Local Currency Contribution to the CMIM

Chapter 4. Plausibility of Local Currency Contribution to the CMIM

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Abstract

This chapter assesses the plausibility of local currency contribution to CMIM arrangement. The arrangement can provide more benefits and less costs when member countries need local currency during balance of payments and/ or short-term liquidity difficulties. In this regard, the demand for local currencies in foreign exchange reserves and net demand (after subtracting estimated actual foreign exchange reserves) for local currencies in CMIM are investigated. The main results are as follows: i) Substantial demand exists for local currencies in foreign exchange reserves; ii) The size of the demand for local currencies in foreign exchange reserves is large in comparison with the size of the maximum withdrawal from CMIM; and iii) Net demand for local currencies in CMIM tends to be positive. These results may support the idea of introducing local currency contribution to CMIM arrangements. In the second part, the stability of local currencies is analyzed by calculating the exchange market pressure index because costs of local currency contribution to CMIM arrangements can be high if local currencies are unstable. The results suggest that several currencies of ASEAN+3 members are as stable as popular non-U.S. international currencies for various sub-periods. The results in terms of stability of the currency, internationalization of the currency, and liberalization of capital account transactions, indicate that the Japanese yen, RMB and the Korean won could first be considered as eligible for local currency contribution to CMIM arrangement.

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Contents

Executive Summary

This chapter assesses the plausibility of local currency contribution to the CMIM arrangement, to which there are various potential benefits. It is efficient and reduces costs if receiving members need local currencies to settle trade or finance matters when faced with balance of payments and/ or short-term liquidity difficulties. Providing members can decrease the burden of drawing on foreign exchange reserves. In addition, there are various externalities, such as promoting trade and financial integration in the region and weakening the over-dependence on the U.S. dollar. However, the arrangement can generate costs if receiving members do not need local currencies when they are faced with balance of payments and/ or short-term liquidity difficulties. In such cases, it is inefficient and costly as receiving members have to exchange local currencies for U.S. dollars. In addition, exchanging local currencies for U.S. dollars may result in the instability of local currencies and increase the possibility of contagion.

Introducing local currency contribution to CMIM can generate costs without providing much benefits if receiving members do not need local currencies when they have balance of payments and/ or short-term liquidity difficulties. In this regard, the demand for local currencies in foreign exchange reserves for ASEAN+3 is inferred by combining the demand for foreign exchange reserves and information on local currency usage in the region. The results show that substantial demand exists for local currencies in foreign exchange reserves. The size of the demand is large in comparison with the size of the maximum withdrawal from CMIM. This result may support the idea of introducing local currency contribution to CMIM arrangements.

The net demand for local currencies in CMIM arrangements is further inferred by subtracting estimated actual foreign exchange reserves from the demand for local currencies in foreign exchange reserves. The results show that net demand for local currency in CMIM tends to be positive, which may suggest room for introducing local currency contribution to CMIM arrangements, even after considering the current level of local currencies in actual foreign exchange reserves. However, the results should be interpreted with caution because the data not perfect.

The costs of local currency contribution to CMIM arrangements can be high if local currencies are unstable. In this regard, the stability of local currencies is examined by calculating the exchange market pressure index. Some conservative results indicate that the currencies of several ASEAN+3 members (China, Japan, Korea, and Vietnam) are as stable as popular non-U.S. international currencies for various sub-periods. In recent years, the currencies of China, Japan and Korea have been as stable as those of the U.K., Canada and the E.U., and even more stable than those of Australia and Switzerland. In recent years, the currencies of other members such as Myanmar, Vietnam and Hong Kong, have also been as stable as those of Australia and Switzerland.

Finally, the internationalization of a currency and the liberalization of capital account transactions are important in implementing local currency contributions to CMIM

arrangements. The Japanese yen is one of the most popular international currencies in the world with liberalized capital accounts. The level of internationalization of the RMB is at about the same level as the Swiss franc, but China still has a high degree of capital controls in place. The Singapore dollar, Hong Kong dollar and Korean won are next in terms of level of internationalization, and the degree of capital controls in these economies is low.

The results relating to currency stability, currency internationalization and liberalization of capital account transactions indicate that the Japanese yen, RMB and the Korean won could be the first currencies considered eligible for local currency contribution to the CMIM arrangement.

4.   Plausibility of Local Currency Contribution to CMIM

1.   This chapter assesses the plausibility of local currency contribution to CMIM arrangement. In the first section, we discuss the benefits and costs of local currency contribution to CMIM arrangements and propose two research questions closely related to the benefits and costs. In the second section, we analyze whether ASEAN+3 countries have enough demand for local currencies in their foreign exchange reserves and CMIM. In the third section, we study the stability of local currencies given the costs of local currency contribution to CMIM arrangements can be high if local currencies are unstable.

