it would be advisable to set more reasonable criteria for eligible collaterals first to boost liquidity supply in the short term.

By excluding Asian sovereign bonds, the global pool of eligible collaterals remains shallow and weak.

<Table Ⅲ-1> Outstanding Amount of Sovereign Bonds (end-2015)

(Unit: bil. USD)

	Total	Domestic	International
US	16194	16189	5
UK	2615	2593	22
Sweden	173	106	67
Euro zone			
Germany	1779	1704	75
France	1935	1926	9
Belgium	406	385	21
Netherlands	380	366	14
Luxembourg	7	4	3
Spain	998	960	38
Portugal*	150	127	23
Italy*	1985	1889	96
Austria	262	169	93
Ireland	137	117	20
Slovenia	32	18	14
Slovakia	39	27	12
Kypros*	7	3	4

Estonia	0	0	0
Latvia	8	1	7
Lithuania	14	2	12
Finland	114	90	24
Greece	82	51	31
Malta	6	6	-
ASEAN+3 (Sovereign Rating A- or higher)			
Malaysia	143	138	5
Singapore	75	75	0
Korea	508	501	7
China	2393	2380	13
Japan	8349	8343	6

Sources: BIS, BIS Statistics Explorer.

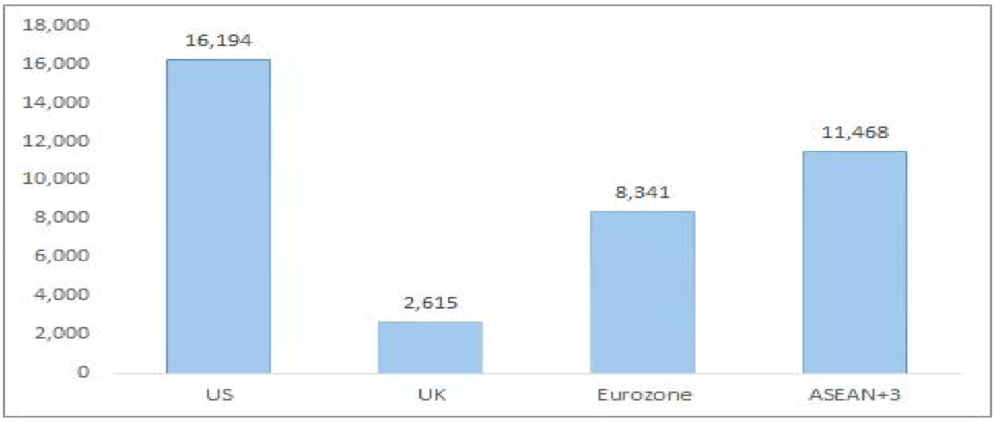
Note: 1) * indicates countries with A- or lower rating by all three rating agencies; by Moody's rating, they include Portugal (BB+), Italy (BBB-), Kypros (BB-) and Greece (B-)

2) San Marino, Monaco, and Vatican City State are not included

3) Includes central and local governments, but not financial/non-financial public corporations

<Fig Ⅲ-1> Outstanding Government Bonds (end-2015)

(Unit: bil. USD)

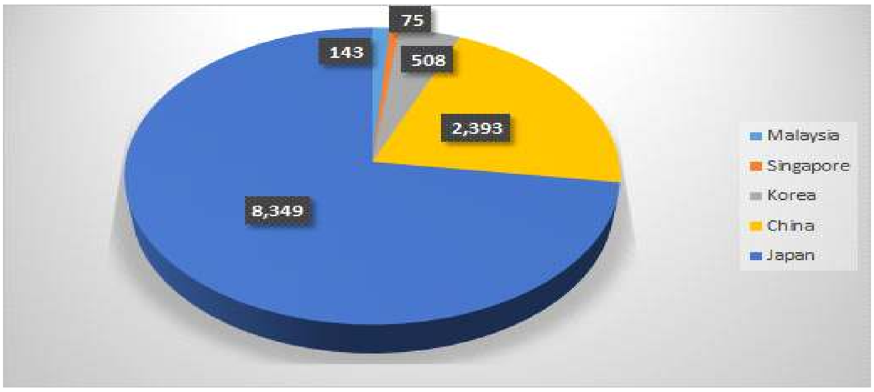


Sources: BIS, BIS Statistics Explorer.

