EMEAP
Executives' Meeting of East Asia-Pacific Central Banks

EMEAP Money Markets

Survey Report

EMEAP Working Group on Financial Markets

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This report was compiled by the Executives' Meeting of East Asia-Pacific Central Banks (EMEAP) Working Group on Financial Markets (WGFM) under the chairmanship of Mr. Eiji Maeda, Executive Director of the Bank of Japan.

Contents

Members

Members of the Executives' Meeting of East Asia-Pacific Central Banks (EMEAP)[1] Working Group on Financial Markets (WGFM)[2] are listed below. Members that took a lead role in compiling this report have an asterisk next to their names.

Reserve Bank of Australia*
People's Bank of China
Hong Kong Monetary Authority
Bank Indonesia
Bank of Japan*
Bank of Korea*
Bank Negara Malaysia
Reserve Bank of New Zealand
Bangko Sentral ng Pilipinas
Monetary Authority of Singapore
Bank of Thailand

[1] EMEAP, established in 1991, is a cooperative organization of central banks and monetary authorities in the East Asia and Pacific region. Its primary objective is to strengthen the cooperative relationship among its members. It comprises the central banks of eleven economies: Australia, China, Hong Kong, Indonesia, Japan, South Korea, Malaysia, New Zealand, the Philippines, Singapore, and Thailand.

[2] The WGFM studies financial market developments in EMEAP member jurisdictions as well as on ad-hoc topics that may arise from time to time, promotes local currency denominated bond markets through the Asian Bond Fund initiative, and serves as a platform to exchange views on market conditions among member central banks.

Executive summary

Money markets serve as an important infrastructure for both private financial institutions and central banks. They are where financial institutions manage short-term funds based on their outlook on interest rates and their demand for, or supply of, funds. While the EMEAP money markets continue to have ample liquidity, partly thanks to prolonged capital inflows, this could start to decrease gradually if there were a reversal of capital flows. This report aims to record the state of play in the money markets, together with policy initiatives taken in the EMEAP region. While acknowledging that money markets have evolved in a manner unique to each jurisdiction, this report provides a reference to assist with further development of money markets in the region.

The WGFM Survey reveals that the EMEAP money markets have grown as a whole over the past several years, not only because of sound economic development but also thanks to the policy initiatives taken in the region. These policy initiatives have been designed in line with the unique structure and development trajectory of each market. This survey confirms the diversity of market size across jurisdictions, and shows the variety in the composition of market participants. Notably, some markets are dominated by the central bank and local banks, while other markets are more diversified, including non-banks and foreign financial institutions. These attributes highlight the different challenges facing each jurisdiction in further deepening their own market and coping with a possible tighter financial environment.

Given that the underlying challenges in money markets could become more evident at some point in the financial cycle, this report reviews policy initiatives to support money market development by incorporating insights from private market participants with experience in the EMEAP jurisdictions. Policy initiatives have been undertaken in three areas of particular interest:

(i) Promotion of repurchase agreements (repos). Initiatives have included regulatory reforms to promote non-bank participation and liberalization of short-selling, or the introduction of securities lending to improve the liquidity of the secondary market for bonds.

(ii) Groundwork for enabling term transactions. There have been efforts to streamline post-trade processes and to alleviate administrative costs pertaining to term transactions.

(iii) Revision of monetary operational frameworks to advance smooth and stable formation of interest rates, and to contribute to better preparation for the changing financial cycle.

The compilation of this report is just one of the ways in which EMEAP is working to further

financial market development in the region. EMEAP also recently introduced PAIF Securities Lending to support the liquidity of local currency-denominated bonds in the secondary markets, thereby further enhancing the function of regional money markets. EMEAP remains committed to contributing to financial market development through a wide range of activities.

1. Introduction

1. **Money markets serve as important infrastructure for both private financial institutions and central banks.**[3] Money markets are where financial institutions manage short-term funds by trading a variety of instruments: uncollateralized loans, repurchase agreements (repos), foreign exchange swaps (FX swaps), certificates of deposits, and commercial paper. Such transactions are based on financial institutions' outlook on interest rates and their demand for, or supply of, funds. The various instruments traded in money markets are also used by many central banks in the implementation of monetary policy, and the rates play a central role in the transmission of monetary policy.

2. **To provide a basis for market development, the WGFM conducted surveys and published reports on EMEAP money markets in 2010[4] and 2014.[5]**

   - The first report by the EMEAP WGFM (2010) was compiled based on the experience of the adverse impact of the global financial crisis on EMEAP money markets. Financial markets in EMEAP jurisdictions were able to withstand international strains at the time for a number of reasons, including proactive provision of sufficient liquidity. Nevertheless, EMEAP members acknowledged the need to work towards developing markets amid growing concerns over the European sovereign debt crisis.

   - The second report by the EMEAP WGFM (2014) undertook a stock-take on the repo market as a part of the money market. Repo markets were seen as having room for further development, as there was traditional reliance in the region on unsecured funding amid a prolonged period of excess liquidity, a lack of counterparty risk aversion, and in some cases additional operational complexities and obligations associated with repo.

3. **The 2018 WGFM Report is compiled at a different point in the financial cycle from the past.** While EMEAP money markets have deepened, partly on the back of policy initiatives to address the challenges described in the past reports, the functioning of these money markets could be affected at a turning point in the

[3] Unless stated otherwise, "private" stands for "non-central bank" in this report. "A private money market" refers to a money market excluding central bank operations. Similarly, "a private financial institution" refers to a non-central bank financial institution, and may include state-owned financial institutions.
[4] EMEAP WGFM (2010)
[5] EMEAP WGFM (2014)

financial cycle. That is, whereas demand for cash in local currency in money markets may have been subdued amid abundant liquidity partly related to capital flows, a possible decrease in liquidity under the new financial cycle could pose challenges for money markets.

4. **An increase in demand for funds amid a reduction in liquidity could increase the importance of having well-functioning money markets.** While EMEAP money markets currently have ample liquidity partly related to strong capital inflows, this could start to decrease gradually if there were a reversal of earlier capital inflows. It would then be increasingly important for money markets to be able to redistribute funds smoothly and efficiently across market participants. A wider variety of market participants could help to deepen the market, making it easier to withstand any negative impact from changes in market sentiment. Increased liquidity of collateral assets and increased availability of term transactions would also support the ability of financial institutions to meet their funding needs in the money markets.

5. **Some central banks may need to adjust their monetary policy implementation in the event of a reversal of the financial cycle.** Given the close relationship between the foreign exchange market and the money market, a number of central banks need to take into account developments in capital flows and the foreign exchange rate when managing domestic market liquidity. Some EMEAP member central banks have weathered challenges stemming from capital inflows and upward pressure on local currencies. To ensure effective domestic liquidity management, it is vital that central banks not only strengthen the self-adjustment mechanism of money markets but also enhance their monetary policy implementation tools.

6. **The 2018 WGFM Report considers the state of play in the money markets and the policy initiatives taken in EMEAP jurisdictions. While acknowledging that money markets have evolved in a manner unique to each jurisdiction, this report provides a reference to assist further development of money markets in the region.** To support the compilation of this report, the WGFM conducted a survey (2017 WGFM Survey)[6] and shared experiences among EMEAP member central banks on the policy initiatives taken in each jurisdiction. The WGFM also held roundtable discussions with various private market participants: local banks, internationally active banks and non-bank financial institutions. The 2018 WGFM Report summarizes the findings from these activities. In particular, the report focuses on developments and initiatives taken

[6] See Annex for more details of the 2017 WGFM Survey.

since 2010, when the WGFM carried out a comprehensive analysis of the money markets in the region.

7. **The structure of the report is as follows.** Chapter 2 provides the results of the 2017 WGFM Survey on the size and structure of money markets. Chapter 3 reviews policy initiatives to support money market development in the region, with a particular focus on (i) repo markets, (ii) term transactions, and (iii) monetary operational frameworks, followed by concluding remarks in Chapter 4.

2. Money market structure

This chapter discusses the state of play in EMEAP money markets by drawing on the results of the 2017 WGFM Survey. Notably, EMEAP money markets have grown since 2010 on the back of the sound economic development and policy initiatives. The survey results also highlight the diversity across jurisdictions in terms of market size, as well as the composition of market participants (e.g. some markets were dominated by central bank and/or local bank activity while other markets had more diversified activity that included non-banks and foreign financial institutions). As such, policy initiatives across the region have varied, designed in line with the unique structure and development trajectory of each market. The diversified features summarized in this chapter highlight the challenges unique to each market, which provide a basis for discussion in Chapter 3.

2.1. Market size

8. **Activity among private participants in EMEAP money markets has grown in most jurisdictions over the past several years.**[7] Table 2-1a shows that private sector activity in money markets has grown in absolute terms in all EMEAP jurisdictions, except for the Philippines.[8] While this expansion can be partly attributed to overall economic growth, Table 2-1b shows that private sector activity in money markets has also increased as a share of GDP in many jurisdictions. That is, in many cases, private activity in money markets has grown faster than the overall economy.

Table 2-1 Growth of money markets (excluding central bank)

a. Annualized growth of absolute size between 2010 and 2016

Southeast Asia						Northeast Asia			Oceania	
ID	MY	PH	TH	SG	HK	CN	KR	JP	AU	NZ
+12.05%	*+8.21%*	-7.43%	+5.82%	*+1.01%*	*+5.35%*	*+25.78%*	+11.78%	+0.23%	+4.88%	*+2.85%*
(U+R+F)	(All)	(All)	(U+R+F)	(U+R+F)	(U+F)	(U+R)	(U+R+O)	(All)	(All)	(U+R+F)

[7] The 2017 WGFM Survey was based on existing and accessible data for EMEAP member central banks. As a result, the size of some markets was reported based on the amount outstanding, whereas other market sizes were reported based on turnover. Amount outstanding and turnover represent different aspects of a market, in that the former indicates the size of stock, whereas the latter indicates the size of flow. Careful interpretation is therefore required when studying the figures in this report. For simplicity, this report does not always note the implications derived from the variation in reporting practices across markets, but the evaluations are based on comparable data.

[8] The drop in the Philippines' FX swap market size may be attributed to the reduction in capital inflows to the country. During 2010 to 2013, the Philippines had net inflows partly owing to the country's sound macro-economic fundamentals and improvement in its country credit ratings. Nonetheless, subsequent years showed reduced inflows amid regulatory adjustments by the BSP on banks' forward transactions (On 16 March 2013, the BSP issued Circular No. 790 which was a macro-prudential measure for handling non-deliverable forwards (NDFs) involving the Philippine peso).

b. Change as a % of GDP between 2010 and 2016

ID	MY	PH	TH	SG	HK	CN	KR	JP	AU	NZ
+0.02%p	*+0.07%p*	-4.41%p	+1.31%p	*-1.47%p*	*-0.30%p*	*+1.94%p*	+5.16%p	-2.10%p	+2.28%p	*-0.35%p*
(U+R+F)	(All)	(All)	(U+R+F)	(U+R+F)	(U+F)	(U+R)	(U+R+O)	(All)	(All)	(U+R+F)

Note: 1. Amount outstanding. Figures reported in daily turnover are *underscored*. Data in 2017 is referred to where data in 2016 is not available.
2. Letters in brackets show the type of instruments included in the overall size of a money market. U: uncollateralized market, R: repo, F: FX swap, O: others (e.g. T-bills, CDs and CPs).