4.1   Introduction: Benefits and Costs

4.1.1 Benefits

2.   (a) There can be concrete demand for local currencies. If local currencies are used in settling trade and finance matters, then ASEAN+3 members may need local currencies to address balance of payments and/ or short-term liquidity difficulties. When members need local currencies, they can obtain local currencies by exchanging U.S. dollars (provided by CMIM arrangements). However, using local currencies directly is more efficient and less costly than exchanging U.S. dollars. In addition, the value of U.S. dollars against local currencies fluctuates over time, such that local currency contribution to the CMIM arrangement is worthwhile at times when local currencies are needed.

3.   (b) Providing members can decrease the burden of drawing on foreign exchange reserves because they can provide their currencies. This factor is likely to be important during crisis periods when receiving members experience crisis and providing members are subject to contagion risks. Drawing on foreign exchange reserves can increase the contagion risks of providing members, such that providing members may be reluctant to draw on foreign exchange reserves and CMIM arrangement may not work well when receiving members experience crisis. However, if local currencies can be provided, members are likely to provide their currencies without much hesitation. More fundamentally, each member under CMIM arrangement may need to prepare foreign exchange reserves for potential drawing from other members, which involves costs (usual costs of holding foreign exchange reserves), but a country is not subject to such a cost if its currency can be used. Similarly, local currency contribution may help increase the size of CMIM when ASEAN+3 wants to increase the size of CMIM because providing members are likely to feel less burden by using their currencies in CMIM arrangements.

4.   (c) There are various positive externalities associated with introducing local currency contribution to CMIM arrangements. Introducing local currency contribution to CMIM may promote trade and financial integration in the region. It could also promote local

currency use in the region and reduce the region's over-dependence on the U.S. dollar. This would be regarded as a positive signal for local currency use in the market.

4.1.2 Costs

5.   Introducing local currency contribution to CMIM can generate costs if receiving members do not need local currency when they are faced with balance of payments and/ or short-term liquidity difficulties.

6.   If receiving countries do not need local currencies when they are faced with balance of payments and/ or short-term liquidity difficulties, providing currencies such as the U.S. dollar, instead of local currencies, is clearly a better option for receiving members because they have to exchange local currencies for U.S. dollars, which is inefficient and costly if local currency is provided. Providing local currencies is inefficient because receiving members must exchange the currencies. This is costly in two aspects. First, receiving members need to pay the transaction costs of exchanging currencies. Second, given the size of local currencies arranged in CMIM, receiving members may exchange local currencies for a lesser amount of U.S. dollars if local currencies depreciate against the U.S. dollar. Generally, the instability of local currency value (against currencies needed) is likely an incurred cost given that the amount of currencies needed (that can be obtained with local currencies) is uncertain. In fact, local currencies' value can be unstable, especially during times when receiving members experience currency crisis, which can be contagious in the region.

7.   In addition, as receiving members exchange local currencies for U.S. dollars (or currencies needed), local currencies are likely to depreciate against the U.S. dollar, which may result in the instability of local currencies and increase the possibility of contagion to members issuing the local currencies. This potential problem can occur for providing members. If this problem happens, then the benefit (b) of not drawing on foreign exchange reserves may disappear because this situation is similar to the case in which providing members draw on foreign exchange reserves and then purchase the same amount of foreign exchange reserves with local currencies. If each member decides not to prepare extra foreign exchange reserves, given that its currency can be used despite not being needed by receiving members (that is, they will exchange the local currency for currencies needed), then the currency of the providing member will be subject to extra depreciation pressure, which can increase the possibility of a contagion risk.

8.   If the size of the CMIM arrangement is defined in terms of U.S. dollars, then the stability of local currencies may not matter much for receiving members even when local currencies are used in CMIM because the receiving members can exchange local currencies with the same amount of U.S. dollars. However, ASEAN+3 may not pursue this arrangement because it arrangement is similar to using U.S. dollars (one difference may be that the transaction costs of exchanging local currencies for U.S. dollars fall into receiving members instead of providing members if arranged in such a way). In addition, if providing

members do not prepare extra U.S. dollars for CMIM, then, as indicated before, this situation can lead to the depreciation of local currencies and increase the chance of contagion to local currencies.

4.1.3. Research Questions

9. Note that costs are generated when receiving members do not need local currencies during the time of balance of payments and/ or short-term liquidity difficulties. Also note that benefit (b) is likely to disappear as discussed if local currencies are not needed (but U.S. dollars are needed) when member countries experience balance of payments and/ or short-term liquidity difficulties. In addition, efficiency can be gained as discussed in (a) if local currencies are needed. That is, when receiving countries need local currencies when they face balance of payments and/ or short-term liquidity difficulties, benefits are generated but no costs are involved. On the other hand, **when receiving countries do not need local currencies, all types of costs are generated potentially, but benefits (a) and (b) are likely to disappear.** The size of benefit (c) is important to be compared with costs, but such a benefit is not easy to measure. Therefore, to discuss the plausibility of local currency contribution to CMIM, this study will first address the following question.

