Establishing Regional Criteria for Eligible Collateral and Tasks to Foster a Robust Regional Repo Market

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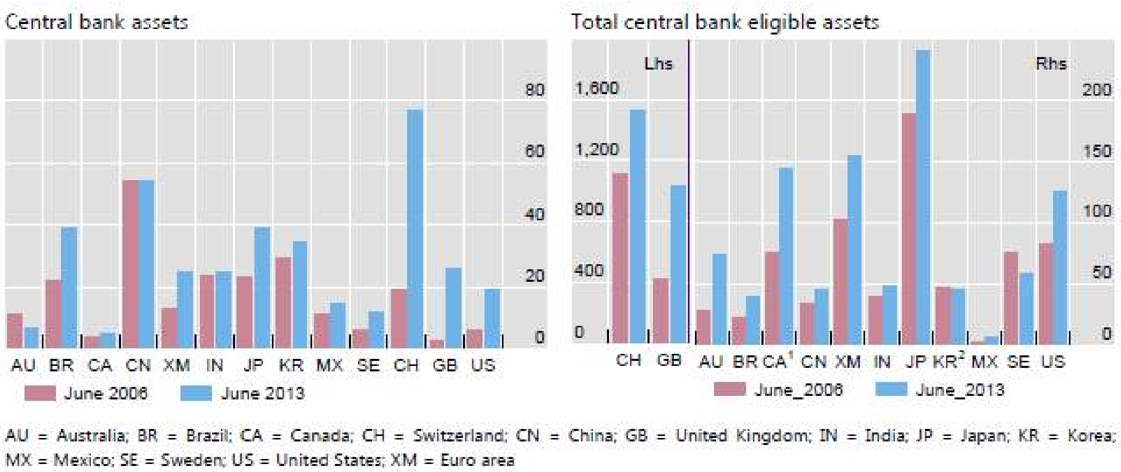
Ⅰ. Research Background

Recurring financial crises in Asia can be primarily attributed to exigency-driven policy efforts without fully overcoming internal market vulnerabilities. The FX supply mechanism in Asia is a contingent facility that connects with the US Fed only in times of crises; when the economy prospers, risk management mostly relies on complex funding infrastructures—including currency swaps and interest rate swaps—in the market.

With the advancement in financial market integration, countries in the region need to join forces to collectively overcome external dependence, particularly, over-sensitiveness to global funding markets. Several Asian countries have been undertaking initiatives to foster repo markets; however, no entity has yet stepped forward to lead the initiative.

<Fig 1> Central Banks in the Collateral Market

(Unit: %, GDP)



Source: BIS, Central bank operating frameworks and collateral markets, May 2015[1)]

Even though Bank of Korea has a strong presence in collateral markets in terms of asset volume relative to GDP, its share of eligible assets remains meager. The international financial system revolves around US dollar assets, especially US Treasury bills. However, after the global financial crisis, massive quantitative easing around the world led to a scarcity of eligible collateral. Due to the scarcity of collateral and consequent funding difficulty of non-banking institutions, capital flow has not recovered to its pre-crisis condition.

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1) Canada's data only include assets denominated in Canadian dollar; sources are central banks of respective countries.

Unconventional monetary policy in the aftermath of the financial crisis entailed a shortage of collateral supply, which further weakened funding in the market. Roughly, collateral scarcity results from a 'pumping' problem on the supply side and a 'plumbing' problem related to system operation.

At any rate, it is increasingly important to build a stronger financial market in the region to ensure greater financial stability. However, in reality, financial stability in Asia continues to depend heavily on hoarding safe assets and entering swap arrangements, with little efforts for internal capacity building.

As for the problem of collateral scarcity, key currency countries have merely proposed to utilize current collateral pools, rather than broadening them[2].

<Table 1> FX Reserves (USD bil, gold included)

	2009	2010	2011	2012	2013	2014	2015. 09
China	2,452.9	2,913.7	3,254.7	3,387.5	3,880.4	3,900.0	-
Japan	1,049.0	1,096.1	1,295.8	1,268.1	1,266.9	1,260.7	1,248.9
Russia	439.3	479.2	497.4	537.8	509.7	386.2	371.3
Korea	270.4	292.1	306.9	327.7	345.7	362.8	368.1
Hong Kong	255.8	268.7	285.4	317.4	311.2	328.5	345.8

Sources: World Bank, IMF

As financially strapped advanced countries revealed their fundamental weaknesses post-crisis, Asia has emerged as a viable source of safe assets.

Other factors that contribute to growing importance of collaterals and repo markets include: 1) borrowing against collaterals has become more common in the post-crisis period, 2) collateral-backed lending is growing important amid increasingly stricter regulations, and 3) these markets are becoming a key funding channel for non-banking institutions.

It should be noted that collateral-backed funding puts an encumbrance on banks, thereby tying their assets with regulations for other purposes. Encumbrances limit banks' capacity to respond to financial shocks, and for this reason, central banks should play a greater role in risk management. The euro area also has a growing reliance tendency towards collateralized market funding.

2) Singh "The (sizable) Role of Rehypothecation in the Shadow Banking System", Jul 2010.

Ⅱ. Regional Repo Markets: Current Trend and Diagnosis

The breadth of collaterals and the quality of collateral management is a good proxy for the degree of financial market development, especially, collateralized financial market. Currently, the presence of Asian repo markets region is minimal and less developed than other financial markets. However, in terms of collateral criteria and market structure, they do not lag far behind.

Meanwhile, oversensitiveness of liquidity supply is observed in countries adjacent to the euro area like Serbia that is preparing to join the euro zone.

<Table 2> EMEAP Repo Markets (End 2013)

	As a percentage of bonds outstanding	As a percentage of bonds outstanding (excluding central bank repo)
UK	43.5*	42.6*
USA	16.646	16.4
Australia	18.6	14.0
China	10.5*	10.5*
Indonesia	0.4	0.0
Japan	15.2	15.2
Korea	11.3	9.9
Malaysia	3.1	1.0
New Zealand	0.9	0.6
Philippines	7.9	0.1
Singapore	10.1	1.8
Thailand	18.6	7.2

*as at end 2012
Source: EMEAP, 2014

<Table 4> Repo Market Infrastructure

	Electronic trading platform	Access to real time pricing	Settlement of repo	DvP settlement	Tri-party
Australia	Y	Y	Outright	Y	Y
China	Y	Y	Outright and pledged	Y	N
Hong Kong	N	N	Outright	Y	Y
Indonesia	N	N	Outright	Y	N
Japan	Y	Y	Outright	Y	Y
Korea	Y	N	Outright and hold-in-custody	Y	Y
Malaysia	Y	Y	Outright	Y	N
New Zealand	N	Y	Outright	Y	N
Philippines	Y	Y	Outright	Y	Y
Singapore	N	Y	Outright	Y	N
Thailand	N	N	Outright	Y	Y

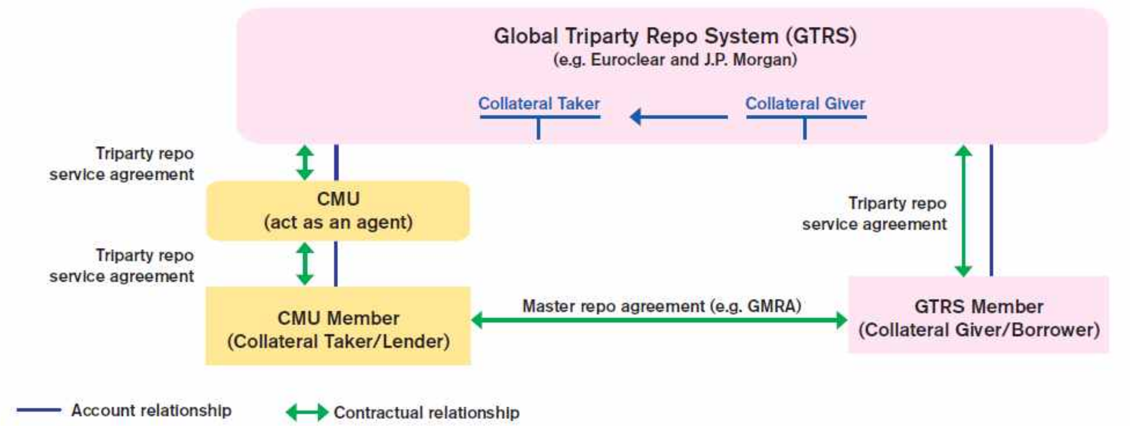
Source: EMEAP

Growth of repo markets has been stunted due to relative costliness compared to unsecured funding and uncertainties over asset disposal in case of a default. Various measures have been implemented post-crisis to promote repo markets amid a changing regulatory environment and growing importance of capital markets. Overseas funding initiatives through repo markets are being undertaken as well, including in Indonesia where several major banks are working to put together a Master Repurchase Agreement.