Source: 2017 WGFM Survey, World Development Indicators

9. **If we look at the growth in money markets across different instruments, we observe that the growth of repo and FX swap markets each has exceeded that of uncollateralized markets in many jurisdictions.** Table 2-2a shows ten jurisdictions reported higher growth rates for repos or FX swaps compared to the uncollateralized call market, in absolute terms. In order to take into account the effect on market size of economic growth, Table 2-2b shows the growth of money markets relative to GDP. Table 2-2b shows nine out of eleven jurisdictions saw a decline in the size of the uncollateralized call market relative to GDP. In contrast, among the nine, seven jurisdictions saw an increase in repo activity relative to GDP, while six saw an increase in FX swap activity. In other words, the decrease in uncollateralized transactions was coupled with an increase in collateralized transactions. It is also notable that repo market activity relative to GDP expanded in seven of the ten jurisdictions. This contrasts with the US and EU where repo markets contracted after the global financial crisis and have seen little recovery.[9]

Table 2-2 Growth of money markets by instrument (excluding central bank)

a. Annualized growth of absolute size between 2010 and 2016

	ID	MY	PH	TH	SG	HK	CN	KR	JP	AU	NZ
Uncollateralized	*+4.38%*	*-2.65%*	-	-3.48%	*-10.42%*[10]	*-0.20%*	*+1.48%*	-12.26%	+2.89%	-5.78%	*-1.02%*
Repo	*+13.69%*	*+63.98%*	-	+2.94%	*+10.77%*	n.a.	*+38.68%*	+30.20%	+10.89%	+6.80%	*+14.85%*
FX swap	*+24.70%*	*+16.47%*	-7.50%	+6.76%	*+1.61%*	*+8.94%*	+35.28%	n.a.	+0.43%	+7.11%	*-0.47%*
Others	n.a.	*+7.33%*	-	n.a.	n.a.	n.a.	n.a.	+13.93%	-15.83%	-0.77%	-
Total	***+12.05%***	***+8.21%***	**-7.43%**	**+5.82%**	***+1.01%***	***+5.35%***	***+25.78%***	**+11.78%**	**+0.23%**	**+4.88%**	***+2.85%***
	(U+R+F)	(All)	(All)	(U+R+F)	(U+R+F)	(U+F)	(U+R)	(U+R+O)	(All)	(All)	(U+R+F)

[9] CGFS (2017)

[10] The reduction in the overall turnover in the uncollateralized call market in Singapore is attributed to the issuance of central bank bills (MAS Bills). In particular, MAS started issuing MAS Bills in 2011, which would have the effect of replacing longer-term uncollateralized call transactions in Singapore.

b. Change as a % of GDP between 2010 and 2016

	ID	MY	PH	TH	SG	HK	CN	KR	JP	AU	NZ
Uncollateralized	*-0.04%p*	*-0.22%p*	+0.01%p	-0.42%p	*-0.79%p*	*-1.56%p*	*-0.33%p*	-1.77%p	+0.25%p	-0.35%p	*-0.06%p*
Repo	*+0.00%p*	*+0.02%p*	+/- 0.00%p	-0.37%p	*+0.26%p*	n.a.	*+2.27%p*	+2.40%p	+9.07%p	+0.55%p	*+0.45%p*
FX swap	*+0.05%p*	*+0.27%p*	-4.42%p	+2.11%p	*-0.95%p*	*+1.26%p*	+8.05%p	n.a.	-0.27%p	+5.97%p	*-0.74%p*
Others	n.a.	*+0.00%p*	+0.00%p	n.a.	n.a.	n.a.	n.a.	+4.53%p	-11.14%p	-3.89%p	+0.15%p
Total	***+0.02%p*** (U+R+F)	***+0.07%p*** (All)	**-4.41%p** (All)	**+1.31%p** (U+R+F)	***-1.47%p*** (U+R+F)	***-0.30%p*** (U+F)	***+1.94%p*** (U+R)	**+5.16%p** (U+R+O)	**-2.10%p** (All)	**+2.28%p** (All)	***-0.35%p*** (U+R+F)

Note: 1. Amount outstanding. Figures reported in daily turnover are *underscored*. Data in 2017 is referred to where data in 2016 is not available.
2. Letters in brackets show the type of instruments included in the overall size of a money market. U: uncollateralized market, R: repo, F: FX swap, O: others (e.g. T-bills, CDs and CPs).
3. The instrument which recorded the highest growth among the comparable data in each jurisdiction is highlighted in red.

Source: 2017 WGFM Survey, World Development Indicators

10. **Some of the expansion in collateralized markets can be attributed to policy initiatives to encourage collateralized transactions.** The expansion in some repo markets was partly due to policy initiatives to foster repo markets in some jurisdictions.[11] In particular, the Korean market has seen a shift in activity away from the uncollateralized call market towards repo markets since 2010, largely driven by the Korean government's policy to restrict certain non-bank financial institutions from uncollateralized transactions in order to generate more activity in repos (See Chapter 3.1 for details). The Indonesian FX swap market's growth is largely attributed to policy initiatives to promote hedging of foreign currency debt and managing liquidity.[12]

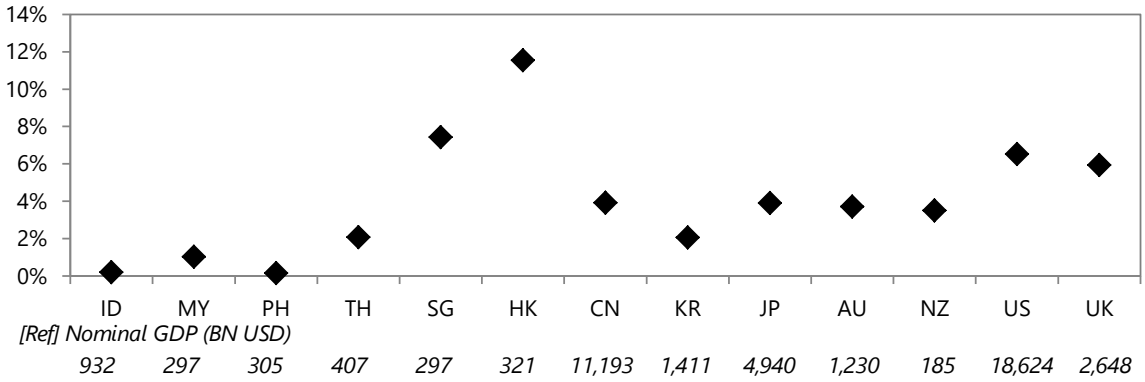
11. **Though money markets have grown in many jurisdictions, activity in money markets as a share of GDP varies significantly across jurisdictions.** Chart 2-1a shows the volume of daily turnover of money markets as a share of nominal GDP in eleven EMEAP jurisdictions, the US and the UK. The chart shows that the total money market turnover as a share of GDP varies significantly across EMEAP jurisdictions. The money market size of some EMEAP jurisdictions, such as Singapore and Hong Kong, was comparable to that in the US and the UK. While the money market size of several other jurisdictions was still modest compared to the size of their economies, most of these jurisdictions recorded a growth during 2010-2016 and have executed policy

[11] The impact of global financial regulations on EMEAP repo markets remains unclear. As discussed in CGFS and MC (2015), the overall impact of global financial regulations on money markets is ambiguous.
[12] Bank Indonesia (BI) introduced regular FX swap auctions in July 2013 and mandatory hedging against foreign debts of corporates at the end of 2014.

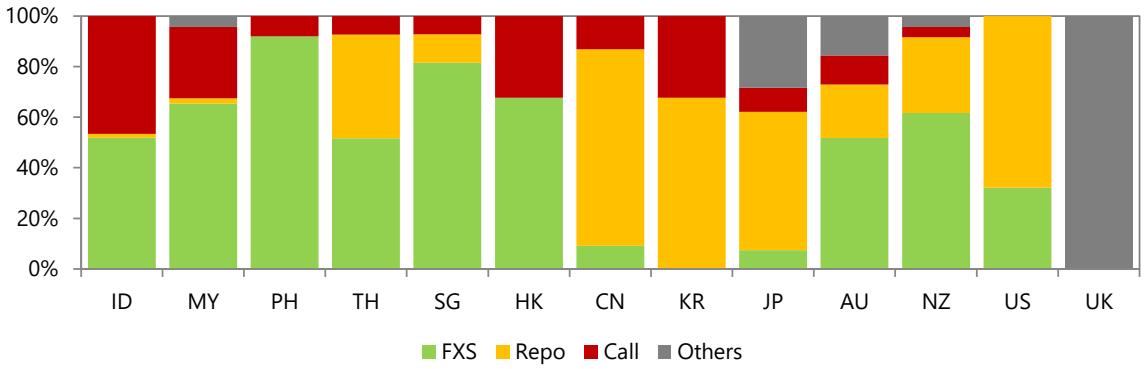
initiatives (see Chapter 3 for details). Such initiatives give these EMEAP money markets greater potential for growth. It should be noted that the estimated daily turnover is subject to a margin of error as it requires an assumption about the average tenor of the outstanding transactions.[13]

Chart 2-1 Money market turnover and composition by instruments

a. Daily turnover as a % GDP in 2016



b. Composition of money markets by daily turnover in 2016



Note: 1. Data in 2017 is referred to where data in 2016 is not available.
2. Figures for Australia, Japan, Korea, the Philippines, Thailand and the US include estimates. Estimated turnover is derived from amount outstanding divided by best available weighted average contract term.
3. Repo and Others are not available for Hong Kong.
4. Others include T-bills, CDs and CPs.

Source: 2017 WGFM Survey, SIFMA (2016), BIS (2016), BOE (2016), World Development Indicators, Bloomberg

[13] If the terms of actual transactions are longer than assumed, the actual turnover volume will be smaller than the estimates. Nevertheless, given that transactions of the longer tenor are limited in most EMEAP jurisdictions (see Chapter 3.2 for details), the above estimates can be considered largely robust.