10.   (a) Do the members of ASEAN+3 need local currencies when they face balance of payments and/ or short-term liquidity difficulties?

11. If arranged local currencies are not really needed directly when members experience balance of payments and/ or short-term liquidity difficulties, then this situation will be inefficient and costs will be involved because receiving countries must exchange local currencies for the currencies needed – for example, the U.S. dollar. In such a case, **when the stability of the value of local currencies is low, the cost is likely high, as discussed above.** In addition, when local currencies are subject to high foreign exchange market pressure (that is, under high speculative attacks), local currencies are likely to experience a currency crisis or abrupt changes in the value of currency. In such a case, the cost is likely large. Therefore, this study will address the following question.

12.   (b) Are the values of local currencies stable? Are local currencies subject to low exchange market pressure?

13.   Note that the first question (a) can be a more fundamental issue than the second question (b), because exchange rate stability/ foreign exchange market pressure does not matter if we have enough demand for local currencies during balance of payments and/ or short-term liquidity difficulties.

4.2   Demand for Local Currencies in Foreign Exchange Reserves and CMIM

14.   In this section, we discuss the first question – whether members of ASEAN+3 need local currencies when they are faced with balance of payments and/ or short-term liquidity difficulties. To address the question, the literature on demand for foreign exchange reserves (or foreign exchange reserve adequacy) is reviewed. Foreign exchange reserves and CMIM play a similar role, and plenty of studies on demand for foreign exchange reserves (or foreign exchange reserve adequacy) are available. Then, demand for local currencies in foreign exchange reserves for ASEAN+3 is discussed by combining the demand for foreign exchange reserves and information on local currency usage in the region. Finally, net demand for local currencies in CMIM arrangements is inferred by subtracting estimated actual foreign exchange reserves from demand for local currencies in foreign exchange reserves.

4.2.1 Demand for Foreign Exchange Reserves (Foreign Exchange Reserve Adequacy)

15.   Past studies have investigated demand for foreign exchange reserves, foreign exchange reserve adequacy, or optimal level of foreign exchange reserves. Past studies are briefly reviewed to discuss how to infer demand for foreign exchange reserves among ASEAN+3 members.

16.   During the Bretton Woods period, the main role of foreign exchange reserves was as a buffer against real external shocks, such as export drops. Exchange rates were fixed, and international financial market integration was limited; thus, such shocks had more important effects than financial shocks. For instance, past studies suggested a simple rule of three months of imports was suggested as a guideline for an adequate level of foreign exchange reserves. In addition to such a simple rule, academic studies (such as Heller, 1966) analyzed the optimal level of foreign exchange reserves based on cost-benefit analysis. Although using the results of these studies in recent years has been difficult, basic ideas from these studies, such as cost-benefit analysis and dependency of foreign exchange reserve demand on country characteristics, are still considered essential elements for foreign exchange reserve demand.

17.   The Tequila and Asian crises of the 1990s suggest that preparation for external financial shocks in addition to external real shocks is crucial. Since then, the precautionary role of foreign exchange reserves as a buffer against abrupt capital outflows has been emphasized. For instance, the Greenspan-Guiddoti rule (100 percent of short-term debt) has been suggested in such a context. In addition, many formal studies on the optimal level of foreign exchange reserves were based on various theoretical models. After the Global Financial Crisis, more studies have discussed that foreign exchange reserve adequacy depends on country characteristics, such as the exchange rate regime and economic development.

**18.   The IMF (2011) reviewed existing approaches to reserve adequacy and developed some new measures. It summarized the traditional measures as follows: import cover,

short-term debt, broad money, GDP and current account. The first is the size of imports that can be sustained for a period, such as three months of imports. That is, a country must pay reserve currencies for imports with foreign exchange reserves when other sources are unavailable. The second is the measure of the size of short-term debt – for example, 100 percent of short-term debt in the Greenspan-Guiddoti rule. This means a country needs foreign exchange reserves to pay off short-term debts in a short period when short-term debts cannot be rolled-over and other sources are unavailable. The third is a fraction of broad money, such as M2 – for example, 20 percent of M2. During a capital account crisis, the capital outflows of domestic deposits of residents are observed. This measure captures the risks of capital flight. The last is GDP – it is sometimes used, but no theoretical or empirical backing is available. GDP may be used as a scale factor in cross-country analysis. Finally, current account deficits (surpluses) imply that foreign exchange reserves are required (provided) if other sources are unavailable. For instance, an extension of the Greenspan-Guidotti rule is the size of short-term debt plus the current account deficit (if it is in deficit). IMF (2011) also mentioned a modified rule that considered the size of short-term debt minus the current account.