Note: ASEAN+3 countries with A- or higher ratings by three major credit ratings (Korea, Japan, China)

<Fig Ⅲ-2> Share of A- or Higher Rated ASEAN+3 Sovereign Bonds (end-2015, Outstanding Amount)

(Unit: bil. USD)



Sources: BIS, BIS Statistics Explorer.

2. Enhancing Criteria for Eligible Collaterals

If current collateral criteria used in euro and US systems are applied, an additional collateral worth USD 3.338 trillion (S&P) ~ USD 3.494 trillion (Moody's and Fitch) can be secured worldwide. In practice, denomination currency determines whether a bond is fit for cross-border transactions, and unless this prejudice is corrected, distorted capital flows would make it hard to achieve financial market stability.

A collateral market consists of repos, securities lending, and derivatives; in this study, we focus on repos to investigate the issue of liquidity supply through sovereign bonds as an advanced repo market facilitates use of local currency bonds for US dollar financing.

If regional bonds can be recognized as eligible collaterals for global repo transactions, countries in the region can mitigate burden of managing FX reserves, and denomination currency of FX reserves can diversify into currencies other than US dollar or euro.

It is of paramount importance to build local currency bonds market to achieve both regional and global financial stability.

<Table Ⅲ-2> ECB Collateral Eligibility Framework vs. Basel Definition of Liquid Assets

Credit Quality	Residual Maturity (years)	Liquidity Categories: Category I Government debt		Category II Muni. & GSE		Category III Covered Bonds		Category IV Financials		Category V ABS
		Fixed Coupon	Zero Coupon	Fixed Coupon	Zero Coupon	Fixed Coupon	Zero Coupon	Fixed Coupon	Zero Coupon	
Steps 1 and 2 (AAA to A-)	0-1	0.5	0.5	1.0	1.0	1.5	1.5	6.8	6.5	16
	1-3	1.5	1.5	2.5	2.5	3.0	3.0	8.5	9.0	
	3-5	2.5	3.0	3.5	4.0	5.0	5.5	11.0	11.5	
	5-7	3.0	3.5	4.5	5.0	6.5	7.5	12.5	13.5	
	7-10	4.0	4.5	5.5	6.5	8.5	9.5	14.0	15.5	
	>10	5.5	8.5	7.5	12.0	11.0	16.5	17.0	22.5	
Steps 3 (BBB+ to BBB-)	0-1	5.5	5.5	6.0	6.0	8.0	8.0	15.0	15.0	Not Eligible
	1-3	6.5	6.5	10.5	11.5	18.0	19.5	27.5	29.5	
	3-5	7.5	8.0	15.5	17.0	25.5	28.0	36.5	39.5	
	5-7	8.0	8.5	18.0	20.5	28.0	31.5	28.5	43.0	
	7-10	9.0	9.5	19.5	22.5	29.0	33.5	39.0	44.5	
	>10	10.5	13.5	20.0	29.0	29.5	38.0	39.5	46.0	

	Level 1 assets	LCR haircut is 0%
	Level 2 assets	LCR haircut > ECB haircut
	Level 2 assets	LCR haircut < ECB haircut
	Non-liquid assets	Non-liquid assets under Basel III

Sources: Doornbos, N. (2012), "Regulatory developments and the impact on collateral and central bank liquidity", Macedonian Financial Sector Conference on Payments and Securities Settlement Systems, Ohrid, June.