To induce sustainable, inclusive growth of the regional economy, more emphasis on repo markets is necessary. A repo market is not merely a secondary short-term funding market; it could house a central platform for liquidity management. Given that regional financial stability heavily relies on FX liquidity, it is imperative to promote cross-border repo markets for unrestricted flows of collaterals. Otherwise, countries in the region cannot help but use substantial resources for financial stability, thereby restricting financial sector capacity to create jobs and spur economic growth. Even though Asian countries have ample amount of high-quality collaterals, their use in the market has been severely restricted due to the lack of global recognition.

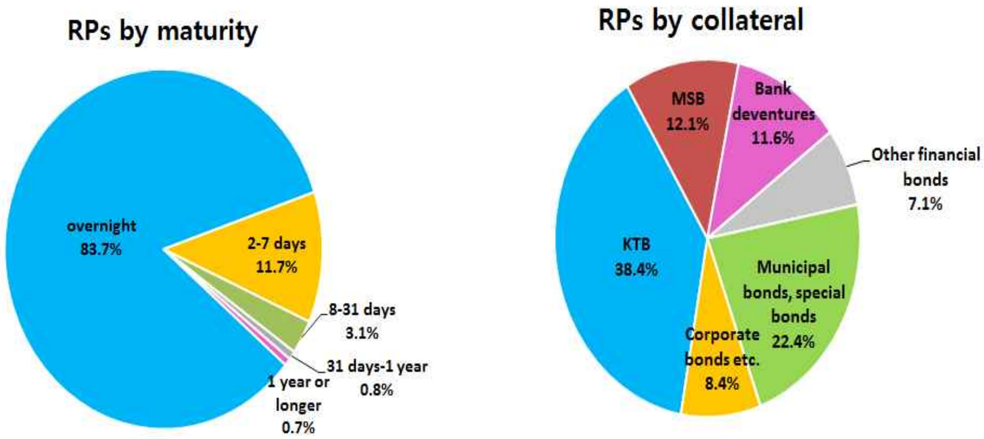
In Asia, Hong Kong has a superb market infrastructure where broker dealers are actively working to facilitate price discovery. Repos in Hong Kong are settled as DvP transactions on a bank repo platform of Central Moneymarket Unit (CMU). CMU is a custodian clearing and settlement system that provides cross-border collateral management service for global third-party platforms such as Euroclear, J.P. Morgan and Clearstream.

<Fig 2> CMU Cross-border Collateral Management Service in Hong Kong



Particularly, GMRA exempts stamp duty for securities lending and borrowing in Hong Kong where capital gains tax and withholding tax is not collected.

<Fig 3> **Hong Kong Repo Markets**



(end February 2014)

Countries in the region show widely divergent development of repo markets. Growth of such markets has not been stunted due to inadequate legal, tax provisions or weak market infrastructure. Rather the problem arises from the lack of repo market's attractiveness amid traditional dominance of unsecured lending, liquidity oversupand the lack of clear aversion to counterparty risks, along with little cost difference between secured and unsecured funding. Shaping market environments in a way that increases reliance on the repo market would create an effective momentum for repo market growth.

Currently in Asia, collateral criteria and pools are overly biased toward US and euro area assets, further limiting supply and use of collaterals in the region. Korea, China, and Japan need to contribute to revitalizing repo transactions in order to resolve collateral scarcity and facilitate operation of international financial systems. Repo markets in the region need to be connected more tightly to contribute to normalizing global capital flows and strengthening Asian financial capacity. These efforts might engender the double effect of expanding a pool of eligible collaterals and enhancing their use. Increasing supply of eligible collaterals needs to be driven by Asian sovereign bonds to mitigate collateral scarcity on the global level and reduce bias in capital flows.

Ⅲ. Enhancing Recognition and Use of Regional Assets through Repo Market

This chapter highlights the importance of repo markets as a means of identifying and utilizing eligible collaterals, and suggests the future direction of developing them.

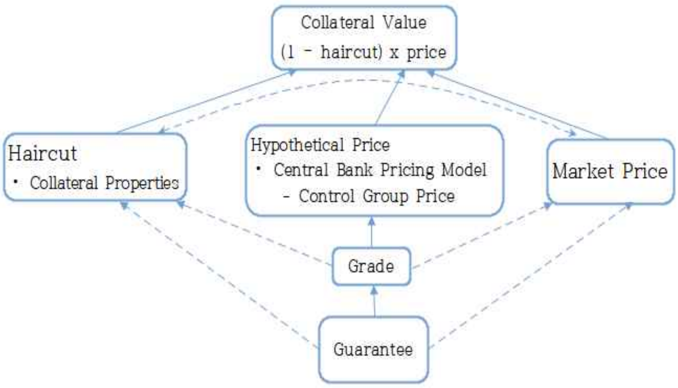
1. Importance of Collateral and the Repo Market

Collateral and the repo market each play a 'pumping' and 'plumbing' role to facilitate capital flows in the market.

Recent studies (ICMA 2013, ERC) pointed out that restricted use of collaterals, rather than their shortage per se (Fender and Lewrick 2013), is the core reason behind collateral scarcity.

In this study, we discuss the issue of recognizing and using regional assets as collaterals, and highlight the importance of repo markets as part of efforts to resolve the current lack of collaterals.

<Fig 4> Collateral Valuation



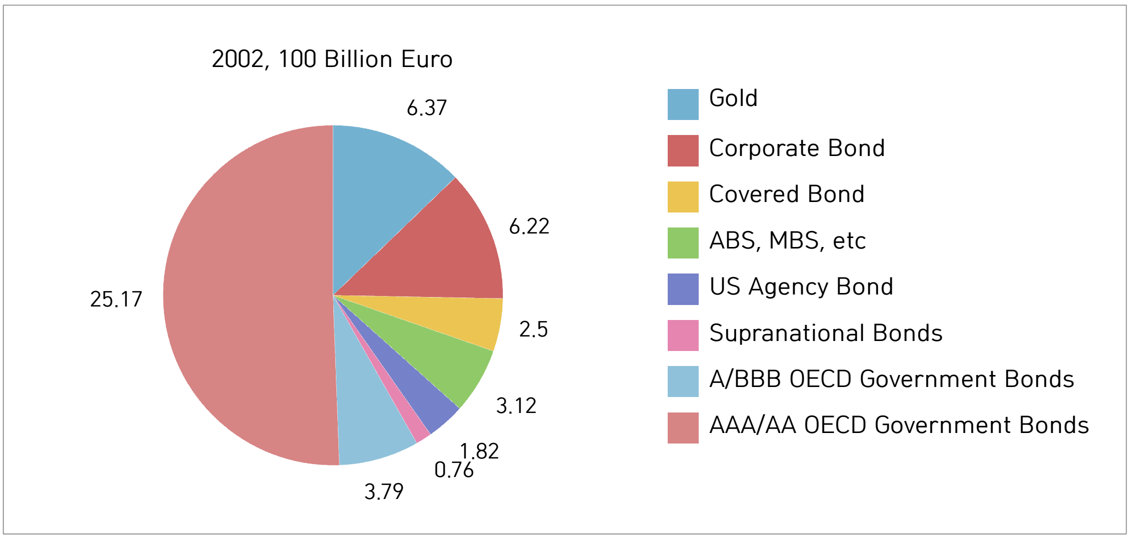
Note: Dotted lines indicate a channel potentially impacting collateral value by influencing market price, while solid lines indicate direct impact on haircut

2. Geographically Biased Distribution of Eligible Collateral and Underutilization of Regional Assets

As it is, eligible collateral is heavily clustered and broadly used in well-developed repo markets such as the US and euro area. Two of the chief reasons are Asia's excessive reliance on bank lending and the US and euro area's advanced repo infrastructure. Along with financial market opening and liberalization progress, strong markets have grown stronger and weak markets weaker with fortified network externality.