19.   **In addition to these traditional measures, IMF (2011) suggested other measures that encompass a broad set of risks based on recent experience as follows: export earnings and medium- and long-term debt and equity liabilities.** Export earnings reflect the potential loss that could arise from a drop in external demand or terms of trade shock. External liability stocks, such as medium- and long-term debt and equities other than short-term debt, can be considered. Although short-term debt would be riskier, the sudden outflows of other external liabilities can lead to exchange rate depreciation and volatility in foreign exchange and financial markets. In addition, even FDI liabilities can be a source of drain, as observed in recent years.

20.   **To infer roughly the size of foreign exchange demand for ASEAN+3 members, we calculate various alternative measures for each ASEAN+3 members.** First, we consider three traditional measures, namely, three months of imports, 100 percent of short-term debt, and 20 percent of M2. In addition, we consider a rule suggested by IMF (2011), which comprises the sum of 30 percent of short-term debt, 15 percent of other portfolio liabilities (long-term debt and equities), 5 percent of M2, and 5 percent of exports for flexible exchange rate regime; and the sum of 30 percent of short-term debt, 20 percent of other portfolio liabilities (long-term debt and equities), 10 percent of M2 and 10 percent of exports for other exchange rate regimes. The IMF rule is a more comprehensive measure given that the it considers various additional factors.

21.   **Table 4.2.1 reports the size of four measures of foreign exchange demand for each ASEAN+3 country, together with the actual size of foreign exchange reserves.** In certain cases, the sizes of foreign exchange reserve demand are fairly different across different measures in each member. Among the four measures, 20 percent of M2 measure shows the largest number in Brunei, Indonesia, Myanmar, the Philippines, Thailand, Vietnam, China and Korea. However, according to the IMF rule Cambodia and Lao P.D.R. have the

highest numbers; and when the 100 percent of short-term debt measure is used, Malaysia, Singapore, Hong Kong and Japan have the highest number.

22. We can compare the number based on each of four measures with the actual holdings of foreign exchange reserves (which is reported in the last column of Table 4.2.1). For easy comparison, Figure 4.2.1 reports the ratio of actual foreign exchange reserves to demand for foreign exchange reserves based on each of four measures. When the ratio is larger than 1, actual foreign exchange reserves are larger than the demand for foreign exchange reserves calculated on the basis of each measure. In Cambodia, Indonesia, the Philippines and Thailand, the actual foreign exchange reserves exceed the demand for foreign exchange reserves based on all four measures. In Myanmar, China, and Korea, the actual foreign exchange reserves exceed the demand based on three measures. **For all members, the actual foreign exchange reserves exceed the demand based on at least one measure.**

Table 4.2.1. Measures for Foreign Exchange Reserve Demand
(USD millions, 2017)

	Three months of imports	100% of short-term debt	20% of M2	IMF rule	Actual FX Reserves
Brunei	1,506	..	2,103	..	3,488
Cambodia	*3,317*	*1,727*	3,911	4,066	12,200
Indonesia	48,375	54,756	80,999	73,592	130,203
Lao P.D.R.	*1,340*	*710*	<u>516</u>	1,344	1,270
Malaysia	56,249	143,337	*77,365*	123,088	102,446
Myanmar	3,495	*762*	7,018	5,715	5,214
Philippines	20,951	19,963	49,551	33,179	81,565
Singapore	140,367	1,085,132	84,011	477,552	279,902
Thailand	77,689	71,904	*103,640*	76,020	202,562
Vietnam	56,811	19,959	69,497	65,786	49,497
China	605,728	1,109,306	4,958,823	3,197,649	3,235,350
Hong Kong	160,453	1,048,002	*241,641*	601,363	431,442
Japan	218,823	2,584,425	*2,399,228*	1,704,287	1,264,141
Korea	166,220	170,445	447,682	272,642	389,248

Note: The IMF rule is 30 percent of short-term debt plus 15 percent of other portfolio liability (calculated as equity and portfolio funds share plus long-term debt securities as of 2017 June) plus 5 percent of M2 plus 5 percent of exports for flexible exchange rate regime countries. Multipliers for other exchange rate regime countries are 30 percent, 20 percent, 10 percent, and 10 percent, respectively. Short-term debt is calculated on remaining maturity basis, but the figures for Cambodia, Lao P.D.R., Myanmar, Singapore, Hong Kong and Japan are based on original maturity, but some numbers (shown in italics) are calculated based on 2016 data, and others (underlined) are calculated based on 2010 data.
Source: IMF IFS/CPIS/WEO/ARA; WDI