12. **The FX swap market was the predominant funding market in many jurisdictions, owing to increasing cross-border flows and ease of access for foreign financial institutions.** Chart 2-1b shows that the turnover of the FX swap market was the largest among money market instruments in eight of the eleven EMEAP jurisdictions. FX swaps became increasingly important as an instrument for sourcing local currency against the backdrop of increasing capital inflows. Foreign banks typically have a narrower local deposit base compared with local banks. Therefore such foreign banks are more likely to have lower liquidity or short in local currencies, and thus look for wholesale market sources. Furthermore, in EMEAP's discussions with various private financial institutions, some argued that foreign financial institutions were less likely to hold local securities which could be used as repo collateral. For these reasons, FX swaps have been an attractive funding tool for foreign banks. The importance of FX swap markets was further reinforced by the mandatory hedging requirements in some jurisdictions.[14]

13. **Repo markets have become prevalent in some jurisdictions, serving as a primary source of funding for non-bank financial institutions.** As seen in Chart 2-1b, repo market turnover was the largest among money market instruments in Japan, China and Korea. One common aspect in these jurisdictions is that non-bank financial institutions drove repo transactions. In Japan, in addition to financing security inventory, securities companies were active in the repo market as borrowers of specific issues of securities, to be able to deliver these securities to other market participants. In Korea, the repo market has become the primary funding market for non-bank financial institutions since 2010 when the government implemented a regulation to restrict non-banks from participating in the uncollateralized call market. For detailed descriptions of the repo market in each jurisdiction, see Annex.

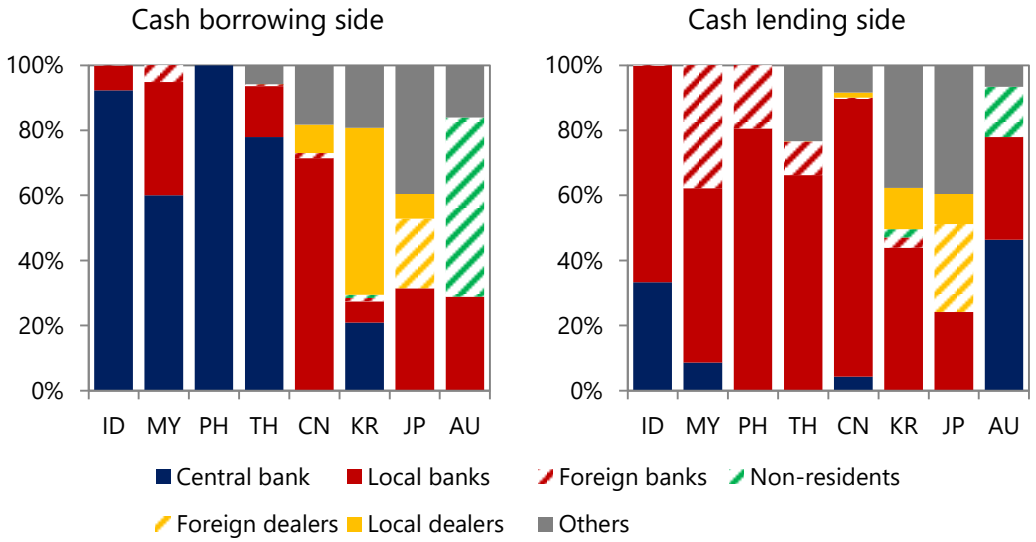
2.2. Market participants

14. **The composition of market participants is one way to illustrate the redistribution mechanism of surplus liquidity.** The EMEAP WGFM (2010) previously noted that the redistribution mechanism was not sufficient in many EMEAP jurisdictions partly owing to limited diversification of market participants. The limited redistribution of liquidity among market participants was mitigated by central banks, which took on the role and became major counterparties in the market. This section reviews the recent

[14] For example, in December 2014, BI issued a regulation that requires corporations that have foreign debt to hedge a certain portion of their position.

composition of money markets by types of financial institution. Hence, unlike the previous section, this section takes into account the presence of central banks in money markets since EMEAP WGFM (2010) and EMEAP WGFM (2014) discussed the significance of central bank transactions in several jurisdictions.

Chart 2-2 Composition of repo markets by types of financial institutions



Note: Composition of financial institutions in 2016. The Philippines data is as of March 2017.
Source: 2017 WGFM Survey

15. **Central banks have played a significant role in the repo markets of some jurisdictions, particularly on the cash borrowing side for liquidity absorption.** Chart 2-2 shows that the central bank was the largest cash borrower in four out of eight reporting jurisdictions' repo markets.[15] The dominance of the central bank on the cash borrowing side could be explained largely by liquidity absorption operations of these central banks, as they faced abundant liquidity. Several members, including BI, Bank Negara Malaysia (BNM), Bangko Sentral ng Pilipinas (BSP), Bank of Thailand (BOT), Monetary Authority of Singapore (MAS) and Bank of Korea (BOK) often conducted open market operations to absorb increased liquidity that was in part related to capital inflows. On the other hand, central banks accounted for a smaller portion of the cash lending side in most jurisdictions.[16]

[15] Central banks' dominance was particularly acute in repo markets, as repos were the core tool of open market operations for many central banks. In other instruments, the central bank share was high on the cash borrowing side of the Malaysian uncollateralized call market.

[16] Some foreign banks with limited access to local markets noted that central banks could be their local currency providers. In the Australian repo market, the central bank share was high on the lending side. This could be partly attributed to non-resident financial institutions engaging in arbitrage activity across repo

16. **Local banks were dominant in repo markets in most jurisdictions, particularly as lenders.** Chart 2-2 shows that the share of local banks was the largest in repo markets, particularly on the cash lending side, with the exception of Australia and Japan. In EMEAP's discussions with private financial institutions, these institutions suggested that large local banks, including state-owned banks, tended to be the major fund providers in the money market because of their large local deposit base. Local banks were typically the counterparties of central banks' monetary operations, which also reinforced their presence on the cash lending side amidst the active liquidity absorption operations of some central banks.

17. **Foreign/non-resident financial institutions accounted for a notable share of repo market activity in a few jurisdictions.** Foreign/non-resident participation was limited in most EMEAP repo markets.[17] The exceptions were Malaysia, Japan and Australia. Subsidiaries and branches of foreign banks were important market players in Malaysia and Japan's repo markets, while non-resident financial institutions were important in Australia's repo market.[18] For example, primary dealers in Malaysia, including subsidiaries of foreign banks, are important market players in the repo market, conducting repo transactions to facilitate their market-making activities.

18. **Participation of local/foreign dealers and other local non-banks in repo markets was notable in only a few EMEAP jurisdictions.** Chart 2-2 shows that local dealers and non-banks accounted for more than half of the repo market in Korea and Japan. In particular, the major participants in the Korean market were securities companies, asset managers and securities trusts. This is largely attributed to the Korean government's policy to encourage non-banks to take up repos by gradually restricting them from participating in the uncollateralized call market (as discussed below). In Japan, securities companies conducted repos to borrow specific issues of securities, or to finance their securities inventory. Other non-bank major players in the Japanese repo market included money brokers, which facilitate repo transactions, including those of securities companies.

19. **Various factors affected private financial institutions ability to diversify their activity across a range of counterparties.** In EMEAP's discussions with private

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and FX swap markets.

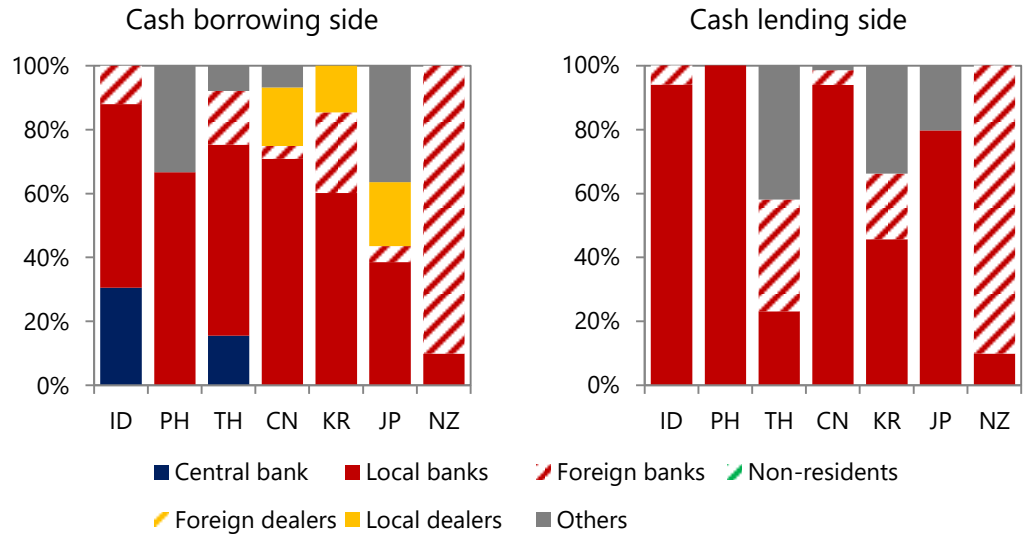
[17] Most EMEAP member central banks reported having limited access to non-resident transaction data. Nevertheless, non-resident transactions were estimated to be negligible in Indonesia, Malaysia and China. Non-residents are not allowed to participate in the Thai repo market.

[18] See RBA (2016) for the increase in non-resident participants in Australian repo market.

financial institutions, some internationally active financial institutions opined that local banks tend to roll transactions with long-standing counterparties, in order to reduce costs associated with counterparty risk assessment. This practice has led to less active transactions among a wide range of financial institutions. The traditional reliance on transactions among incumbent market participants makes it more difficult for local financial institutions to participate in money markets if they do not have high credit ratings or high quality collateral assets. Some local financial institutions said it was operationally easier to place excess cash in central bank accounts. Local financial institutions also noted that internationally active financial institutions often imposed a heavy haircut on local government bonds in repo transactions, which had discouraged local institutions from expanding their counterparty base to include international banks.

20. **Local and foreign banks dominate the uncollateralized call and FX swap markets.** Chart 2-3 and Chart 2-4 shows that, unlike in repo markets, central banks accounted for only a small share in both uncollateralized and FX swap markets. Local banks were the major players in the uncollateralized market. A notable exception was New Zealand, where foreign banks were the dominant players. In the FX swap market, the presence of foreign banks was larger, reflecting their need to fund local currencies, as described in paragraph 12, while local banks were the largest fund providers in the market.