<Table Ⅲ-3> Assets in Asia by Credit Quality and Liquidity Categories

(Unit: bil. USD)

Credit Quality	Countries	Liquidity Categories: Category I Government debt	Category II Muni. & GSE	Category III Covered Bonds	Category IV Financials	Category V ABS
Steps 1 and 2 (AAA to A-)	Singapore	75		0.981	85	
	Korea	508		2.085	553	70
	China	2,393			2,979	61
	Japan	8,349			2,281	5
	Malaysia	143			77	0.188
	Total	**11,468**		**3.066**	**5,975**	**136.188**
Steps 3 (BBB+ to BBB-)	Thailand	108			112	
	Philippines	111			8	
	Total	**219**			**120**	

Sources: BIS, ECBC, Financial Supervisory Service (Korea), Japan Securities Dealers Association, China Bond, Bank Negara Malaysia

Note: 2015 data; 2015 average exchange rates were used to convert local currency into US dollar value

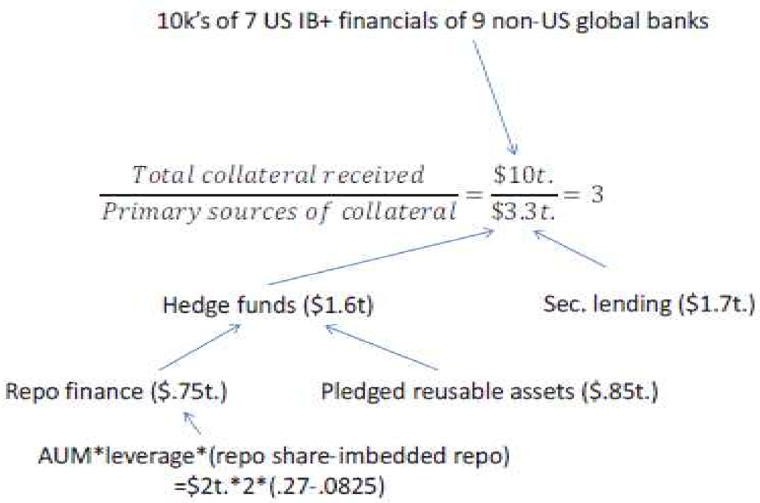
Considering crisis-ridden European countries' sovereign bonds are still regarded as eligible collateral within the Eurosystem, the value of high-rated Asian sovereign bonds (e.g. Korean and Chinese) is deeply underestimated.

Stimulating market interest in establishing and applying more reasonable collateral criteria is essential for furthering financial market development. If only bonds denominated in US dollar and euro continue to be accepted as eligible collaterals, Asian countries cannot use local currency-denominated assets for liquidity supply, which would worsen external reliance and threaten global financial stability.

As market integration advances around the world, it would be more effective if market participants make concerted efforts to deepen market liquidity compared to individual countries' pursuit of fragmented policy efforts.

Facilitating cross-border transfer of high-quality collaterals is key to making an enabling market environment, and such capacity is regarded important in supporting financial market stability.

<Fig Ⅲ-3> Velocity of Collateral (2007)



Source: Singh, M. (2011), "Velocity of Pledged Collateral: Analysis and Implications", International Monetary Funds, November.

The ECB and ICMA merely provide eligible collateral criteria from the standpoint of central banks within the legacy system and in accordance with CCP standards. Countries in Asia, on their part, need to build foundations to freely mobilize liquidity at all times by identifying and utilizing high-quality collaterals internally.

Ⅳ. Expected benefits

The aforementioned problems can be mitigated to an extent by recognizing and utilizing eligible collaterals within Asia, and improving related criteria at a global level. This study articulated that the current criteria for eligible criteria are overly restrictive. As markets grow increasingly more integrated and cross-border capital flows pose a threat to global financial stability, the regionally fragmented collateral management is a dire problem to be tackled. Considering that Asian economies' share in global economy has grown significantly over the past decades, the current pool of eligible collaterals needs to expand to accommodate the large amount of Asian sovereign bonds.