Figure 4.2.1. Ratio of Actual Foreign Exchange Reserves
to Demand for Foreign Exchange Reserves Economies
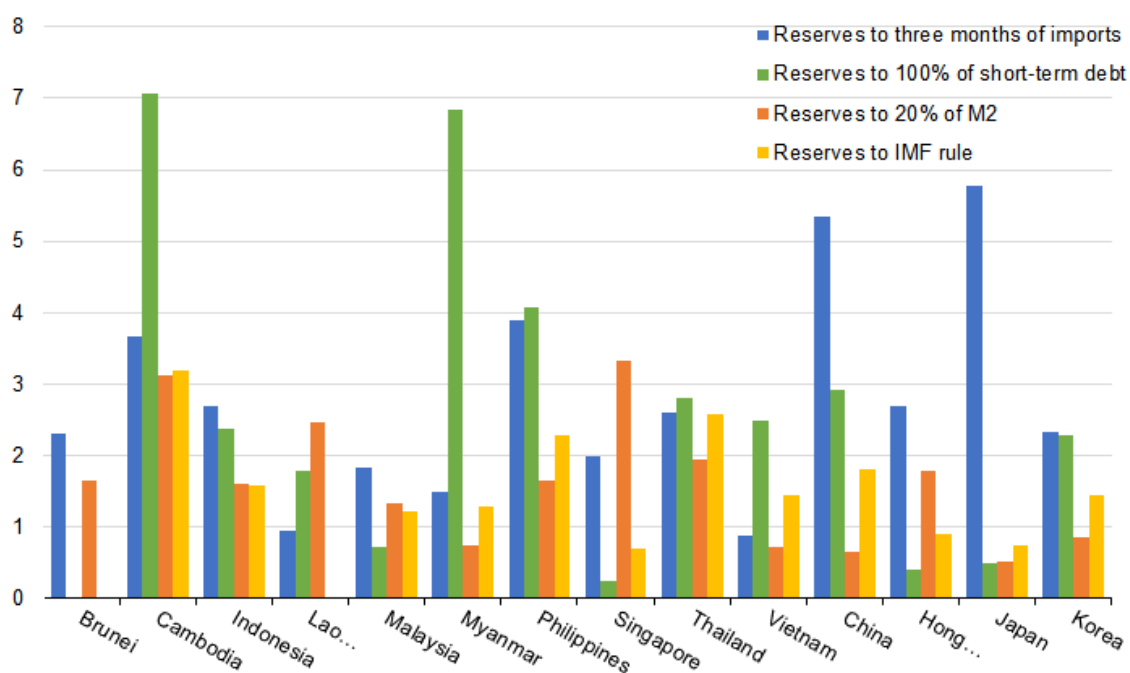
4.2.2 Demand for Local Currencies in Foreign Exchange Reserves

23.　The demand for foreign exchange reserves was discussed in the previous section. **In this section, we discuss the demand for local currencies in foreign exchange reserves.** First, we present the types of information needed to infer the demand for local currencies in foreign exchange reserves, in addition to information on the total reserve demand for foreign exchange reserves discussed in the previous section.

24.　Past studies suggested trade statistics, such as imports, exports and current account, to infer the demand for foreign exchange reserves, as discussed in the previous section. **The demand for local currencies in foreign exchange reserves in relation to trade statistics is likely to depend on local currency use in trade settlements given the total demand for foreign exchange reserves.** Foreign exchange reserves are needed to cover a certain period of imports. If local currency use in import settlements is large, then demand for local currency in foreign exchange reserves is large as well given that a large amount of local currencies would be needed to pay for imports.

25.　The size of export earnings is also considered a measure for foreign exchange reserve demand. Export earnings reflect the potential loss of foreign exchange provisions that can arise from a drop in external demand or terms of trade shock. **If local currency use in export settlements is large, then the potential loss of local currency provisions is large; thus, the demand for local currency in foreign exchange reserves may be high.**[2]

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[2] Export earnings may be regarded as a resource that can provide foreign exchange reserves to a country. When a member has high local currency use for exports, the member can receive more local currencies. Therefore, high local currency use in exports may not necessarily imply that the member needs more demand for local currency in foreign exchange reserves. Rather, high local currency use in exports may imply that the member has less demand for local currency in foreign exchange

26.   A similar reasoning can be applied to the current account measure. Foreign exchange reserves are needed to finance current account deficits. Assume the composition of local currency is the same for credit and debit transactions. If a large amount of local currency is needed to finance a current account deficit, then the demand for local currency in foreign exchange reserves is large.[3] Additionally, the current account includes net investment income in addition to trade in goods and services; thus, local currency use in net investment income flow must be considered.

27.   In sum, information on local currency use in trade settlements is important to determine the demand for local currencies in foreign exchange reserves. High local currency use in imports implies high demand for local currencies in foreign exchange reserves. High local currency usage in exports may be positively related to high demand for local currencies in foreign exchange reserves.

28.   Second, various measures suggest that local currency use in cross-border assets and liabilities is an important determinant of demand for local currencies in foreign exchange reserves. External liabilities, such as short-, medium-, and long-term debt, equities and FDI, are indicators for demand for foreign exchange reserves as foreign investors are likely to sell these assets during a crisis. **Therefore, when the local currency composition of external liabilities is large, demand for local currencies in foreign exchange reserves is large.** Given that short-term debts are riskier and are likely sold more quickly than other external liabilities, the local currency composition of short-term debts is likely to be more important than that of other external liabilities.