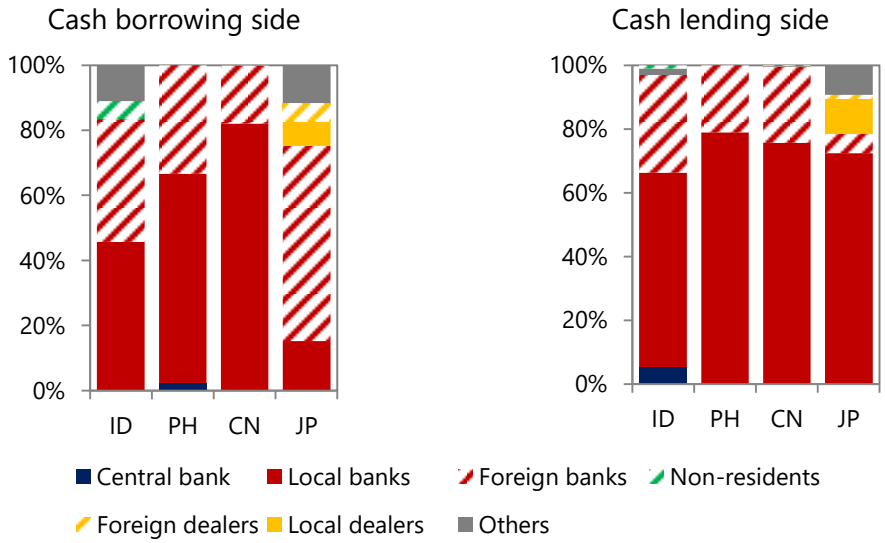
Chart 2-3 Composition of uncollateralized markets by types of financial institutions



Note: Composition of financial institutions in 2016. The Philippines data is as of March 2017. New Zealand data for call market is as of February 2017.

Source: 2017 WGFM Survey

Chart 2-4 Composition of FX swap markets by types of financial institutions



Note: Composition of financial institutions in 2016. The Philippines data is as of March 2017.
Source: 2017 WGFM Survey

3. Challenges and initiatives

The findings in Chapter 2 illustrate the diversity of market size and market participants across jurisdictions, highlighting the challenges unique to each market. Given that the underlying challenges in money markets could become more evident at a certain point in the financial cycle, this chapter discusses some of the underlying challenges that exist for money market development, as well as initiatives that have been undertaken to enhance the redistribution mechanism of money markets. This chapter also reviews changes in EMEAP central banks' monetary operations to advance smooth and stable formation of interest rates and contribute to being better prepared for the changing financial cycle.

3.1. Repo markets

Repo markets have the potential to bring together a wide range of market participants, to facilitate low-risk investment of cash, and to promote efficient management of liquidity and collateral. Repo markets also have an important bearing on the price discovery process in the underlying securities markets. This section of the report identifies underlying challenges for repo market development, such as institutional arrangements that hinder wider participation of financial institutions and low market liquidity of collateral assets. EMEAP jurisdictions have undertaken a range of initiatives to develop repo markets, such as the promotion of non-bank participation, enhancement of industry standards, technical assistance to market participants, liberalization of short-selling, and improvements to collateral management efficiency.

3.1.1. Underlying challenges in repo markets

21. **A number of factors have had an impact on the development of repo markets in the EMEAP region. Among others, the traditional reliance of financial institutions on FX swap or uncollateralized funding markets has affected activity in repo markets.** As discussed in Chapter 2, market participants, typically foreign banks, prefer the FX swap market for its high accessibility. There are also cases where uncollateralized funding is preferred for its operational convenience. That is particularly true when a market participant, typically a large local bank, has a long-standing relationship with its counterparty.

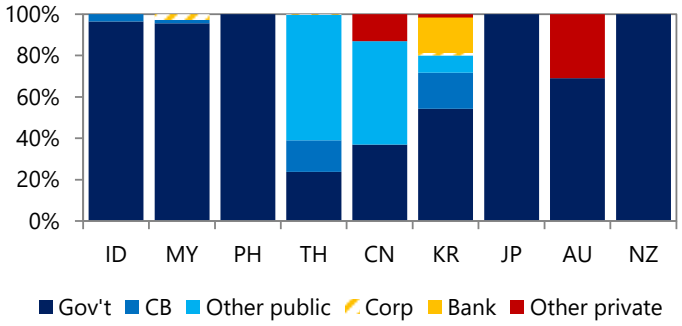
22. **Private financial institutions rationalized that the reliance on long-standing relationships for counterparty risk management had not spurred the need for repo transactions with various types of financial institutions, further affecting repo market development.** As discussed in Chapter 2, central banks and local banks are dominant in those repo markets where the turnover of private transactions is relatively low. Private financial institutions rationalized that they see little necessity for collateralized transactions because long-standing relationships alleviate concerns over counterparty risks. On the other hand, foreign banks that do not have long-standing relationships with local banks, and small local banks that have low credit ratings and

limited holdings of high quality collateral, can face constraints in participating in repo markets. Demand for collateralized transactions is affected by the lack of participation of non-banks, such as asset managers with a preference for term funding.

23. **There are some cases where legal arrangements have affected market activity.** The introduction of the Financial Institutions Development Fund (FIDF) [19] fee on bank funding from non-bank counterparties significantly reduced non-bank participation in the Thai market. While the use of the Global Master Repurchase Agreement (GMRA) has become more prevalent in EMEAP jurisdictions, some private financial institutions mentioned that further standardization of documentation and operating practices across the region would encourage greater foreign participation.[20] Other impediments raised by private sector participants include the restriction of non-resident access to the markets in some jurisdictions.

24. **In some cases, low market liquidity of underlying securities affects repo activity.** Debt securities issued by the government and central bank make up the vast majority of repo collateral across EMEAP markets (Chart 3-1). Feedback from local and foreign financial institutions indicated market participants face difficulties in accessing bonds in hold-to-maturity portfolios of some banks and asset managers. At the same time, local financial institutions may not find it attractive to lend securities to international financial institutions if they impose a heavy haircut on local government bonds in repo.

Chart 3-1 Composition of repo by types of collateral



Note: In 2016. The Philippines data is as of March 2017.
Source: 2017 WGFM Survey, CEIC, China Central Depository & Clearing

[19] The FIDF fee was introduced in May 2012 to recoup the costs of supporting the Thai banking system during the Asian Financial Crisis, generating negative side effects on market development. The current contribution is set at 0.46% of banks' average Thai Baht-denominated liabilities, excluding transactions with BOT and in interbank markets.

[20] In Japan, market participants plan to unify repo contract types into the "new gensaki" method from the current three methods (gentan, new gensaki, old gensaki). The new gensaki repo transactions are the equivalent of typical repo transactions in the US.

3.1.2. Policy initiatives to foster private repo markets

25. **EMEAP jurisdictions have undertaken a range of initiatives to develop repo markets, such as promotion of non-bank participation, enhancement of industry standards, technical assistance to market participants, liberalization of short-selling, and improvements to collateral management efficiency.**

26. **There have been regulatory changes to promote non-bank participation.** Korean authorities introduced a regulation in 2010 to restrict non-banks from participating in the uncollateralized call market and in turn to encourage participation in repo market. In addition, in 2017 a broader range of asset managers (including pension funds and public institutions) were permitted to participate in the OTC repo market.

27. **Efforts have been made to make repos more appealing by enhancing industry standards and policy support.** The Philippines' Money Market Association (MART) launched a Government Securities Repurchase Program in November 2017, to encourage the engagement of financial institutions in the repo market. The program set out standards for master agreements, collateral assets and terms, and established a trading platform to encourage OTC repos.[21] The BSP and the Philippine Bureau of Internal Revenue have also taken steps to encourage repos under the program by removing reserve requirements and exempting stamp tax, both of which used to require additional costs on repos.

28. **Authorities are providing technical assistance to market participants.** BI provides technical assistance to repo market participants to address differences in technical skills across traders of different institutions. This includes running capacity-building workshops on the use of the newly-adopted GMRA.[22] BI has noted that some participants were able to undertake repo transactions for the first time following these workshops. Capacity-building workshops to upgrade the skills of market players were also conducted in the Philippines, led by the Bureau of the Treasury.

29. **Regulatory changes have been implemented in an effort to improve the liquidity of the secondary market for bonds.** In April 2017, BNM liberalized its regulated

[21] As was reported in EMEAP WGFM (2014), a triparty repo service was provided by Philippine Dealing System Group, but transaction has been nil since April 2013. Following the launch of the Government Securities Repurchase Program in November 2017, total daily transactions in the interbank repo market amounted to as much as PHP11 billion until the end of January 2018, although there were days where no transactions were dealt.

[22] These workshops are conducted together with the Indonesia Foreign Exchange Market Committee (IFEMC).

short-selling (RSS) framework to allow all residents to participate in short-selling activities of Malaysian Government Securities (MGS), providing access to risk management tools, adding liquidity to the bond market and facilitating a better price discovery process. In November 2017, BNM further extended its RSS framework to include Malaysian Government Investment Issues (MGII) by both conventional and Islamic banks. This revision is expected to increase liquidity and trading activities for MGII in the secondary market as well as tighten the pricing gaps and yield differences between MGS and MGII. EMEAP has also taken steps to support securities lending activity in the region (see Box 1 for more details).

30. **There have been steps to promote the use of corporate bonds as repo collateral.** In May 2015, MAS launched the Securities Repo Facility (SRF). Under this facility, eligible banks can borrow certain high quality corporate bonds via repo transactions from the MAS. MAS reported that the SRF has helped enhance banks' ability to make markets for such bonds by increasing their operational familiarity with repo transactions collateralized by corporate bonds.

31. **In EMEAP markets where repos were already an important funding instrument, improvement in collateral management practices has been one common area of reform to further enhance the convenience of repos.** For example, a tri-party repo service was introduced in Australia in 2014. Tri-party arrangements can improve repo market efficiency by allowing participants with a large number of small-denomination securities to fund those via repo. The introduction of the general collateral finance (GCF) repo supported the development of the repo market in Korea (see Chapter 3.2 for more details).[23]

[23] Another initiative currently underway in Japan is the introduction of a new transaction scheme for general collateral (GC) repos called the Subsequent Collateral Allocation Method. The new method allows market participants to outsource collateral management operations to the central counterparty of JGBs. The said method was introduced in May 2018. See BOJ (2015) and BOJ (2016) for details.

Box 1 PAIF Securities Lending

The EMEAP WGFM has contributed to promoting local currency-denominated bond markets through the Asian Bond Fund (ABF) initiative. The ABF has played a catalytic role in improving market infrastructure, accelerating tax and regulatory reforms to facilitate cross-border investments, and raising investor awareness and interest in Asian bonds. This box introduces a new policy initiative for the ABF Pan-Asia Bond Index Fund (PAIF).[24]

Local currency-denominated bond markets have expanded. Since EMEAP set up the ABF in 2003,[25] the amount outstanding of local currency-denominated bonds in EMEAP jurisdictions where PAIF invests increased from USD1.3 trillion in 2003 to the level above USD10 trillion in 2017, providing more funding and investment instruments in local currencies.