Asian countries need to spur efforts to enhance governance of global financial stability that currently revolve around reserve currency countries. By doing so, they create an enabling market environment and simultaneously strengthen capacity for liquidity supply. Such efforts would help build a permanent—instead of an ad hoc facility—internal channel for liquidity supply.

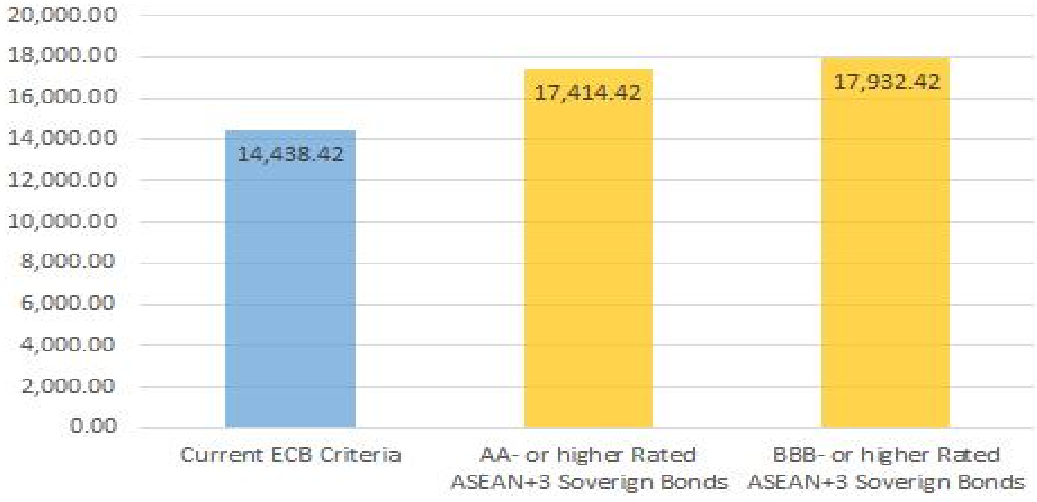
To support this effort, we plan to closely analyze and compare eligible collateral criteria of related institutions, and identify what are needed to establish regional criteria and increase the probability of incorporating ASEAN+3 sovereign bonds into a pool of high-quality collaterals. This is an urgent task for Asian Bond Markets Initiative (ABMI), and a prerequisite for laying groundwork to better utilize assets in the region. Benefits of establishing global criteria for eligible collaterals for accommodation and broader use of newly eligible collaterals are expected to be lasting and far-reaching. Specifically, investment conditions would improve in emerging markets as they are freed from the burden of FX asset reliance and holding, open to global opportunities for investment, boost employment, and attain sustainable financial stability.

In case BB+ or higher rated Asian sovereign bonds are recognized as eligible collaterals in both primary and secondary markets—these include bonds of Singapore, Korea, China, Japan, Malaysia, Thailand, the Philippines, Indonesia—an additional amount of eligible collateral would be approximately USD 3.494 trillion.

If the threshold is raised to AA-, sovereign bonds of Singapore, Korea, China would be additionally included, and the increased amount would be between USD 583 billion (Fitch) and USD 2.976 trillion (S&P and Moody's). Including AA- or higher rated government bonds of ASEAN+3 countries would increase the amount of marketable eligible assets by 21% from USD 14.4384 trillion to USD 17.4144 trillion. If currently accepted rating (BBB-) is applied, the same figure would increase by 24% to USD 17.9324 trillion.

<Fig Ⅳ-1> Eligible Marketable Assets with Inclusion of ASEAN+3 Sovereign Bonds

(Units: bil. USD, nominal amounts, month-end)



Sources: BIS, BIS Statistics Explorer; ECB, Eurosystem Collateral Data

Notes: 1) end-2015

2) 2015 average USD/EUR exchange rate(0.937) was used to convert to US dollar.

Ⅴ. Conclusion and policy messages

In this study, we argued that efforts are required to recognize and utilize high-quality Asian sovereign bonds as eligible collaterals in order to address adverse effects of fragmented global capital markets and minimize their spillover effects.