29.   Broad money, such as M2, is another measure for foreign exchange reserve demand discussed in the previous section. Broad money is included to represent the risk for capital flights of domestic residents. During crisis periods, domestic residents can sell liquid domestic assets and purchase foreign assets. **If the current local currency composition of foreign assets can represent the composition of foreign assets that domestic residents would like to purchase during crisis, then the high local currency composition of foreign assets may suggest high demand for local currency in foreign exchange reserves.[4]

30.   In sum, the local currency composition of foreign assets and liabilities is important to infer demand for local currencies in foreign exchange reserves. A high local

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reserves given the size of exports. That is, exports provide local currencies instead of international reserve currencies; thus, the member may need to accumulate more international reserve currencies in foreign exchange reserves. However, export earnings included in the IMF rule is the measure to reflect the potential loss of foreign exchange provisions, and thus, local currency use in export settlements is treated as positively related with demand for local currency in foreign exchange reserves.
[3] If the composition of local currency is different for credit and debit transactions, high local currency use in debit transactions implies high local currency demand in foreign exchange reserves, but high local currency usage in credit transactions does not necessarily imply high local currency demand in foreign exchange reserves.
[4] However, foreign assets can be regarded as a resource for international reserve currencies during the crisis time. That is, domestic residents may sell foreign assets to obtain international reserve currencies in need during crisis. In that case, the high local currency composition of foreign liabilities may not necessarily suggest high demand for local currency in foreign exchange reserves. The high local currency composition of foreign liabilities given the size of foreign liabilities means that local currencies can be more easily obtained by selling foreign liabilities, but international reserve currencies can be obtained with more difficulties. Therefore, the high local currency composition of foreign liabilities may imply low demand for local currency in foreign exchange reserves.

currency composition of foreign liabilities implies a high demand for local currencies in foreign exchange reserves. A high local currency composition of foreign assets, in relation to capital flight, may imply a high demand for local currencies.

31.   We determine the demand for local currencies in foreign exchange reserves by inferring how much local currencies is likely needed in the demand for foreign exchange reserves based on various measures, as calculated in the previous section. This means we calculate the likely portion of local currency demand out of total demand for foreign exchange reserves calculated in the previous section and multiply the portion by the total demand for foreign exchange reserves to obtain demand for local currencies in foreign exchange reserves. The likely portion of local currency demand in total demand for foreign exchange reserves based on each measure is calculated thus.

32.   We use the following information on local currency shares. For the three-month import measure, we use the local currency proportion data in import settlements. For the 100 percent short-term debt measure, we use the local currency composition data for foreign liabilities because obtaining the data is difficult on currency composition for short-term debt only. For the 20 percent of M2 measure, we use the local currency composition data for foreign assets. For the IMF rule components, such as imports and short-term debts, the same data are used as explained above. For other portfolio liabilities in the IMF rule, we use the local currency composition data for foreign liabilities. For exports in the IMF rule, we use the local currency proportion data in export settlements.

33.   Relevant data on local currency shares are collected in the following way. For export and import local currency share data, we first use the survey data prepared by AMRO. However, for Indonesia and Thailand, relevant data are collected from the web-page of each central bank where separate data for import and export shares are available. For the local currency composition of short-term debts and foreign liabilities, we first use the survey data. For the local currency composition of foreign asset data, we first use the survey data. Thereafter, we use CPIS data (Coordinated Portfolio Investment Survey from IMF) for Malaysia because the relevant data are unavailable from the survey. We use CPIS data for Thailand and the Philippines given that the survey data do not provide separate information for foreign assets and liabilities unlike CPIS data. When the relevant data are unavailable, the proportion in foreign exchange market turnover data is used to approximate the share of each currency.

34.   Table 4.2.2 reports the demand for all local currencies in foreign exchange reserves in each ASEAN+3 member. The size in U.S. dollars and the size as a fraction of the maximum amount of withdrawal from CMIM are reported. The maximum amount of withdrawal from CMIM is also reported for each country. We compare the demand for local currencies in foreign exchange reserves with the maximum amount of withdrawal from CMIM to infer whether local currency demand is enough for CMIM arrangements. For instance, if the demand for local currencies in foreign exchange reserves is smaller than the size of potential

CMIM withdrawal, then introducing local currency contribution to CMIM arrangement may not be desirable as demand for local currencies might not be enough. However, if the former is larger than the latter, then we may further consider local currency contribution to CMIM arrangement because of enough demand that can be compared with the size of potential CMIM withdrawal. In the last row ("Total") of Table 4.2.2, the aggregates of all ASEAN+3 members are reported. For the 100 percent of short-term debt measure and the IMF rule, we report an additional number in brackets for the aggregate of all ASEAN+3 members. That number shows the aggregate, excluding Hong Kong and Singapore. Hong Kong and Singapore are huge offshore financial centers, which means that their demand for foreign exchange might be exaggerated when assessed on the basis of the size of financial assets and liabilities. To avoid such potential problems, we report the additional aggregate number, excluding Hong Kong and Singapore, for two measures that are based on the size of financial assets and liabilities.