EMEAP started lending selected local currency-denominated bonds held within PAIF, adding a new channel for financial institutions to access local currency-denominated bonds in the region. That is, securities lending by PAIF enables a financial institution to borrow local currency-denominated bonds from PAIF against eligible collateral. The financial institution as a borrower, for example, is able to borrow cash in local currencies by using local currency-denominated bonds borrowed from PAIF.

The new initiative contributes to higher liquidity and better functioning of the bond secondary market in the region. The liquidity of underlying securities markets is crucial to deepening collateralized markets. The new initiative aims to support the development of securities lending markets in the region. A better-developed securities lending market will help to enhance the price discovery mechanism with higher liquidity in the secondary markets, and to advance institutional and settlement infrastructures.

3.2. Term transactions

Market participants have different preferences regarding the term of their borrowing and lending activity. To the extent that market participants can meet their various demands for transaction terms in money markets, they can better manage their risks. This section of the report analyses the level of activity at different terms in EMEAP money markets. A key result from the 2017 WGFM Survey was that the majority of transactions in several EMEAP money markets were concentrated in the short tenors. In part, this reflects the underlying challenges, such as administrative costs and tax arrangements, which discourage term transactions. EMEAP members have initiated policies to promote term transactions by streamlining post-trade processes, enhancing industry standards, and developing new instruments to allow term funding.

[24] PAIF is a component of ABF that invests in local currency-denominated government and quasi-government bonds in EMEAP economies excluding Australia, Japan and New Zealand. The Fund is managed passively.

[25] EMEAP set up the ABF in 2003 as part of central bank cooperation. Development of bond markets in the region gained momentum, drawing on the lessons from the Asian Financial Crisis in 1997.

3.2.1. Underlying challenges in term transactions

32. **The majority of money market transactions were shorter than one month in several EMEAP jurisdictions.** Table 3-1 shows the term composition of repo markets in six EMEAP jurisdictions, as well as that of the EU and the US. While the share of terms of over one month in Japan and Malaysia was comparable to that of the EU and the US, this was not the case for other EMEAP jurisdictions. For instance, several EMEAP jurisdictions appeared to have negligible activity in repos for terms of more than one month, while overnight transactions accounted for 92% and 86% of activity in Korean and Chinese repo markets, respectively.

Table 3-1 Share of transactions by maturity in repo market (%)

	ID	MY	TH	CN	KR	JP	EU	US
Overnight	0.8	3.7	38.0	85.5	92.3	45.1	18.4	63.1
One week or less	59.2	-	60.0	10.9	3.3	9.1	22.3	14.1
Over 1 week and up to 1 month	39.7	59.3		3.2	0.3	21.6	20.0	
Over 1 month	0.3	37.0	2.1	0.3	0.0	24.1	22.2	22.9
Others	-	-	0.0	0.0	4.1	0.1	17.1	-

Note: 1. Open-end transactions are reported under "Others" for Korea, Japan, and the EU. They are reported under "Overnight" for the U.S. Forward-start transactions in the EU are reported under "Others."
2. Figures for Malaysia, Thailand and China include central bank operations. Figures for the US include only primary dealers' transactions.

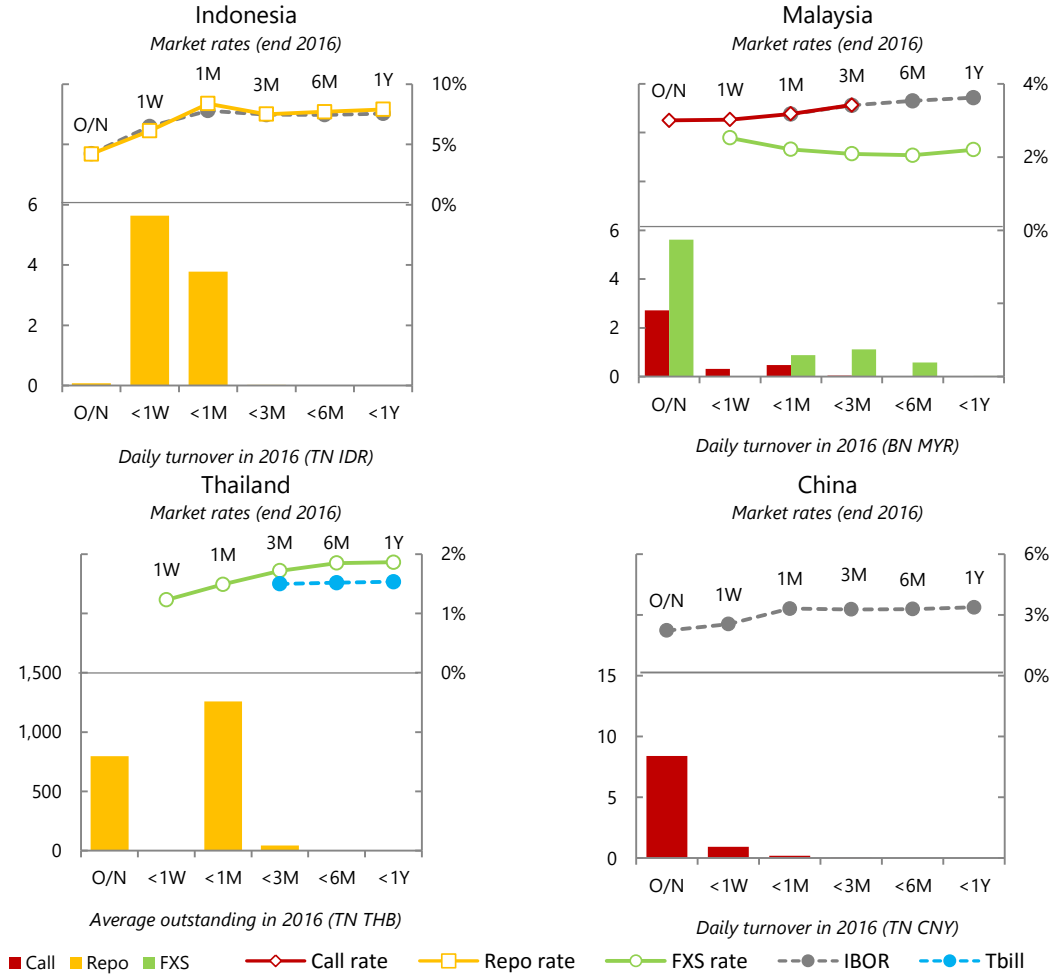
Source: 2017 WGFM Survey, ICMA (2017), Federal Reserve Bank of New York.

33. **There are cases where market rates with underlying transactions were absent in several EMEAP money markets, sometimes to be supplemented by interbank offered rates or T-bills.** Chart 3-2 shows some of the notable aspects of yield curve formation in several EMEAP jurisdictions. First, there were cases where term rates had a relatively small amount of underlying transactions in the market. In the case of Indonesian repo rates for example, while the yield curve could be observed for terms of overnight up to one-year, the underlying transactions were concentrated around one week to one month. Second, in some cases, market rates could not be observed despite the large transactions in the underlying market. For example in Thailand, short-term repo yield curves could not be observed even though the repo market was as large as the FX swap.[26] The absence of market rates with underlying market transactions was sometimes supplemented by interbank offered rates, T-bills or rates on central bank operations. For example in Malaysia, the Kuala Lumpur Interbank

[26] The rate of O/N repo transactions is available on the website of the Thai Bond Market Association.

Offered Rate (KLIBOR) served as a benchmark for the term yield curve, particularly for the prices of one month and above.

Chart 3-2 Short-term yield curves and underlying transactions in selected markets



Source: Bloomberg, 2017 WGFM Survey

34. **There are two common challenges to activating term transactions in many EMEAP jurisdictions. First, in some cases administrative costs make term transactions less appealing.** As discussed above, ample liquidity in the market has made term transactions less appealing to both fund borrowers and providers. The administrative process pertaining to collateral management, including collateral substitutions and margin calls of repos, seems to have reinforced participants' preference for shorter transactions.

35. **Second, tax arrangements could hold back term transactions in some jurisdictions.** Some members' tax arrangements may have held back term transactions. Such impediments could become more evident if there were an increase in demand for adjusting funds in money markets amid possible tighter liquidity

conditions. For example, in the Philippines, interbank call loans are subject to a tax of 20% when traded with terms longer than five days, which seems to have affected term loans.

3.2.2. Policy initiatives to promote term transactions

36. **Indonesia has taken steps to promote term transactions by enhancing industry standards in order to support price discovery in longer-term transactions, and by developing new instruments to allow term funding.** First, BI expects enhancement of benchmark interest rates to benefit term transactions. BI reported that one of the major impediments for term transactions is the unreliable benchmark rate system, especially at longer terms. To address this problem, BI introduced a new system in 2010 allowing participants to borrow and lend money easily, based on the Jakarta Interbank Offered Rate (JIBOR). Under the new system, participants are able to transact with each other at the submitted rate, within a specified amount. Since the new system was introduced, benchmark rates for term transactions have become more reliable, resulting in an increase in term transactions.[27] Second, the Financial Services Authority and BI initiated a regulation, effective from July 2017, on the issuance of negotiable certificates of deposit (NCD) that could increase banks' funding tenors.[28]

37. **In Korea, efforts have been made to promote term transactions by reducing administrative costs pertaining to term repos.** First, the GCF repo system introduced in 2013 was enhanced in July 2017 to encourage term transactions by including them within its coverage.[29] The previous GCF system had applied only to overnight transactions. The new system also allows repo sellers to enact collateral substitutions on demand (previously this required prior approval of repo buyers on each occasion). Second, term repo trade volume was given a greater weight in the assessment and selection criteria of Korea Treasury Bond primary dealers and institutions qualifying for Bank of Korea (BOK) open market operations. Third, the Korea Securities Finance

[27] The new system in benchmark rates allows mutual transaction between contributing banks at the rates that they submitted up to a 3-month tenor within a certain time window and up to a specified transaction amount. Since the new system was introduced, transaction volume in the uncollateralized market has increased, especially in the longer-tenor.

[28] NCDs can be issued until 36-month tenor.

[29] The Korean government introduced a GCF repo system in 2013 to streamline post-trade processes of repo transactions to benefit repo sellers (cash borrowers) such as securities companies. A similar effort is being made in Japan to further encourage term transactions in the repo market. The establishment of a market infrastructure along with the introduction of the Subsequent Collateral Allocation Method (see footnote 23) offers an automated collateral substitution function that reduces the administrative burden pertaining to term transactions.

Corporation was permitted to temporarily borrow or lend funds in the call market depending on its term repo trading volume, in order to promote such term repo trading by this institution. Finally, the liquidity stress testing of securities companies was strengthened to improve liquidity risk management, encouraging greater use of term transactions.