Particularly, an extended period of low interest rate can be attributed to misallocated funding, and it needs to be investigated why this fundamental problem has been left unattended, while massive quantitative easing takes place around the world.

Great uncertainties over the future is a consequence of ignoring unsustainable collateral system for a long time, which resulted in uphill capital flows and an over-extended financial system, to create asset bubbles in advanced economies and turn emerging markets into production base.

Noting this, we propose how to enhance eligible collateral criteria and form a more balanced collateral pool to normalize global capital flows and lay groundwork for global financial stability.

We urge that high-quality Asian sovereign bonds are recognized as eligible collateral to stop further fragmentation of capital markets. The current US and euro-centric collateral system merely serves as a filter to identify usable collaterals in regional repo markets.

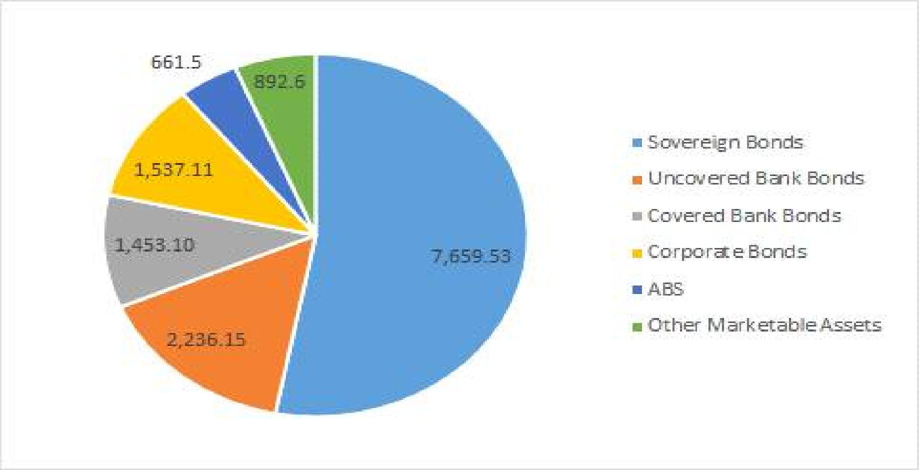
Efforts to broaden the scope of collaterals need to be made in a way that absorbs external assets. Active infrastructure investment needs to be made to alleviate discrepancies across the region. As is, severe imbalances are observed in both issuance and allocation of eligible collaterals, and policy efforts to restore the balance are actually worsening the situation. Hence, regional criteria for eligible collaterals need to be established in a way that incorporates high-quality external assets, rather than loosening current criteria.

In conclusion, we propose that global criteria for eligible collaterals should improve and regional criteria for eligible assets should establish to include high-quality ASEAN+3 sovereign bonds, backed by infrastructure investment. Once Asian sovereign bonds are included in the collateral pool, market assessment of related risks can be made, based on which, a balancing mechanism can be activated to facilitate transfer and utilization of collaterals.

As it is, government bonds represent 53% of all eligible assets in the Eurosystem. If AA- or higher rated ASEAN+3 government bonds are included in this pool, the amount of eligible assets would increase by USD 2.976 trillion (S&P and Moody's) with the share of government bonds at 61%. If the threshold rate is lowered to BBB-, the additional amount would be as much as USD 3.338 trillion, with the share of government bonds at 62%.

<Fig Ⅴ-1> Eligible Collaterals in Eurosystem

(Unit: bil. USD)