**Table 4.2.2. Demand for Local Currencies in Foreign Exchange Reserves
(USD millions, 2017)**

	Three months of imports		100% of short-term debt		20% of M2		IMF rule		Maximum withdrawal (CMIM)
Brunei	240	80%	..	..	335	112%	..	..	300
Cambodia	528	44%	275	23%	623	52%	648	54%	1,199
Indonesia	3,212	15%	4,008	18%	607	3%	3,583	16%	21,896
Lao P.D.R.	213	71%	113	38%	82	27%	214	71%	300
Malaysia	3,844	18%	22,574	103%	4,936	23%	13,951	64%	21,896
Myanmar	557	93%	121	20%	1,118	186%	910	152%	600
Philippines	859	4%	739	3%	606	3%	944	4%	21,896
Singapore	21,090	96%	163,041	745%	12,623	58%	71,752	328%	21,896
Thailand	5,671	26%	8,125	37%	15,053	69%	8,591	39%	21,896
Vietnam	9,049	91%	581	6%	2,022	20%	4,773	48%	9,917
China	12,115	50%	154,569	632%	690,955	2826%	419,156	1714%	24,452
Hong Kong	24,168	398%	71,264	1172%	16,432	270%	46,170	759%	6,079
Japan	3,064	12%	0	0%	23,992	92%	6,668	26%	26,111
Korea	13,131	41%	3,409	11%	53,274	165%	16,048	50%	32,255
Total	97,741	46%	428,819 (194,514)	204% (106%)	822,658	390%	593,408 (475,486)	282% (260%)	210,694 (182,719)

Note: Figures are derived by multiplying demand for foreign exchange reserves by relevant local currency composition ratio. Demand for own currency is not counted. Invoicing currency data for import, currency composition data for short-term debt, currency composition data for foreign liabilities, currency composition data for other portfolio liabilities, and invoicing currency data for exports are used to calculate relevant local currency composition ratios for imports, short-term debts, M2, other portfolio liabilities (in the IMF rule) and exports (in the IMF rule) respectively. Currency invoicing and composition data are collected from Chapter 2, survey, and IMF CPIS. Foreign exchange reserves in local currency are estimated by applying the compositions of the RMB and yen in world international reserves (IMF COFER, 2017).

35. **When the total aggregate number for all ASEAN+3 members (shown in the last row of Table 4.2.2) suggests the demand for local currencies is far larger than the maximum amount of withdrawal from CMIM based on all measures, except for the first measure.** Based on the first, second, third, and fourth measures, the demand for local currencies stands at 46 percent, 204 percent, 390 percent and 282 percent of the maximum withdrawal from CMIM respectively. The aggregate numbers for the two measures, excluding Hong Kong and Singapore, are still larger than 100 percent, at 106 percent and 260 percent respectively. As the first measure tends to be out of date, this result suggests that the demand for local currencies in foreign exchange reserves is far larger than the size of the maximum withdrawal in CMIM, which may provide a rationale for considering local currency contribution to CMIM arrangements.

36.   **The demand for local currencies in foreign exchange reserves tends to be lower for most individual members than for the aggregate results, as aggregate results include huge local currency demand in China.** Still, seven members record demand larger than the maximum withdrawal from CMIM based on at least one measure. They are Brunei, Malaysia, Myanmar, Singapore, China, Hong Kong and Korea. In addition, only two members have a demand that is smaller than 50 percent of the maximum withdrawal from CMIM based on all measures – Indonesia and the Philippines. The ratios of demand for local currencies in foreign exchange reserves to actual foreign exchange reserves for Indonesia and the Philippines range from 3 percent to 18 percent and from 3 percent to 4 percent respectively, based on four measures. Overall, the results affirm substantial demand for local currencies in foreign exchange reserves compared with the size of the maximum withdrawal from CMIM for most ASEAN+3 members.

37.   **In Table 4.2.3, we calculate the demand for the Japanese yen in foreign exchange reserves.** We see that more than half the demand for local currencies is in Japanese yen. The number for the sum of all ASEAN+3 members shows that the demand for the yen is far larger than the maximum withdrawal from Japan in CMIM based on three measures.[5] The net demand for the yen in CMIM that subtracts the estimated actual foreign exchange reserves from the demand for the yen in foreign exchange reserves is also far larger than the maximum withdrawal from Japan in CMIM based on three measures. In all members, except for Indonesia and the Philippines, demand for the yen is larger than 95 percent of the maximum withdrawal from Japan in the CMIM, based on at least one measure.