38. **Some of the recent revisions in monetary operational frameworks may also contribute to facilitating term transactions.** In particular, MAS has gradually increased the size of daily term repo operations to increase operational familiarity with the instrument, and to serve as a price reference, thereby encouraging broader repo market activity. Furthermore, many member central banks have revised their monetary operational frameworks, which could assist private money market term transactions. The details of such revisions are described in Chapter 3.3.

3.3. Monetary operational frameworks of EMEAP central banks

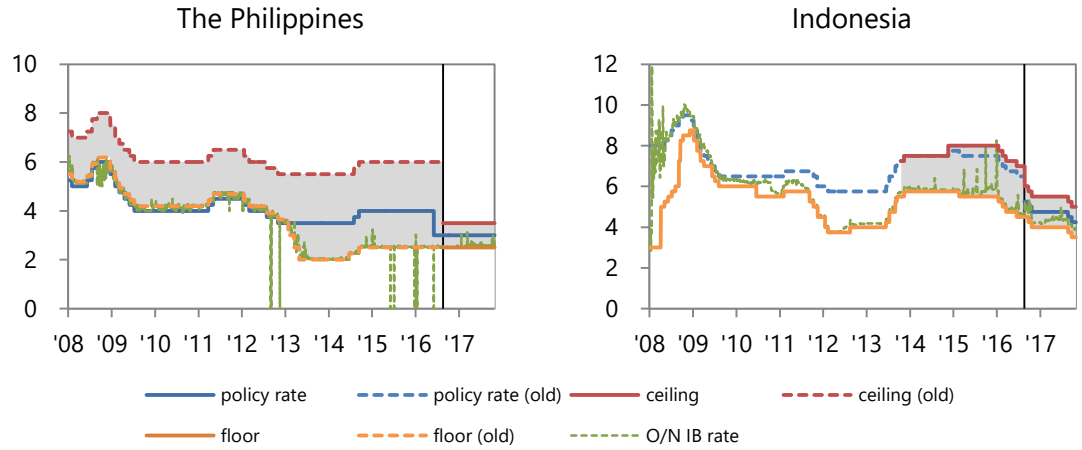
While the previous sections discussed challenges and initiatives for private transactions, this section deals with the monetary operational frameworks of member central banks. In particular, this section considers how these frameworks are expected to promote smooth and stable formation of short-term interest rates and assist in the transmission of monetary policy. This section then addresses fund provision operations, which are gaining importance in the context of fine tuning operations among several member central banks. While fund absorption operations have played a central role in monetary operations for these central banks, fund provision operations may become more important in the long run to cope with the possible tighter liquidity conditions.

3.3.1. Advancing smooth and stable formation of interest rates

39. **Some EMEAP member central banks have adjusted their monetary operational frameworks in response to ample liquidity partly related to capital inflows.** Given the accommodative monetary environment in EMEAP markets, some EMEAP economies have observed short-term interest rates in domestic markets, including target rates,[30] staying below the central bank policy rate (Chart 3-3). The BSP and BI have enhanced their interest rate corridor mechanism as detailed below, resulting in market interest rates being less likely to fall below the policy rate.

[30] There are cases where policy rate and operating target are different. For example, BI's policy rate is 7D reverse repo rate and their operating target is O/N call rate. The BSP's policy rate is overnight reverse repo facility and they do not have an operational target.

Chart 3-3 Market interest rates in the Philippines and Indonesia (%)



Note: Vertical lines indicate the date of the introduction of new interest rate corridor system.
Source: Bloomberg

40. **The BSP launched a series of reforms to enhance the transmission of monetary policy operations in June 2016, leading to more stable formation of short-term interest rates.** First, the interest rate corridor system was introduced, as summarized in Table 3-2. While there is no material change in the lower bound in effect,[31] the upper bound is expected to have increased its effectiveness since the lending facility has greater influence on market interest rates than the repo facility (as repo transactions are less prevalent in the Philippines). The corridor was also narrowed and made symmetric around the policy rate to provide clearer guidance to the market. Second, the use of the term reverse repurchase (RRP) rate as the BSP policy rate was discontinued in order to reinforce the role of the overnight RRP rate. The overnight RRP rate has become the main BSP policy rate. The overnight RRP operation is offered daily at a fixed-rate with a full allotment allocation, which is expected to guide the overnight RRP rate close to the policy rate. Third, a Term Deposit Facility (TDF)[32, 33] was introduced to withdraw the bulk of excess liquidity from the financial system.[34]

[31] There is no material difference between the SDA and ODF. In the initial stages of the IRC, the existing set of counterparties (banks, NBQBs and trusts) for the SDA facility was retained. Starting in June 2017, trust entities are no longer allowed to access the TDF/ODF facility. Further, the BSP has also prohibited banks from putting funds owned by their foreign clients in such facilities.
[32] Term deposits are auctioned using variable-rate with multiple price tenders.
[33] Following the introduction of the TDF, the SDA, which was operated in a passive manner, was discontinued.
[34] Most EMEAP member central banks issue central bank debt securities, which play a crucial role in withdrawing liquidity from the market. The BSP is prohibited from issuing central bank bills, except under extraordinary circumstances (See Box 2 for more details).

Table 3-2 BSP's interest rate corridor system

	Until June 2016	Present
Upper bound	O/N & Term Repurchase Facility @6.0%	O/N Lending Facility @3.5%
Policy rate	O/N & Term Reverse Repurchase Facility @4.0%	O/N Reverse Repurchase Facility @3.0%
Lower bound	Special Deposit Account @2.5%	O/N Deposit Facility @2.5%

Note: Interest rates indicated above are the rates applied in June 2016.

41. **BI carried out a wide range of reforms to its monetary operational framework in August 2016, allowing better formation of interest rates in the private money market.** The previous BI policy rate, which corresponds to the 12-month central bank bill (SBI), was replaced with a 7-day reverse repo rate (Table 3-3). The 7-day reverse repo rate was deemed to be better tracked by market interest rates than the 12-month SBI, which did not have corresponding transactions in the market. The new policy rate has been placed in the middle of the upper and the lower bound, and the width of the corridor has been narrowed to +/- 75bps from +/- 125bps. BI also started to use the TDF to absorb liquidity from the market.

Table 3-3 BI's interest rate corridor system

	Until August 2016	Present
Upper bound	O/N Lending Facility @7.00%	O/N Lending Facility @6.00%
Policy rate	BI Rate (12-month tenor) @6.50%	7-day Reverse Repo Rate @5.25%
Lower bound	O/N Deposit Facility @4.50%	O/N Deposit Facility @4.50%

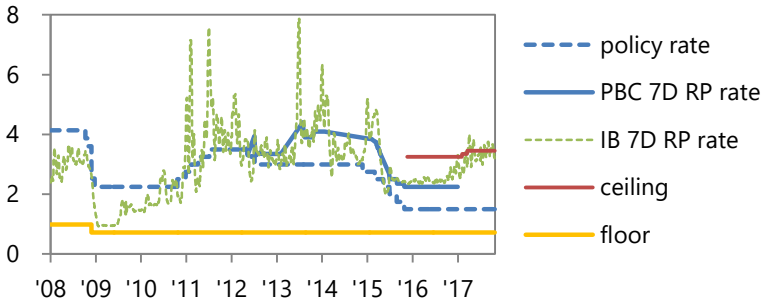
Note: Interest rates indicated above are the rates applied in August 2016.

42. **China has also adjusted its monetary policy framework in a similar context to the BSP and BI, but with a greater focus on market-oriented reforms.** The Chinese authorities have promoted market-oriented reforms over the past several years, including the liberalization of deposit rates in 2015, to address challenges stemming from both changes in the external environment and evolution of a more market-based domestic financial system. In 2015, Chinese markets exhibited heightened volatility, which prompted the acceleration of monetary policy reforms to better control market interest rates and stabilize market expectations. To this end, while keeping its official operating target to be monetary growth, the PBC started to send policy signals via the 7-day repo rate from 2015, including the publication of the interest rate on its Standing Lending Facility[35] since November 2015, which may serve as the ceiling of the interest

[35] PBC's Standing Lending Facility was originally introduced in 2013. In November 2015, in order to explore

rate corridor (Chart 3-4).[36]

Chart 3-4 Market interest rates in China (%)



Source: Bloomberg, Wind

43. **Besides the enhancement of interest rate corridors, other aspects of the monetary operational frameworks of EMEAP central banks have assisted the strategic liquidity management of market participants. First, the majority of EMEAP central banks disclose the schedule and results of open market operations (OMOs).** While there is no one-size-fits-all practice for central bank communication, transparency on market liquidity and open market operations aids market participants in projecting liquidity positions. With BI beginning regular publishing of its OMO schedule in August 2016, all EMEAP member central banks that conduct OMOs now publish such schedules (Table 3-4). Announcing the OMO schedules well in advance has allowed money market participants to formulate better liquidity management plans. For example, following BI's launch of dissemination of information relating to OMO in August 2016, the composition of monetary instruments in Indonesia has shifted towards longer tenors, and the transaction volume in the uncollateralized market has also increased.

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the role of the SLF interest rates offered by branch offices to serve as the ceiling of the interest-rate corridor, based on the liquidity situation and the regulatory needs of monetary policy, the PBC decided to appropriately cut the SLF interest rates in branches, after which the interest rates of overnight and 7-day SLFs for local corporate financial institutions that met the macro-prudential requirements were cut to 2.75 percent and 3.25 percent respectively.

[36] PBC (2016).

Table 3-4 Information dissemination of open market operations

	Schedule of regular OMO published before operations	Volume and price of OMO published after operations
ID	Yes	Yes
MY	Yes	Yes
PH	Yes	Yes
TH	Yes	Yes
SG	Yes	Yes
CN	Yes	Yes
KR	Yes	Yes
JP	Yes	Yes
AU	Yes	Yes
NZ	Yes	Yes

Note: This is not applicable to Hong Kong because, under the currency board system, the HKMA does not conduct regular OMOs to sterilize capital inflows or to manage liquidity in the market.

Source: EMEAP

44. **Second, several member central banks disclose the size of autonomous factors,[37] both ex ante and ex post (Table 3-5).**

Table 3-5 Information dissemination of autonomous factors

	Actual	Forecast
ID	No	No
MY	Daily	Daily
PH	No	No
TH	No	No
SG	No	No
CN	No	No
KR	No	No
JP	Daily	Daily
AU	Daily	Daily
NZ	Daily	Daily

Note: While the HKMA does not conduct OMOs, factors (actual and forecast sizes) that affect the Aggregate Balance (i.e. the sum of the balances of the clearing accounts maintained by commercial banks with the HKMA) are disclosed on a daily basis.

Source: EMEAP

45. **Third, some members have introduced reserve averaging, increasing the flexibility of private financial institutions' liquidity management.[38]** In July 2017, BI introduced a new reserve averaging scheme to allow private banks to manage their liquidity in the interbank market. Previously, the reserve requirement ratio was set at 6.5% of the Third Party Fund (TPF), which needed to be maintained on a daily basis.