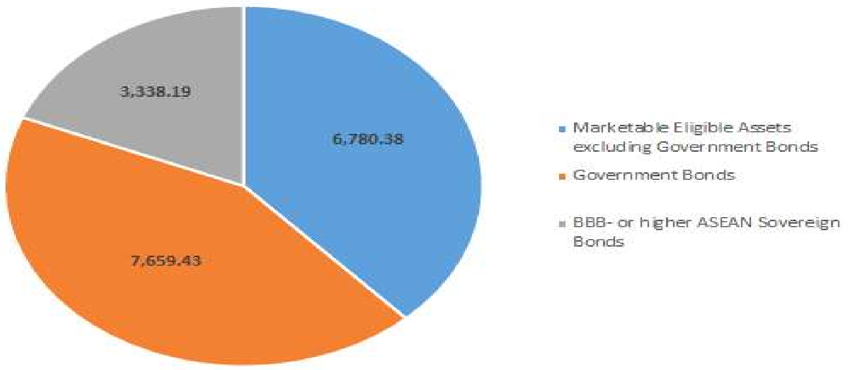
Sources: ECB, Eurosystem Collateral Data

Notes: 1) End-2015 data; 2015 average USD/EUR exchange rate (0.937) was used to convert to US dollar

2) Government bonds include central and local government bonds

<Fig Ⅴ-2> Eligible Collaterals Including BBB- or Higher-rated ASEAN+3 Sovereign Bonds

(Unit: bil. USD)



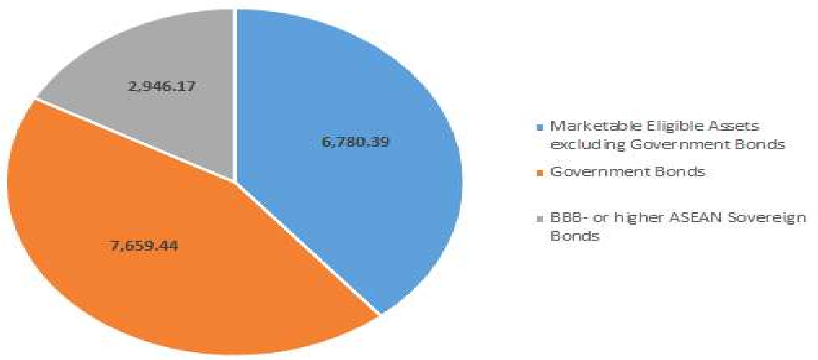
Sources: BIS, BIS Statistics Explorer; ECB, Eurosystem Collateral Data

Notes: 1) End-2015 data; 2015 average USD/EUR exchange rate (0.937) was used to convert to US dollar

2) Includes central and local governments, but non-financial/financial public corporations are not included

<Fig Ⅴ-3> Eligible Collaterals Including BBB- or Higher-rated ASEAN+3 Sovereign Bonds

(Unit: bil. USD)



Sources: BIS, BIS Statistics Explorer; ECB, Eurosystem Collateral Data

Notes: 1) End-2015 data; 2015 average USD/EUR exchange rate (0.937) was used to convert to US dollar

2) Includes central and local governments, but non-financial/financial public corporations are not included

An in-depth research needs to be conducted to investigate how these efforts would expand the scope of collaterals, enhance their utilization, help to shift away from current safe asset hoarding, and thereby contribute to global financial stability.

Ⅵ. Future roadmap

First, it is required to recognize investment-grade regional bonds as globally eligible collaterals, and explicitly express this intention in a joint statement at ASEAN+3 Financial Minister's meeting. Coordination among involved parties is mandatory to clarify criteria for eligible collaterals.

Second, an organization needs to be established, which is dedicated to regional repo transactions, or current infrastructure needs to be improved. And it needs to be researched how an expanded pool of eligible collaterals would operate in the market. Eligible collaterals need to be widely used in repo markets. Shifting away from liquidity supply driven by central banks and government, market participants need to raise liquidity in the market. Given current regulatory framework, liquidity supply backed by public support has clear limitations.

Next, various proposals on promoting regional repo markets must be considered. It is important to provide incentives to European and US repo practitioners to develop interest in Asian markets, and also change regional market participants' perception over regional assets and market. APCF panels need to be organized of global members, not just Asian researchers, to facilitate a more systematic change of perception over potentials in the region.

Fourth, actual consultations need to be undertaken with European and US central banks which persuades them to recognize Asian sovereign bonds as eligible collaterals.