<Fig 5> Volume of Reported Potential Collateral Assets

(Unit: bil. EUR)



Source: IMF, "Safe assets: Financial cornerstone?", May 2012

Central banks usually establish and manage criteria for eligible collaterals; the criteria indicate highly liquid securities whose title can be transferred. Global credit rating agencies' ratings are an important indicator of market accessibility, but they do not necessarily translate to collateral eligibility. Given that collaterals can be managed flexibly through haircut adjustments and margin calls, the current practice of adhering to preset criteria needs to be broadly modified. More importantly, the criteria for eligible collaterals should be differentiated from credit ratings that focus on credit risks, considering their weak correlation[3].

<Table 5> Major Central Banks' Collateral Criteria

	Type 1	Type 2	Type 3	Type 4	Type 5
ECB	• Central government debt 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

3) Basel Ⅲ: A global regulatory framework for more resilient banks and banking systems
Basel Ⅲ: International framework for liquidity risk measurement standards and monitoring
Tri-Party Repo Infrastructure Reform

BoE	• Sovereign debts of 22 countries including the US, UK, Germany, Japan	• Bonds issued by G10 government agencies explicitly guaranteed by national governments • Conventional debt issued by Freddie Mac and Fannie Mae • UK government guaranteed bonds	• Covered bonds with underlying assets of UK or EEA public sector debt, social housing loans or residential mortgages • UK and EEA RMBS • UK, US and EEA securitized portfolios of senior secured or on-balance sheet, corporate loans or SME loans	• Credit institution debt instruments (unsecured) • Debt instruments issued by financial corporations other than credit institutions (unsecured)	• UK, US and EEA ABS backed by credit cards
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 6> Tri-party Repos in the US[4]

Asset	Collateral value (bil. USD)	Ratio	Top-three concentration
Fedwire available			
Agency CMOs	$77.33	4.8%	33.8%
Agency Debentures & Strips	$57.37	3.6%	31.2%
Agency MBS	$458.65	28.6%	28.0%
US Treasuries Strips	$31.57	2.0%	42.5%
US Treasuries excluding Strips	$613.91	38.3%	28.2%
Sum	$1,238.92	77.2%	
Fedwire unavailable			
ABS Investment Grade	$19.25	1.2%	41.6%
ABS Non Investment Grade	$34.18	2.1%	62.1%
CDOs	$1.15	0.1%	
CMO Private Label Investment Grade	$10.09	0.6%	54.3%
CMO Private Label Non Investment Grade	$34.83	2.2%	62.9%
Corporates Investment Grade	$49.55	3.1%	26.6%
Corporates Non Investment Grade	$23.90	1.5%	34.2%
Equities	$165.51	10.3%	53.4%
International Securities	$4.39	0.3%	
Money Market	$10.55	0.7%	65.4%
Municipality Debt	$11.14	0.7%	49.8%
Whole Loans	$0.93	0.1%	
Others	$0.11	0.0%	
Sum	$365.58	22.8%	
Total	$1,604.41		

Sources: New York Fed, BNY Mellon, JP Morgan Chase, Aug 2015

<Table 7> Bonds Eligible for Repo Transactions in Korea

Sector	Bond	Condition
Government	– Treasury – FX Equalization Fund	① Minimum outstanding face value of 200 billion won ② Vanilla bond
Monetary Stabilization and Deposit Insurance	– Monetary Stabilization Bond – Deposit Insurance Bond	
Others	– Corporate Bond – Other Special Bond	① Same as above ② AA or higher rated bonds

Source: KRX

Note: Statistical data unavailable for specific share of each bond type or degree of concentration for top-ranking bonds.

4) In a tri-party repo, a transaction party uses settlement, custodian, and collateral management services provided by tri-party agents such as central securities depository and clearing banks.

In terms of eligible criteria, there is little reason strong sovereign bonds in Asia should not be utilized in a prime collateral pool; it is urgent to facilitate market-making effort in the region. Asian countries' heavy reliance on US dollar-denominated securities for financial market stability has magnified risks.

<Table 8> Sovereign Bond Ratings as of Nov 11, 2015

	Foreign currency			Local currency		
	Moody's	S&P	Fitch	Moody's	S&P	Fitch
Advanced economies						
US	Aaa	AA+u	AAA	Aaa	AA+u	AAA
UK	Aa1	AAAu	AA+	Aa1	AAAu	AA+
Japan	A1	A+u	A	A1	A+u	A
Germany	Aaa	AAAu	AAA	Aaa	AAAu	AAA
France	Aa2	AAu	AA	Aa2	AAu	AA
Italy	Baa2	BBB-u	BBB+	Baa2	BBB-u	BBB+
Portugal	Ba1	BB+u	BB+	Ba1	BB+u	BB+
Spain	Baa2	BBB+	BBB+	Baa2	BBB+	BBB+
Emerging markets						
Brazil	Baa3	BB+	BBB-	Baa2	BBB+	BBB
Chile	Aa3	AA-	A+	Aa3	AA+	AA-
China	Aa3	AA-	A+	Aa3	AA-	A+
Colombia	Baa2	BBB	BBB	Baa2	BBB+	BBB+
Czech Republic	A1	AA-	A+	A1	AA	AA-
Hong Kong	Aa1	AAA	AA+	Aa1	AAA	AA+
India	Baa3	BBB-u	BBB-	Baa3	BBB-u	BBB-
Indonesia	Baa3	BB+	BBB-	Baa3	BB+	BBB-
Korea	Aa3	AA-	AA-	Aa3	AA-	AA
Malaysia	A3	A-	A-	A3	A	A
Mexico	A3	BBB+	BBB+	A3	A	A-
Nigeria	Ba3	B+	BB-	Ba3	BB-	BB
Peru	A3	BBB+	BBB+	A3	A-	A-
Philippines	Baa2	BBB	BBB-	Baa3	BBB	BBB
Poland	A2	A-	A-	A2	A	A
Russia	Ba1	BB+	BBB-	Baa1	BBB	BBB
Singapore	Aaa	AAAu	AAA	Aaa	AAAu	AAA
Thailand	Baa1	BBB+	BBB+	Baa1	A-	A-
Uruguay	Baa2	BBB	BBB-	Baa2	BBB-	BBB

Source: Bloomberg L.P.

<Table 9> Fiscal Overview (Korea and OECD Average)

A. Real GDP (% change)		
	Korea	OECD
2007	5.46	2.69
2008	2.83	0.25
2009	0.71	-3.45
2010	6.50	3.02
2011	3.68	1.93
2012	2.29	1.31
2013	2.90	1.44
2014	3.31	1.83

B. Fiscal Balance (% GDP)		
	Korea	OECD
2007	4.24	-1.54
2008	2.34	-3.54
2009	-1.32	-8.39
2010	0.97	-7.91
2011	0.98	-6.56
2012	1.01	-5.78
2013	1.34	-4.17
2014	1.64	-3.66

C. Gross Debt (% GDP)		
	Korea	OECD
2007	26.88	73.54
2008	28.29	81.98
2009	30.98	93.59
2010	31.82	99.81
2011	33.26	104.70
2012	34.79	110.28
2013	34.76	110.26
2014	34.46	113.78

D. Structural Balance (% GDP)		
	Korea	OECD
2007	3.83	-2.89
2008	1.72	-4.41
2009	-0.39	-7.08
2010	0.48	-6.84
2011	0.74	-5.90
2012	0.63	-4.97
2013	0.54	-3.53
2014	0.50	-3.13