[37] Autonomous factors refer to changes in the central bank's balance sheet that are not a result of its open market operations [BIS (2008)]

[38] While BI and PBC recently introduced as discussed above, the EMEAP central banks except for RBNZ have reserve averaging frameworks (RBNZ is the exception as it does not have a reserve requirement). BNM has the Statutory Reserve Requirement (SRR), which requires balances equivalent to a certain proportion of their eligible liabilities (SRR rate) to be maintained in their Statutory Reserve Accounts (SRA).

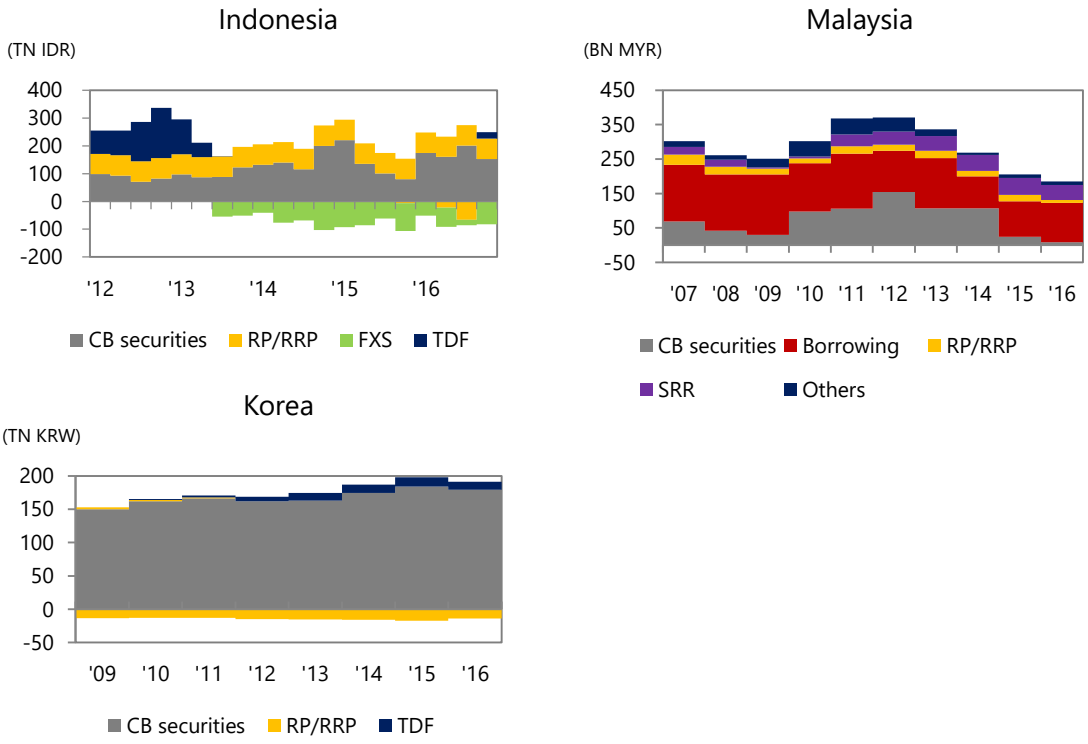
The new scheme requires reserves to be maintained at 5% of TPF on a daily basis, plus 1.5% of TPF on average within a two-week period.[39] PBC adopted the averaging assessment method in September 2015. The average ratio of the end-of-day balance of reserves to the base amount for the reserves assessment had been required to be no less than the reserve requirement ratio. The ratio is now allowed to be lower than the reserve requirement ratio by a maximum of 1%.

3.3.2. Exercising fund provision operations

46. **Several EMEAP member central banks have exercised liquidity absorption operations in the face of ongoing excess liquidity in domestic markets.** For example, BI, BNM and BOK have focused in recent years on withdrawing liquidity from the market (Chart 3-5). It is notable that one of the core tools for liquidity absorption was central bank debt securities, partly owing to the limited size of the domestic repo market (see Box 2 for more details on central bank debt securities).

[39] While it is still too early to assess the impact of the introduction of reserve averaging, as it has only recently been implemented, some private banks have used the reserve averaging scheme, noting that, for them, it resulted in a more efficient management of liquidity.

Chart 3-5 Amount outstanding of OMOs of selected member central banks



Note: Positive figures indicate liquidity absorption
Source: Central bank website

47. **In recent years, fund provision operations have become increasingly important in the context of fine tuning operations.** Monetary policy has become more market-based in some EMEAP central banks, placing greater importance on the smooth and stable formation of short-term interest rates. These central banks have increased fund provision operations for fine tuning operations amidst occasional capital outflows and liquidity tightening in the domestic market. In fact, BI has increased fund provision through FX swap operations (Chart 3-5). Similarly, since February 2016, PBC has established a daily mechanism of OMOs in the face of heightened volatility in short-term market rates[40].

48. **Those EMEAP central banks that have faced excess liquidity are well equipped with liquidity absorption tools (Table 3-6).** Many EMEAP central banks have repo[41], FX swap, and outright facilities for both fund absorption and provision tools. Some EMEAP central banks also issue central bank securities for fund absorption while most of them do not have other facilities for fund provision.

[40] PBC (2017).
[41] Further development of repo markets may enhance the effectiveness of their suite of operational tools for liquidity provision.

Table 3-6 List of monetary operational tools of EMEAP member central banks

	BI	BNM	BSP	BOT	MAS
Fund absorption					
Repo	Yes	Yes	Yes	Yes	Yes
FXS	Yes	Yes	Yes	Yes	Yes
Outright	Yes	Yes	Yes	Yes	No
CB securities	Yes	Yes	No	Yes	Yes
Others	Yes	Yes	Yes	No	Yes
	TDF	*TDF*	*TDF*		*Direct borrowing*
Fund provision					
Repo	Yes	Yes	No	Yes	Yes
FXS	Yes	Yes	No	Yes	Yes
Outright	Yes	Yes	Yes	Yes	No
Others	No	No	No	No	No

	PBC	BOK	BOJ	RBA	RBNZ
Fund absorption					
Repo	Yes	Yes	Yes	Yes	Yes
FXS	No	No	No	Yes	Yes
CB securities	Yes	Yes	Yes	No	Yes
Outright	No	Yes	Yes	Yes	No
Others	No	Yes	Yes	Yes	No
		TDF (MSA)		*TDF*	
		Securities lending	*Securities lending*		
Fund provision					
Repo	Yes	Yes	Yes	Yes	Yes
FXS	No	No	No	Yes	Yes
Outright	No	Yes	Yes	Yes	No
Others	Yes	Yes	Yes	Yes	No
	Mid-term lending facility *Supplementary lending facility*	*Securities borrowing*	*Auction/Fixed rate lending*		

Note: BOT can conduct outright sales if needed, but currently only conducts outright purchases for the purpose of using bonds as a bilateral repo collateral.
Source: EMEAP

49. **Several EMEAP central banks have expanded the range of eligible collateral for monetary operations to enhance their liquidity provision capacity.** One common development is to increase the range of collateral eligible for cross-border collateral arrangements (CBCAs).[42] Notably, BNM (May 2012),[43] the BOT (May 2017),[44] and MAS

[42] Cross-border collateral arrangements are arrangements between monetary authorities to allow cross-border use of collateral, either on a routine or emergency basis.
[43] BNM accepts home currency sovereign issues and the currencies of countries with which the BNM has signed CBCAs. BNM also accepts a) non-ringgit Malaysian Government securities, b) USD, GBP, EUR, JPY, and government and central bank securities of EMEAP member jurisdictions in their respective home

(May 2015) [45] have broadened their lists of eligible collateral for their standing facilities to include assets such as foreign currencies and bonds issued by foreign governments or central banks.[46]

currencies, and c) US Treasuries and UK Gilts.

[44] BOT has expanded the list of eligible collateral for its end-of-day lending facility to include foreign currencies (USD, JPY, and MYR), bonds issued by the Japanese government, and bonds issued by the Malaysian government or central bank.

[45] Under the MAS-BOJ CBCA, the collateral for SGD borrowing is Yen cash and JGBs.

[46] For details of counterparty eligibility across different jurisdictions, see Box 3.

Box 2 Central bank debt securities

The 2017 WGFM Survey revealed that the majority of EMEAP central banks issue debt securities (hereafter referred to as "central bank debt securities", as these securities have a variety of attributes with different names across the region). This box briefly summarizes the motivation for issuing central bank debt securities and their role in monetary operations in EMEAP jurisdictions.

Central bank debt securities are more common in EMEAP jurisdictions than in other parts of the world. Eight out of eleven EMEAP central banks had central bank debt securities outstanding in 2017, whereas only one third (42 out of 125) of central banks globally had central bank debt securities outstanding in 2013.[47] The 2017 WGFM Survey shows that, among EMEAP jurisdictions, central bank debt securities are currently issued in Indonesia, Malaysia, the Philippines, Thailand, Hong Kong, Singapore, Korea and New Zealand. In these jurisdictions, the amount outstanding of government bonds is larger than that of central bank debt securities, with the exception of Hong Kong.

Amount outstanding of local currency debt securities by types of issuers as at end-2016

	ID	MY	PH	TH	SG	HK	CN	KR	JP	AU	NZ
Gov't	78.0%	53.3%	84.9%	38.9%	21.2%	5.9%	35.4%	36.0%	78.2%	38.5%	99.8%
< 1Y	2.1%	2.6%	4.5%	4.1%	1.7%	0.9%	-	3.7%	9.1%	1.1%	10.3%
C'bank	6.7%	0.7%	0.4%	28.6%	16.0%	55.7%	0.0%	10.0%	-	0.0%	0.2%
< 1Y	6.7%	0.7%	-	22.4%	16.0%	53.8%	-	6.7%	-	0.0%	0.2%
Other	15.3%	46.0%	14.7%	32.5%	62.7%[48]	38.4%	64.6%	54.0%	21.8%	61.5%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total (BN$)	171	283	126	293	368	223	9,186	1,506	11,899	1,386	53

Note: Underlined figures are the share of those maturities less than one year. Data in 2017 is referred to where data in 2016 is not available.

Source: 2017 WGFM Survey

EMEAP jurisdictions issue central bank debt securities for a variety of purposes, including liquidity management in domestic markets, provision of HQLAs to meet increasing demand for these assets and funding of foreign reserves. One of the common purposes of issuing central bank debt securities is for liquidity absorption (this is the case for BI, BNM, BOT, BOK and MAS). BOT bonds are used to conduct monetary policy (managing liquidity and interest rates in order to stabilize economic growth) and to set benchmark interest rates that assist with corporate debt market development.[49] MAS has issued short-term MAS bills[50] since 2011 as part of its market operations to manage banking system liquidity, and meet banks' demand for more regulatory and liquid assets. Some central banks, such as BI and the BSP, issue central bank securities in foreign

[47] Gray and Pongsaparn (2015)

[48] Includes non-SGD denominated securities.