Lastly, other issues to consider include a possibility of including only a few countries' sovereign bonds in the collateral pool, and a possibility of developing index bonds to collectively recognize regional sovereign bonds as eligible collaterals.

References

Anderson, R. & Joeever, K. (2014), The Economics of Collateral", Financial Markets Group Discussion Paper, No 732, May.

Baranova, Y. Liu, Z. and Noss, J. (2016), "The role of collateral in supporting liquidity", Bank of England Staff Working Paper, No 609, August.

Bank for International Settlements (2010), "The role of margin requirements and haircuts in procyclicality", CGFS, No 36, Basel.

BNY Mellon (2015), "Collateral Management: A Review of Market Issues", October.

Borio, C. E. V. (2010). "Implementing a macro prudential framework: Between boldness and realism. Bank for International Settlements, Basel, July.

Borio, C. E. V. and Shim, I. (2007). What can (macro-_2007), "What can (macro-)prudential Policy do to support Monetary Policy?", BIS Working Papers, NO.242, Monetary and Economic Department.

Caballero, R. J. & Farhi, E. (2014) "On the role of safe asset shortages in secular stagnation", Centre for Economic Policy Research, p.111-122.

Capel, J. (2011) "The post-crisis world of collateral and international liquidity", DNB Occasional Studies, Vol. 9/No 3.

Choi, G. (2013), "Internationalization of Regional Currencies using Common Currency Unit," KIF working paper.

Choi, G. (2014), Chinese Shadow Banking: Issues and Policy Responses, Mimeo.

Copeland, A., Martin, A. and Walker, M. (2010), "The Try-Party Repo Market before the 2010 Reforms", Federal Reserve Bank of New York Staff Reports, No 477, November.

Di Maggio, M. & Tahbaz-Salehi, A. (2015), "Collateral Shortages and International Networks", Columbia Business School, Columbia University, October.

Dobbs, R. & Lund, S. (2013), "Is financial glottalisation in retreat? And if so, does it matter?", VoxEU, June.

Doornbos, N. (2012), "Regulatory developments and the impact on collateral and central bank liquidity", Macedonian Financial Sector Conference on Payments and Securities Settlement Systems, Ohrid, June.

Eberl, J., & Weber, C. (2014), "ECB Collateral Criteria: A Narrative Database 2001-2013", IFO Working Paper, NO. 174, February.

European Central Bank, (2013). “Collateral Eligibility Requirements: A Comparative Study Across Specific Frameworks”, July.

European Central Bank, (2013). “The Eurosystem Collateral Framework Throughout the Crisis”, July.

Federal Reserve Bank of New York (2012), Task Force on Tri-Party Repo Infrastructure, Final Report.

Freixas, M., Parigi, B. and Rochet, J. C. (2000), “Systemic Risk, Interbank Relations and Liquidity Provision by the Central Bank”, DNB Staff Reports series, No 47, Netherlands Central Bank.

Futures Industry Association (FIA), (2015). “Securities Financing Transaction Regulation (SFTR) and its impact on Commodities Markets”, October.

Härle, P., Lüders, E., Pepanides, T., Pfetsch, S., Poppensieker, T. and Stegemann, U. (2010), “Basel III and European banking: Its impact, how banks might respond, and the challenges of implementation”, McKinsey Working Papers on Risk, No 26, November.

Levels A. & Capel, J. (2012), “Is Collateral Becoming Scarce? Evidence for the euro area”, DNB Occasional Studies, Vol. 10/No 1.

Singh, M. (2011), “Velocity of Pledged Collateral: Analysis and Implications”, International Monetary Funds, November.

Singh, M. (2013), ‘Collateral and Monetary Policy’, IMF Working Paper, WP/13/186

Singh, M. (2014), “Financial Plumbing and Monetary Policy”, IMF Working Paper, NO. 14/111, June.

World Bank (2016), “Global Economic Prospects: Global Outlook – Divergences and Risks”, June.