Source: OECD (2015), Economic Outlook No. 97 database

<Table 10> **Fiscal Balance (% of GDP)**

	2007	2009	2013	2014
Slovenia	-0.073	-6.132	-14.884	-4.884
Greece	-6.744	-15.288	-12.345	-3.557
Japan	-2.088	-8.843	-8.459	-7.670
Spain	2.000	-10.958	-6.795	-5.800
Ireland	0.272	-13.947	-5.810	-4.116
US	-3.695	-12.809	-5.710	-4.988
UK	-3.017	-10.950	-5.507	-5.316
Portugal	-3.009	-9.806	-4.829	-4.459
Israel	-0.615	-5.620	-4.090	-3.731
France	-2.543	-7.161	-4.079	-3.976
Poland	-	-	-4.015	-3.203
Italy	-1.526	-5.270	-2.949	-3.034
Belgium	0.045	-5.464	-2.918	-3.248
Canada	1.458	-4.521	-2.706	-1.635
Slovakia	-1.922	-7.925	-2.585	-2.868
Finland	5.129	-2.532	-2.536	-3.154
Hungary	-5.047	-4.581	-2.441	-2.550
Netherlands	0.175	-5.474	-2.275	-2.294
Iceland	5.146	-9.400	-1.975	-0.217
Australia	1.854	-4.093	-1.427	-2.211
Sweden	3.336	-0.718	-1.372	-1.882
Austria	-1.316	-5.320	-1.285	-2.405
Czech Republic	-0.694	-5.510	-1.155	-1.982
Denmark	5.019	-2.811	-1.061	1.248
Estonia	2.512	-2.168	-0.213	0.621
Switzerland	0.929	0.759	0.081	0.158
Germany	0.309	-3.036	0.148	0.639
New Zealand	4.370	-2.881	0.275	1.394
Luxembourg	4.220	-0.540	0.857	0.610
Korea	4.236	-1.317	1.336	1.645
Norway	17.122	10.339	11.329	9.063

Sources: OECD (2015), Economic Outlook No. 97, OECD Economic Outlook: Statistics and Projections (database)

<Table 11> **Total Sovereign Debts (% of GDP)**

	2007	2009	2013	2014
Japan	180.02	207.33	239.29	-
Greece	112.83	134.64	179.68	181.03
Italy	110.63	125.89	142.95	156.00
Portugal	78.10	96.11	141.23	149.58
Ireland	27.48	68.36	136.55	127.85
US	75.72	104.86	122.02	122.56
Belgium	93.54	109.03	117.59	129.68
Iceland	49.49	109.64	112.02	-
France	75.76	93.37	111.60	119.97
Canada	84.27	102.08	105.66	-
Spain	41.73	61.74	102.05	115.81
Austria	68.72	85.58	101.42	110.51
UK	50.12	75.75	100.80	111.56
Hungary	71.72	84.38	96.58	100.13
Germany	64.24	75.52	81.75	82.42
Slovenia	29.12	42.50	79.03	97.51
Israel	82.65	84.68	77.53	-
Netherlands	48.52	63.68	76.98	81.81
Finland	39.09	49.23	64.80	71.05
Poland	50.92	57.10	62.31	65.75
Slovakia	34.32	41.90	60.78	60.02
Australia	34.20	43.70	58.91	63.92
Czech Republic	30.25	41.01	58.35	56.98
Denmark	34.59	49.50	57.27	60.39
Sweden	51.82	54.46	54.05	60.84
Switzerland	50.46	46.40	45.68	-
Turkey		54.30	39.75	-
Norway	55.56	48.07	34.82	32.26
Korea	26.83	30.83	34.73	-
Luxembourg	11.90	19.03	30.06	30.65
Chile	12.18	13.44	19.45	23.08
Estonia	7.25	12.68	13.54	14.27
Mexico	27.90	37.14	-	-

Sources: OECD (2015c), OECD National Accounts Statistics (database), European Commission (2015), Government Finance Statistics (database), Eurostat

<Table 12> Local Currency Bonds Market in Asia

	2013 Q4		2014 Q3		2014 Q4		Growth rate (local currency, %)			
							2013 Q4		2014 Q4	
	Amount ($ bil)	Share (%)	Amount ($ bil)	Share (%)	Amount ($ bil)	Share (%)	q-o-q	y-o-y	q-o-q	y-o-y
China										
Total	**4,724**	**100**	**5,143**	**100**	**5,192**	**100**	**2.7**	**12.5**	**2**	**12.7**
Government	3,073	65	3,315	64.5	3,335	64.2	2.7	7.7	1.7	11.2
Corporate	1,652	35	1,828	35.5	1,858	35.8	2.7	22.6	2.7	15.3
Hong Kong										
Total	**195**	**100**	**194**	**100**	**194**	**100**	**0.9**	**9.7**	**-0.04**	**-0.2**
Government	108	55.7	110	56.8	109	56.4	0.4	16.1	-0.8	0.9
Corporate	86	44.3	84	43.2	85	43.6	1.5	2.6	0.9	-1.7
Indonesia										
Total	**108**	**100**	**124**	**100**	**123**	**100**	**6.8**	**20.1**	**1.6**	**16.8**
Government	90	83.3	105	85.4	106	85.4	7.9	20.9	1.7	19.8
Corporate	18	16.7	18	14.6	18	14.6	1.5	16.4	1.2	2.1
Korea										
Total	**1,641**	**100**	**1,715**	**100**	**1,703**	**100**	**2.5**	**10**	**2.6**	**7.8**
Government	626	38.2	674	39.3	701	41.2	1.9	7.9	7.5	16.4
Corporate	1,015	61.8	1,041	60.7	1,002	58.8	2.9	11.4	-0.5	2.6
Malaysia										
Total	**312**	**100**	**329**	**100**	**316**	**100**	**2.9**	**2.2**	**2.3**	**8**
Government	182	58.5	193	58.6	185	58.6	2.4	-0.2	2.2	8.3
Corporate	130	41.5	136	41.4	131	41.4	3.7	5.9	2.3	7.5
Philippines										
Total	**99**	**100**	**102**	**100**	**104**	**100**	**2.4**	**8.5**	**1.4**	**5.5**
Government	86	86.6	86	83.8	87	83.7	1.5	8	1.3	2
Corporate	13	13.4	17	16.2	17	16.3	8.7	12.4	2.3	28.5
Singapore										
Total	**244**	**100**	**252**	**100**	**241**	**100**	**1.5**	**9.1**	**-0.7**	**3.8**
Government	150	61.4	153	60.5	147	60.8	1.1	9.3	-0.3	2.8
Corporate	94	38.6	100	39.5	95	39.2	2.2	8.9	-1.4	5.5
Thailand										
Total	**275**	**100**	**283**	**100**	**282**	**100**	**0.8**	**5.6**	**1**	**2.9**
Government	214	77.7	213	75.4	211	75.1	-0.2	3.4	0.6	-0.5
Corporate	62	22.3	70	24.6	70	24.9	4.4	14.3	2.4	14.9
Vietnam										
Total	**29**	**100**	**38**	**100**	**41**	**100**	**14.8**	**15.6**	**7.9**	**43.1**
Government	28	97.6	37	98.5	40	98.5	15.4	17.9	7.9	44.4
Corporate	0.7	2.4	0.6	1.5	0.6	1.5	-6.8	-36	9.5	-9.6
East Asian Emerging Market										
Total	**7,627**	**100**	**8,180**	**100**	**8,196**	**100**	**2.6**	**11.1**	**2**	**10.6**
Government	4,557	59.7	4,887	59.7	4,921	60	2.4	7.7	2.4	10.9
Corporate	3,070	40.3	3,293	40.3	3,275	40	2.8	16.6	1.5	10
Japan										
Total	**9,990**	**100**	**9,742**	**100**	**8,972**	**100**	**1.1**	**4**	**0.6**	**2.1**
Government	9,203	92.1	8,998	92.4	8,292	92.4	1.1	4.7	0.7	2.5
Corporate	787	7.9	744	7.6	680	7.6	0.04	-3.4	-0.2	-1.7
India										
Total	**988**	**100**	**1,064**	**100**	**1,063**	**100**	**5.5**	**8.5**	**2**	**9.7**
Government	761	77	810	76.1	801	75.4	6.2	6.4	1	7.4
Corporate	227	23	254	23.9	261	24.6	3.3	15.8	5.2	17.5

Source: Asia Bond Monitor, ADB, Mar 2015.