[49] BOT Website (https://www.bot.or.th/English/DebtSecurities/IntroToGovtDebtSecurities/Pages/Type.aspx)

[50] MAS Website (http://www.mas.gov.sg/monetary-policy-and-economics/central-bank-operations-and-liquidity-management/mas-bills.aspx)

currencies, which provides them with additional foreign reserves to support their operations in FX markets.[51]

Several EMEAP central banks have reduced their issuance of debt securities in recent years, notwithstanding the flexibility afforded by such securities in absorbing excess liquidity from the market. Some of the reduction has been aimed at fostering development of the government securities market, while there are country-specific drivers for other jurisdictions. For example, the BSP stopped issuing such securities to support foreign reserves in 1997, owing to its rising foreign reserves.[52, 53] In Indonesia, central bank debt securities used to be the main monetary instrument, especially after the Asian financial crisis in 1997/1998, due to the lack of collateral in the money market. With the growth of government bonds, BI has shifted from central bank debt securities to government bonds in conducting monetary operations (using reverse repo transactions) and certificates of deposit. Correspondingly, the amount outstanding of central bank debt securities in Indonesia has declined over the past several years.[54] In Malaysia, the total issuance of BNM securities has decreased significantly, due to lower excess liquidity that can be absorbed at longer tenures.

Amount outstanding of local currency central bank debt securities of selected jurisdictions

	BI	BNM	BOT	MAS	HKMA	PBC	BOK	RBNZ
	TN IDR	BN MYR	BN THB	BN SGD	BN HKD	BN RMB	TN KRW	BN NZD
2007	247	70	1,351	-	137	3,659	150	-
2008	180	42	1,392	-	158	4,812	127	4
2009	260	30	1,789	-	534	4,233	149	1
2010	203	98	2,381	-	653	4,091	164	-
2011	123	107	2,642	15	655	2,129	165	-
2012	82	154	3,120	30	657	1,344	163	-
2013	96	107	2,843	64	751	552	164	0
2014	97	107	2,743	96	753	428	178	1
2015	39	25	2,823	78	828	428	181	1
2016	105	9	3,136	83	963	0	168	3

Note: Sharia included.

Source: Central bank websites, China Bond, ADB "Asia Bond Monitor".

[51] BSP Charter, Section 92 (http://www.bsp.gov.ph/about/charter.asp) stipulates that 'issuance of such certificates of indebtedness shall be made only in cases of extraordinary movement in price levels.

[52] Aside from increasing foreign reserves, the BSP has also focused its financing strategy to borrowing of loans following an agreement with the National Government (NG) that bond issuances will be handled by the latter.

[53] The BSP has been working with Congress on the amendment of its Charter to allow it to use and issue its own debt securities to conduct open market operations.

[54] Similarly, the share of central bank debt securities used as collateral in the repo market declined from 7.51% in 2010 to 3.47% in 2016.

Box 3 Counterparty eligibility of EMEAP member central banks

Central banks recognize the need to tailor their counterparty eligibility frameworks to changing market structures. Central banks have designed their counterparty eligibility frameworks to best fit the structure of their domestic money markets. For example, BOT's Bilateral Repo Primary Dealer (PD) system limits the number of participants who can access the BOT windows, thereby encouraging activity among interbank players. BOT took a phased-in approach starting from 2002 and achieved full implementation in 2008, along with the development of a private repo market.[55] BNM also decided to enhance its standing facilities (SFs) in August 2016 to include Development Financial Institutions, which has contributed to enhancing BNM's liquidity provision capacity.[56]

Number of central bank counterparties of OMOs

	Banks, total		Banks, local	Large	Small	Banks, foreign	Nonbanks	Total
ID	116	[91%]	106	-	-	10	0	116
MY	54	[96%]	29	-	-	25	0	54
PH	74	[12%]	55	22	33	19	38	112
TH	8-31	[24-91%]	7-20	4	3-16	1-11	8-11	16-42
SG[57]	13	[10%]	3	3	0	10	0	13
CN	44	[3%]	41	19	22	3	4	48
KR	20	[33%]	14	9	5	6	12	32
JP	5-241	[3-124%]	5-225	3-12	2-213	0-16	4-33	9-274
AU	81	[101%]	32	4	28	49	81	162
NZ	28	[117%]	4	1	3	24	0	28

Note: 1. Figures in brackets indicate the number of banks as counterparties as a percentage of the total number of banks in the banking sector.
2. RBA's eligible counterparties include banks and other deposit-taking institutions, holders of an Australian Financial services license, government institutions and FMIs.
3. RBNZ allows offshore counterparts to participate in their operations. This is due to the small size of the New Zealand market. RBNZ currently has seven offshore institutions with access to RBNZ's operations.
4. BOT's nonbank counterparties include Specialized Financial Institutions (SFIs).

Source: 2017 WGFM Survey

[55] Despite the reduced access to BOT's repo operations, the Thai repo market has been little disturbed in times of stress and market rates have been successfully anchored around the policy rate.

[56] Development Financial Institutions are specialized financial institutions established by the government with the specific mandate to develop and promote key sectors.

[57] The MAS transacts exclusively with Primary Dealers for daily money market operations. However, a much wider set of counterparties can access MAS' liquidity facilities.

4. Concluding remarks

50. **The 2018 WGFM Report shows that EMEAP money markets have grown as a whole over the past several years, while confirming the diversity of market size and market participants across jurisdictions.** Regional money markets have grown with unique structural attributes and development trajectories. The composition of market participants is also varied: some markets are dominated by the central bank and local banks, while other markets are more diversified, with non-banks and foreign financial institutions.

51. **Each money market has distinct challenges in line with this diversity, and various measures have been taken to promote market development. Proactive efforts to address remaining tasks are becoming increasingly important to further advance money market development as demand for short-term transactions may increase in the possible reversal of the financial cycle.** This report has examined the underlying challenges and policy initiatives regarding three topics: repo markets, term transactions, and monetary operations by central banks, as summarized below.

- [Repo markets] The low activity in many EMEAP repo markets is partly attributed to the institutional frameworks that hinder wider participation of non-bank financial institutions, and low market liquidity of underlying securities for collateral. Some EMEAP jurisdictions have addressed these impediments by making regulatory reforms to promote non-bank participation, enhancing industry standards, providing technical assistance to market participants, liberalizing the short-selling framework, and improving collateral management efficiency.

- [Term transactions] In several jurisdictions, the majority of transactions are concentrated in the short tenor. The underlying challenges that hinder term transactions include administrative costs and tax arrangements. Some EMEAP members have initiated policies to promote term transactions by streamlining post-trade processes, enhancing industry standards, and developing new instruments to allow term funding.

- [Monetary operational frameworks] Some member central banks have reviewed their monetary operational frameworks to promote smooth and stable formation of short-term interest rates and enhance the transmission channel of monetary policy. Recent developments in monetary operational frameworks indicate the growing importance of fund provision operations, which may become more important in the long run to cope with possible tighter liquidity conditions.

52. **The 2018 WGFM Report provides a useful reference for member central banks to understand the key attributes in the local money markets and initiatives undertaken by other member central banks to promote further market development.** The sharing of such experiences will assist members to review and develop their own markets. At the same time, it is important to note that there is no "one" approach for developing the money markets given the country-specific structure of financial markets and unique drivers of money market conditions in each jurisdiction.

53. **EMEAP will continue to pursue further financial market development in the region.** EMEAP has initiated various initiatives by making the best use of its membership of regional central banks and close ties with private financial institutions. Most recently, EMEAP successfully introduced PAIF Securities Lending (described in Box 1) as a landmark initiative to support liquidity of local currency-denominated bonds in the region's secondary markets. This will also contribute to further enhancing the functioning of regional money markets. EMEAP is committed to contributing to financial market development in member jurisdictions. EMEAP will continue discussions among both internal and external members and conduct thematic research projects.

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Abbreviations

ABF	Asian Bond Fund
ADB	Asian Development Bank
AU	Australia
BI	Bank Indonesia
BIS	Bank for International Settlements
BNM	Bank Negara Malaysia
BOE	Bank of England
BOJ	Bank of Japan
BOK	Bank of Korea
BOT	Bank of Thailand
BSP	Bangko Sentral ng Pilipinas
CBCA	cross border collateral arrangement
CDs	certificate of deposits
CGFS	Committee on the Global Financial System
CN	China
EMEAP	Executives' Meeting of East Asia-Pacific Central Banks
FIDF	Financial Institutions Development Fund (Thailand)
FX	foreign exchange
GC	general collateral
GCF	general collateral finance
GDP	gross domestic product
GMRA	Global Master Repurchase Agreement
HK	Hong Kong
HKD	Hong Kong dollar
HKMA	Hong Kong Monetary Authority
HQLAs	high quality liquid assets
IB	interbank
ICMA	International Capital Market Association
ID	Indonesia
IDR	Indonesian rupiah
IFEMC	Indonesia Foreign Exchange Market Committee (Indonesia)
IRC	interest rate corridor
JGBs	Japanese government bonds
JIBOR	Jakarta Interbank Offered Rate
JP	Japan
JPY	Japanese yen
KLIBOR	Kuala Lumpur Interbank Offered Rate
KR	Korea
KRW	Korean won
MAS	Monetary Authority of Singapore
MC	Markets Committee
MGII	Malaysian Government Investment Issues
MGS	Malaysian Government Bond
MY	Malaysia
MYR	Malaysian ringgit
NCD	Negotiable Certificate of Deposit
NBQBs	Non Bank Financial Institutions with Quasi Banking Functions (the Philippines)
NZ	New Zealand
NZD	New Zealand dollar
O/N	overnight
ODF	overnight deposit facility (Philippines)
OMO	open market operation
OTC	over-the-counter
PAIF	ABF Pan Asia Bond Index Fund
PBC	People’s Bank of China
PDs	primary dealers
PH	Philippines
RBA	Reserve Bank of Australia
RBNZ	Reserve Bank of New Zealand
RMB	Renminbi

RRP	reverse repurchase
SDA	special deposit account (the Philippines)
SF	standing facilities
SG	Singapore
SGD	Singapore dollar
SIFMA	Securities Industry and Financial Markets Association
SRF	Securities Repo Facility (Singapore)
SRR	Statutory Reserve Requirement (Malaysia)
TDF	term deposit facility
TH	Thailand
THB	Thai baht
UK	United Kingdom
US	United States of America
USD	United States dollar
WGFM	Working Group on Financial Markets

List of charts and tables