3. Potential Benefits of Regional Repo Markets and Barriers

As collateral frameworks are already skewed and collateral supply and utilization widely vary per jurisdiction, countries encounter a fundamentally different ability when coping with capital flows.

Raising the status of Asian government bonds to globally eligible collaterals would lay foundations for globalizing regional financial markets, in addition to mitigating distorted capital flows, diversifying investment opportunities, and stabilizing international financial system.

Meanwhile, regulatory reforms have been underway in the post-crisis period to effectively protect consumers and investors, and strengthen systemic risk management. A renewed emphasis on stability engenders risk by driving up the price of safe assets, and worsening asset supply and demand mismatches.

Noting this, regulators should revise collateral management regulations in a direction that increases collateral fluidity through lifting various restrictions and enhancing their availability in the market. Additionally, efficient transfer of collaterals on the system requires an integrated infrastructure that can coordinate, monitor, and regulate all stages of settlement. It would be a long time before such a seamless infrastructure is put in place in Asia, let alone in the euro area where collaterals are actively used. Even in Europe, cross-border collateral transfer remains largely restricted due to various reasons: i.e. lack of consistent eligibility criteria, room for multiple interpretation on transaction terms, costly and risky practice of requiring identical collateral for different uses, discrepancy between internal and external rules governing the collaterals, and barriers to transferring collaterals across accounts on a custodian banking network.

Currently Europe is undergoing efforts to enhance the collateral market. T2S (Target 2-Securities) establishes a pan-European centralized DvP settlement system by standardizing cross-border settlement. EU CSDR (Central Securities Depository Regulation) seeks to harmonize settlement periods, record-keeping, principles of business conduct and prudential requirements across all CSDs and CCPs. Europe has also enhanced tri-party settlement interoperability between ICSD (International Central Securities Depository) and CSD.

In Asia, on the other hand, market infrastructure, production base for collaterals, and related regulations do not favorably work toward facilitating collateral markets. Each and every country have their unique regulations and infrastructure, which calls for the need to create a co-prospering ecosystem as the euro counterpart; Euro member states' sovereign bonds are accepted as collaterals even when some countries are fiscally worse off than Asian countries.

Efforts to internally source collaterals would engender futile results as long as policy priority is pegged on securing US dollar liquidity. Without building a strong repo market where regional assets can be utilized for funding, excessive resources would continue to be used for stabilization efforts. Nevertheless, efforts to build an efficient repo market remain few and far between. Not surprisingly, Asian countries continue to heavily depend on US dollar assets, further hindering development and advancement of regional financial markets.

Ⅳ. Tasks to Foster a Regional Repo Market

1. Understanding the Repo Market Ecosystem

First of all, market development drives need to be thoroughly analyzed from a market practitioner perspective. People engage in repo markets for various reasons: including risk management, investment returns, and liquidity supply. Other demand for the repo market comes from leveraged intermediaries' funding needs; in practice, banks and broker dealers monopolize wholesale funding market. Another important axis in a repo market is hedge funds for leveraging and short selling. Additionally, various pension funds that adopt LDI (liability-driven investment) strategies use repos to lend long-term high-quality securities for liquidity management and higher investment returns. Asset management companies can capture more opportunities to invest customers' assets through prime broker service in regional repo markets. Sovereign bonds are mostly lent for cash infusion, in which case, profits can be divided between a lender and an agent, and a lender gaining extra investment return by investing received cash.

For these reasons, the repo market has emerged as a critical element in advanced financial markets by facilitating price discovery and deepening liquidity.

Before seeking strategies to develop regional repo markets, prominent problems need to be identified. First, central banks in the region are overly focusing on hoarding US dollar assets. Second, regional repo markets are merely tapped to resolve short-term liquidity shortfall in most cases. Third, they hardly play a role in supplying safe assets, thus hindering market development.

2. Strategies to Develop a Regional Repo Market

We propose that the following aspects are fully considered before seeking specific measures to develop regional repo markets. First, creating a market-driven ecosystem needs to be emphasized in terms of liquidity supply and asset management. Establishment of a regional body in charge of repo market development needs to be discussed and implemented at ministerial level meetings. Public-private joint TF needs to be organized akin to the ICMA's Repo Council. At the same time, it is imperative to garner support from international financial institutions to build an overarching platform for regional repo markets. Institutional investors' asset management guidelines need to be revised to shift the current focus from 'holding' collaterals to 'utilizing' them, and concurrent efforts to attract global investment banks are necessary. Second, it is important to strengthen data collection capacity in the region by establishing a center that analyzes the data. Lastly, to reduce reliance on FX liquidity, the criteria of 'safety' and 'soundness' need to be modified to emphasize the capability of mobilizing liquidity in the organizations.

Meanwhile, governments need to revise their mode of operation so that repo market development would benefit to market practitioners. In addition to central banks' efforts for liquidity management, various elements—e.g. inter-banking transactions, maturity transformation, securities portfolio funding, and collateralized funding—need to be meshed together to stimulate an endogenous growth of market. Other issues to be addressed include collateral valuation and margin calls, and minimum level of haircuts.

It is particularly important that different countries work together to align market infrastructure, legal and tax provisions, since cross-border collateral flow is essential for smooth repo market functioning.

To foster increasingly important repo markets, it is critical to establish an eligible collateral criteria, build a regional consensus to invest in market infrastructure, and produce a consistent guideline across jurisdictions.

Under this circumstance, the Bank of Korea bears an epic responsibility of leading and overseeing initiatives to nurture fledgling repo markets in Korea. To facilitate this effort, researchers in the region need to come together to form a working-level network and establish an overarching guideline.

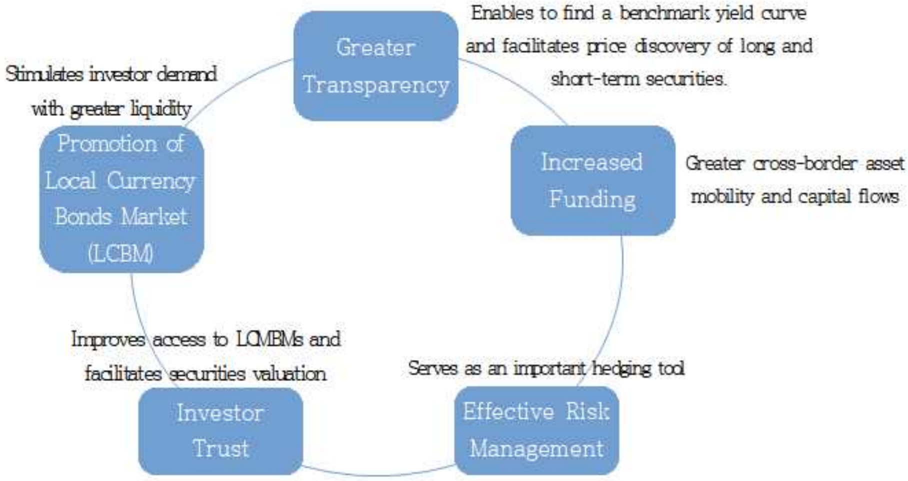
In this study, we emphasize two key aspects of fostering Asian repo markets: i) practical and reasonable criteria for eligible collaterals ("pumping") and ii) strategies to better utilize safe assets ("plumbing" for greater collateral velocity).

<Table 14> Current State of Asian Repo Markets and Key Considerations

Area	Current Barriers	Considerations
Legal Structure	Discrepancies in terms of transaction enforceability, investor protection, and bankruptcy procedures across the region	1. Legal and systematic revisions to reflect characteristics of repos 2. Creditor protection across different bankruptcy procedures 3. Recognition of repos in case of bankruptcy/default 4. Information sharing on repo agreements among regulatory and tax authorities
Legal Design of Repos	Widely varying legal design of repo agreements across the region	1. Legal design to enhance consistency and predictability of cross-border repo transactions 2. Protection of securities provider's rights in case of borrower's default
Market Structure	Lack of accessibility to pricing information and coordination among countries	1. E-platform to enhance real-time transactions 2. Interoperability of core market infrastructure; development of ICSD, CSD, SSS
Fluidity	1. Limitation of local-currency bonds market 2. Limited use of bonds in repo markets 3. Restricted access for foreign investors 4. Lack of liquid assets 5. Strong tendency for asset holding until maturity 6. Statutory liquidity reserves 7. Limited participation of institutional investors	1. Utilization of local currency bonds as collaterals 2. Promoting cross-border collateral use and expanding pool of available securities based on cooperation with regional central banks 3. Improved access for foreign investors 4. Eased obligation on asset holding until maturity 5. Promoting full transfer of collateral ownership and deepening secondary market liquidity to extend collateral chain 6. Attraction of institutional investors
FX Regulation	Ceilings on FX exchanges and cross-border remittances	Eased regulation to stimulate cross-border local currency bonds and repo markets; investment diversification
Tax Treatment	Reduced liquidity supply due to holding tax, transaction tax, and stamp duty	Attracting market participants through agreements on double taxation
Market Access	Stunted liquidity supply and advancement of cross-border repo markets due to various restrictions on foreigners.	Eased regulation to attract foreign institutional investors; investment diversification to deepen market liquidity

Source: ASIFMA, Developing a Repo Best Practice Guide for Asian Markets, Jul 2014.

<Fig 6> Impact of the Repo Market on Real Economy



Source: ASIFMA, Developing a Repo Best Practice Guide for Asian Markets, Jul 2014.

<Table 13> Repo Market Volume to GDP Ratio (US, %, USD bil.)

Year	$Repo_{year}$	$Rev.Repo_{year}$		GDP_{US} (USD bil.)	
1996	245	182	426	8,100	53
1997	291	222	513	8,609	60
1998	355	279	634	9,089	70
1999	340	268	608	9,666	63
2000	361	274	636	10,290	62
2001	448	329	777	10,625	73
2002	546	405	951	10,980	87
2003	589	422	1,011	11,512	88
2004	719	521	1,239	12,277	101
2005	825	591	1,416	13,095	108
2006	847	556	1,403	13,858	101
2007	973	622	1,595	14,480	110
2008	985	653	1,638	14,720	111
2009	645	459	1,104	14,418	77
2010	663	518	1,181	14,958	79
2011	689	549	1,238	15,534	80
2012	686	541	1,226	16,245	76
2013	666	501	1,167	16,800	70

Sources: Securities Industry and Financial Markets Association (ASIFMA), World Bank Indicator

<Fig 7> Three Key Elements to Stimulate Asian Repo Markets

Realigning Legal Structure

- Clear legal provisions to protect creditor rights in case of borrower's default/ bankruptcy
- Coordination with traditional repo transactions in Asia (i.e. transfer of title ownership)
- Legal framework that acknowledges verity and enforceability of repo agreement

Deepening Market Liquidity

- Greater participation of institutional investors and corporates
- Pricing criteria for greater market transparency
- Enhanced market access for foreign investors
- Eased regulation on FX exchanges and remittance

Integrating and Strengthening Market Infrastructure

- Enhanced access to real-time price information
- Interoperability among core market infrastructure: development of ICSD, CSD, SSS to facilitate cross-border asset mobility

Source: ASIFMA, Developing a Repo Best Practice Guide for Asian Markets, Jul 2014.

According to the current eligible collateral criteria (ICMA), Asian government bonds are deemed ineligible for no apparent reasons. To redress, Asian countries need to supply high-quality assets to meet their own collateral needs, and expand infrastructure investment to better utilize regional collaterals.

As a recap, this study proposes to revise current criteria for eligible collaterals in order to increase the collateral pool and its use. Specifically, we make the following suggestions. First, Korean and Chinese government bonds need to be taken as eligible collaterals to circulate in repo markets. Second, efforts are called for to channel parts of FX reserves held by governments or institutional investors to repo markets. Coordination and cooperation with the ICMA and ECB would be important to globally acknowledge and accept these efforts. Finance ministers' meeting could be an effective forum to launch these initiatives, along with concurrent efforts to produce a pan-regional guideline for collateral sourcing and utilization.

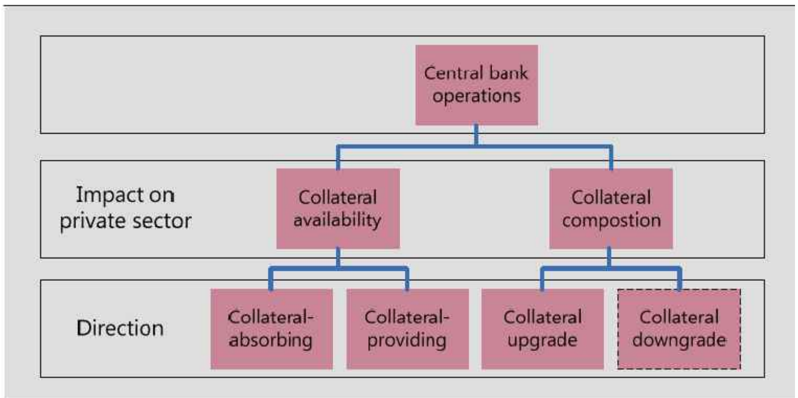
Institutional investors, on their part, need to pursue more active asset management, shifting away from the widespread practice of holding assets until maturity.

Meanwhile the Basel Committee on Banking Supervision regards the current collateral scarcity as a temporary phenomenon that can be resolved through price adjustment and external supply factors. That is, current international financial institutions consider an increased collateral demand can foster a robust Asian collateral pool through increased collateral utilization and supply rather than an infusion of new collateral.

If visible efforts are made in the region to stimulate supply and demand of regional collaterals, greater market trust will be constructed as an effective follow-up measure to the CMIM (Chiang Mai Initiative Multilateralization).

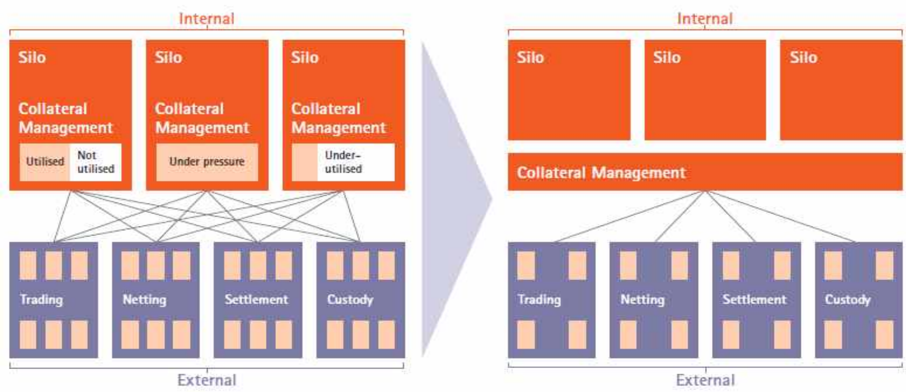
The primary task at this point would be to create an inducive environment and provide strong incentives to encourage repo market participation.

<Fig 8> The Scarcity Channel and Central Bank Operations



Source: BIS, Central bank operating frameworks and collateral markets, Mar 2015.

<Fig 9> Efficient Collateral Management with Designated Desk at Banks

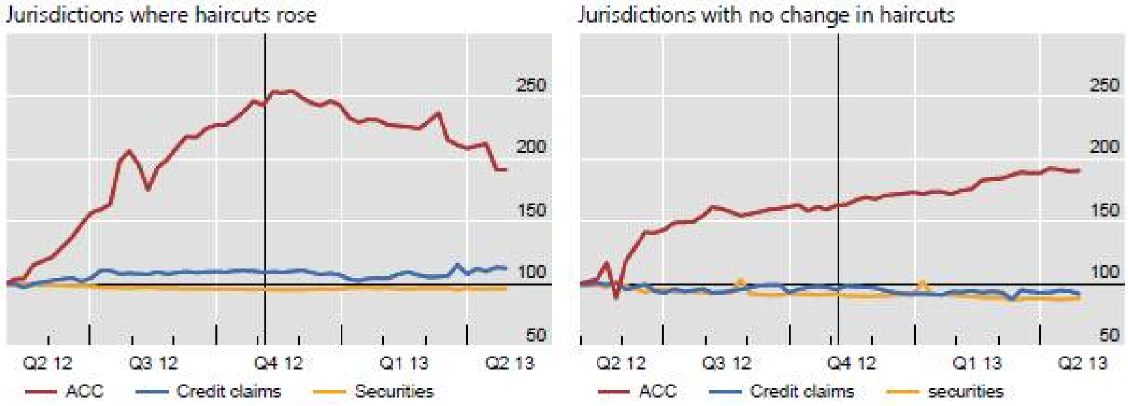


<Table 15> Eurosystem Collateral Eligibility Expansion: Price Impact on Affected Assets

	15 Oct 2008	12 Nov 2008	6 Sep 2012	All dates (pooled)
Number of observations	351	339	283	973
Observations >0	236	222	110	568
Observations <=0	115	117	173	405
Median	0.02	0.02	-0.01	0.01
Mean	0.18	0.03	-0.09	0.05
p-value (t-test: mean >0)	0.08	0.40	0.93	0.23

Source: BIS, Central bank operating frameworks and collateral markets, Mar 2015[5)]

<Fig 10> Collateral Use at Concerned Eurosystem Central Banks (Apr 25, 2012 = 100)



Source: BIS, Central bank operating frameworks and collateral markets, Mar 2015[6)]

Growth of regional repo markets for short-term funding has been lackluster because liquidity supply is dominated by central banks and also because market participants stand on the same side whether funding over-supply or shortfall. One of key tasks to stimulate repo markets would be to promote market-driven funding.

To recap, it is essential to revise global criteria for eligible collateral and initiate massive investment in regional repo markets so that capital outflows to key currency countries can be curbed to some extent. Greater efforts are mandatory to enhance collateral value of Korean government bonds, which would not only contribute to the national economy but also strengthen global financial stability.

Ⅴ. Expected Benefits of Advanced Regional Repo Markets

These days repo markets are not only tapped for liquidity but also serve as a means of managing risk. To ensure regional financial stability, regional repo markets

5) Price response was calculated based on time difference between a day before and after the announcement (Source: ECB)

6) The vertical line indicates the date of implementing a higher ACC haircut (2012. 11. 7)

need to develop enough to deal with liquidity shortfall and collateral over-supply when the US Fed begins to unwind quantitative easing.

Meanwhile, a prolonged period of ultra low interest rate is delaying necessary restructuring efforts by obstructing healthy credit flows and market practitioners' risk calculation, and also severely obstructing investment and job creation. Combined with governments' unconventional monetary policy, financial market functioning is being disrupted, further delaying an economic recovery.

<Table 16> Cash Holding by Major Korean and US Corporations

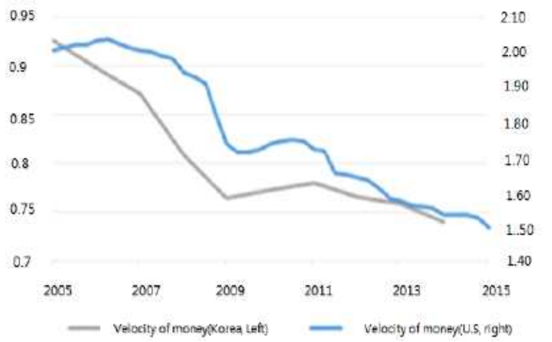
Top 5 Korean companies	Cash holding (tril. won, 2014 Q1)	Top 5 US IT firms	Cash holding (bil. USD, 2015 Q2)
Samsung	182.4	Microsoft	96.5
Hyundai Motors	113.9	Google	69.8
SK	58.5	Cisco Systems	60.4
LG	49.6	Oracle	54.4
POSCO	44.5	Apple	34.7

Source: CEOscore, FactSet

<Fig 11> US Labor Market and Investment

Source: FRB

<Fig 12> Velocity of Money in Korea and US



Sources: BOK, FRB

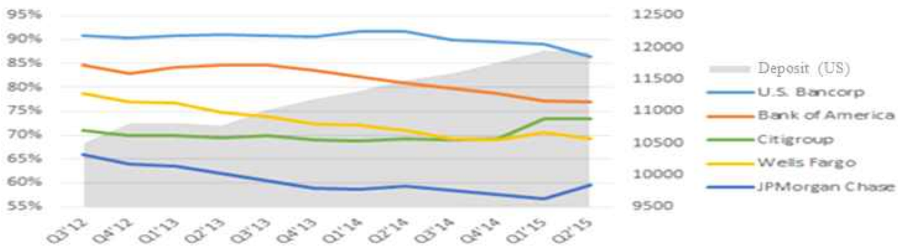
What is particularly worrisome is that it is nearly impossible to normalize monetary policies under the current financial system. Collateralized funding has grown important in the post-crisis period, and yet, due to a heavy bias toward US dollar assets, emerging markets experience severe restrictions in both supply and utilization of collaterals. Despite an overall scarcity of eligible collaterals, Asian assets remain largely underutilized, with little attempts for internal asset supply within the region. Continuing reliance on US dollar assets and a disregard for Asian government bonds perpetuates dependence on the external system by crippling efforts to foster regional markets. Meanwhile, with recurring crises, the US dollar-centric system has been over-extended to the point of debilitating systemic elasticity that is critical for market adjustment.

All-out global support should be given to build an asset base in Asia and utilize its assets so as to minimize looming interest rate shocks and ensure smooth exits from post-crisis largess in key currency countries[7].

The primary task is to resolve global collateral scarcity by using Asian assets, which would also absorb interest rate shocks coming from the US. The key is to tap strong-performing Asian sovereign bonds to increase the supply and utilization of collaterals. Repo market infrastructure needs to be more actively used to facilitate the supply and utilization of assets that accurately reflect underlying conditions.

<Fig 13> LTD Ratio and Deposit Volume of Major US Banks

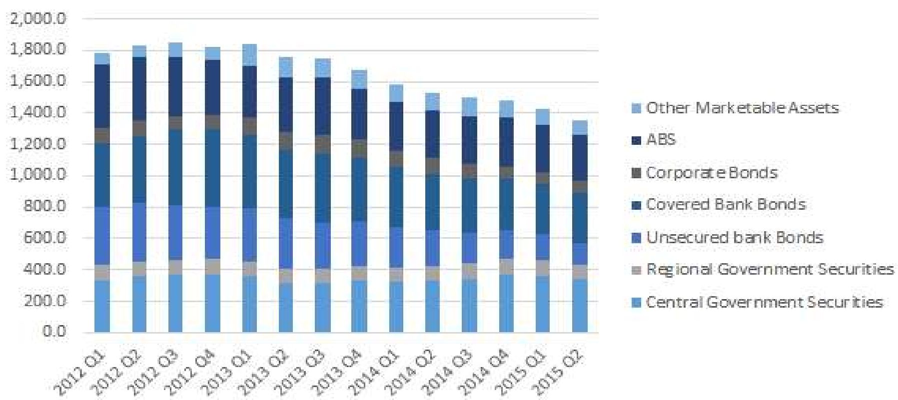
(Unit: bil. USD)



Source: FDIC,BankRegData.com

<Fig 14> Composition of Collaterals Utilization in Eurozone

(Unit: EUR bil.)

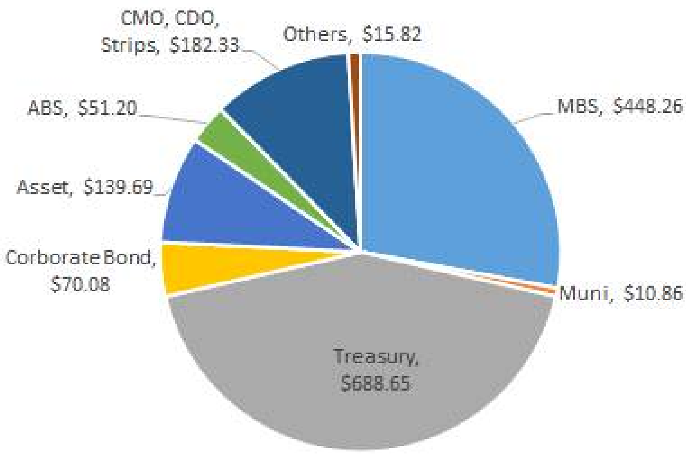


Source: ECB, https://www.ecb.europa.eu/paym/coll/charts/html/index.en.html

7) Gongpil Choi, A Regional Repo Market Initiative for Global Financial Stability, Korea Institute of Finance, 2014. 12.

<Fig 15> Use of Collaterals in US Tri-party Repo Market

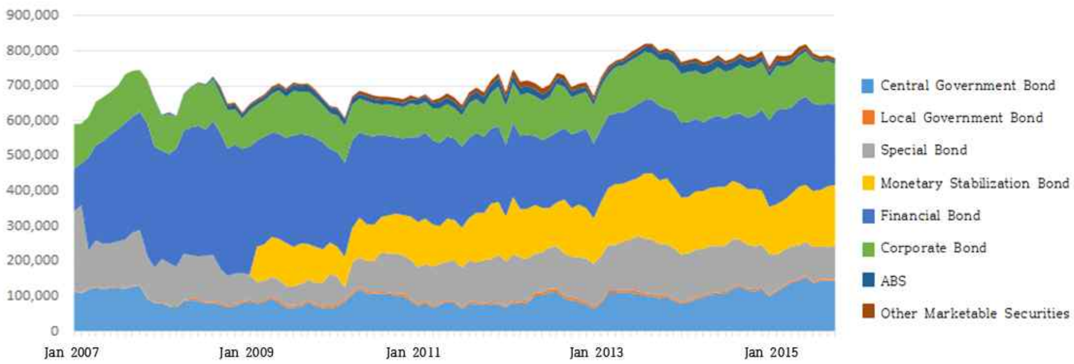
(Unit: USD bil.)



Source: FRB New York, Sep 2015

<Fig 16> Repo Amount Outstanding in Korea

(Unit: 100 mil. won)



Source: KOFIA

Ⅵ. Conclusion and Policy Implications

In Asia, developing a regional repo market is critical to facilitate financial industry advancement and lay the foundations for endogenous financial growth while achieving a more sustainable and balanced economic growth. It is also expected to contribute to financial stability within the region and globally.

In order to draw market practitioners to engage in regional repo market activities, it is vital to provide a visionary long-term roadmap backed by specific plans.

As of 2015, urgent tasks include 1) setting up and fine-tuning regional criteria for eligible collaterals, 2) encouraging broader use of pension funds and sovereign wealth funds as collateral, and providing a guideline thereof, and 3) establishing a regional institution and infrastructure for various services including mediation over legal disputes surrounding cross-border repo transactions, counterparty risk management, collateral management, clearing and settlement, exchange, collateral pricing, and custodian service.

For efficient operation of repo markets, the importance of banks' collateral desks needs to be highlighted given that banks' collateralized funding is the key player in market making.

Meanwhile, banks' demand for HQAs and HQLAs is likely to grow as clearer evidence of repayment ability is required in times of stress.

All these developments point to a growing need for collateral related research as the importance of secured lending has emerged in the post-crisis period for macro-prudential reasons.

This study aims to fill in blanks left in previous discussions on development of Asian repo markets, namely, world-wide collateral scarcity, drawbacks of current criteria for eligible collaterals, lack of infrastructure related to supply and trading of collaterals, and the need for safe asset supply within the region. It has been noticed that the importance of collaterals grew sharply after the global financial crisis, and that collateral holding and utilization is pivotal for financial market stability and efficiency. Further, as market funding grows more important, the role of the repo market is growing as a building block for short-term funding market. Although repo markets worked as one of triggers of the global financial crisis, they are more resilient to shocks compared to other financial markets, and play a fundamental role in funding; for this reason, the task of ensuring its smooth operation cannot be delayed anymore.

It is imperative that repo markets should be developed for better utilization of collaterals that play a pivotal role in credit creation and intermediation, and ultimately financial market stability.

Particularly, collateral is a crucial factor in market funding, but Asian countries currently have no choice but to cling to advanced countries' government bonds. To address this structural problem, groundbreaking measures need to be taken across the region. On the supply side, eligible collateral criteria need to be adjusted to utilize high quality Asian government bonds. A proposal in this direction needs to be made to organizations including ICMA (International Capital Market Association), ASIFMA, and the Repo Council. Also, measures for broader use of Asian sovereign bonds as collaterals need to be suggested to institutions such as the ECB and ICMA.

Adjusting the eligible collateral criteria alone would not suffice; acknowledging regional collaterals and actually using them in the market should be top priority. Posting Korean government bonds on the HKMA platform would be a stepping stone to such initiative. More progressive effort is required to create a regional network among securities depositories and exchanges of respective countries, and pursue establishment of ASIFMA (Asia Securities Industry and Financial Markets Association).

As an interim step to raise the status of domestic securities to a global standard, it is necessary to set up a self-regulating body that will facilitate repo transactions based on collaterals in the region. Specifically, KRX, KOFIA, and other related institutions need to work with, for instance, JSDA of Japan or SAC of China to establish a self-regulating body. Since regulations and legal provisions governing capital and securities markets widely vary across the Asian region, it is imperative to integrate a regulatory framework as a means to minimize arbitrage costs and build an infrastructure to better utilize savings and collaterals. Such an effort needs to be eventually scaled up to ASEAN+3 Self-regulatory Organization to reshape the overly conservative order of the current Asian securities market, and loosen the eligible collateral criteria to rein in financial risks. At the same time, the self-regulatory organization and supervisory authority of respective countries need to collaborate and allocate the role of monitoring and supervision suitable for each jurisdiction to avoid market confusion.

Additionally, the HKMA platform should scale up to better utilize available collateral. One of the practical ideas would be to channel SWFs and FX reserves contained in silos to cross-border repo markets. Concurrent efforts are required to stimulate repo transactions and utilize Chinese and Korean government bonds as eligible collateral for internal supply.

To develop and utilize regional collateral, various alternatives and related issues need to be explored: including development of regional currency, a possibility of using regional safe assets as reserve assets, and development of EM index bonds. Growth of Asian financial markets has been impeded by an excessive reliance on US dollar assets as Asia's prime assets are not effectively tapped in the market (less than 10% of regional assets are collateralized). Fostering regional repo markets would be pivotal for normalizing global capital flows and achieving a more balanced growth. Without efforts to utilize regional assets and severe a crippling dependence on foreign assets, it is impossible to advance the regional financial market.

This study is expected to lay solid and practical foundations for internationalization of the Korean currency by proposing measures to increase Korea’s contribution to global financial stability while building internal financial capacity.

Financial firms face a steep challenge under the changing post-crisis regulatory environment. Collateral management is critical for securing liquidity amid a possibility of liquidity crunch in the future. The ability of central banks and financial institutions managing collateral is likely to affect liquidity management and risk management significantly. Meanwhile, private corporations that are at the forefront of cash hoarding have not gained market trust to contribute to risk management. Under this circumstance, corporations and financial institutions in Asia might confront substantial risks unless they step up collateral management ability. Concurrently, preparations should be made to deal with costs and risks associated with the growing demand for collaterals.

We are at a critical juncture where regional leadership is direly needed to lay the groundwork for sustainable growth and financial market stability in the region. Noting this, the Korean government and market practitioners need to redouble efforts to stimulate the regional repo market for greater use of collaterals to unleash more investment opportunities for shared growth and prosperity of the region.

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