Table 4.2.3. Demand for the Yen in Foreign Exchange Reserves
(USD millions, 2017)

	Three months of imports		100% of short-term debt		20% of M2		IMF rule		Maximum withdrawal (CMIM)
Brunei	240	80%	..	..	335	112%	..	..	300
Cambodia	528	44%	275	23%	623	52%	648	54%	1,199
Indonesia	3,212	15%	4,008	18%	607	3%	3,583	16%	21,896
Lao P.D.R.	213	71%	113	38%	82	27%	214	71%	300
Malaysia	3,844	18%	22,574	103%	4,936	23%	13,951	64%	21,896
Myanmar	557	93%	121	20%	1,118	186%	910	152%	600
Philippines	859	4%	739	3%	606	3%	944	4%	21,896
Singapore	21,090	96%	163,041	745%	12,623	58%	71,752	328%	21,896
Thailand	5,671	26%	8,125	37%	15,053	69%	8,591	39%	21,896
Vietnam	9,049	91%	581	6%	2,022	20%	4,773	48%	9,917
China	12,115	50%	154,569	632%	690,955	2826%	419,156	1714%	24,452
Hong Kong	24,168	398%	71,264	1172%	16,432	270%	46,170	759%	6,079
Japan	3,064	12%	0	0%	23,992	92%	6,668	26%	26,111
Korea	13,131	41%	3,409	11%	53,274	165%	16,048	50%	32,255
Total	97,741	46%	428,819 (194,514)	204% (106%)	822,658	390%	593,408 (475,486)	282% (260%)	210,694 (182,719)

38.   **Table 4.2.4 reports the demand for the RMB in foreign exchange reserves.** Demand for the RMB is smaller than that of the yen, but still substantial based on the aggregate numbers, showing 9 percent to 78 percent of the maximum size of withdrawal from

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[5] The maximum withdrawal from Japan is obtained by multiplying the maximum withdrawal from CMIM by Japan's share of contribution to CMIM.

China. Demand for the RMB in each country is non-negligible. Except for Indonesia, the Philippines and Thailand, demand for RMB is larger than 20 percent of the maximum withdrawal from China in CMIM, based on at least one measure.

Table 4.2.4. Demand for RMB in Foreign Exchange Reserves
(USD millions, 2017)

	Three months of imports		100% of short-term debt		20% of M2		IMF rule		Maximum withdrawal from China (CMIM)
Brunei	30	35%	..	..	42	49%	..	..	86
Cambodia	66	19%	34	10%	78	23%	81	24%	342
Indonesia	307	5%	110	2%	567	9%	262	4%	6,487
Lao P.D.R.	27	31%	14	16%	10	12%	27	31%	86
Malaysia	521	8%	2,858	44%	502	8%	1,717	26%	6,487
Myanmar	70	41%	15	9%	140	82%	114	67%	171
Philippines	63	1%	20	0%	34	1%	41	1%	6,487
Singapore	2,799	43%	21,636	334%	1,675	26%	9,522	147%	6,487
Thailand	544	8%	0	0%	0	0%	37	1%	6,487
Vietnam	1,133	40%	0	0%	0	0%	438	15%	2,850
China	..	..	..	..	..	..	..	..	..
Hong Kong	3,199	178%	0	0%	0	0%	1,274	71%	1,796
Japan	1,969	18%	0	0%	2,399	22%	1,270	12%	10,944
Korea	1,662	15%	1,704	16%	41,187	376%	11,462	105%	10,944
Total	12,389	21%	26,392 (4,756)	44% (9%)	46,634	78%	26,244 (15,449)	44% (30%)	59,651 (51,368)

39.   Table 4.2.5 reports the demand for other currencies in foreign exchange reserves (excluding the yen and RMB). The demand for other currencies is substantial. The demand is larger than the maximum size of withdrawal from other members in CMIM based on two measures for aggregate of all members. The numbers based on the last three measures range from 71 percent to 195 percent. Except for Korea, Indonesia and the Philippines, the demand for local currency is larger than 20 percent of the maximum withdrawal from China in CMIM, based on at least two measures.

Table 4.2.5. Demand for Other Local Currencies in Foreign Exchange Reserves
(USD millions, 2017)

	Three months of imports		100% of short-term debt		20% of M2		IMF rule		Maximum withdrawal from others
Brunei	47	40%	..	..	66	55%	..	..	118
Cambodia	104	22%	54	11%	122	26%	127	27%	473
Indonesia	1,082	13%	230	3%	0	0%	277	3%	8,126
Lao P.D.R.	42	35%	22	19%	16	14%	42	35%	118
Malaysia	1,969	24%	4,220	52%	3,863	48%	4,530	56%	8,126
Myanmar	109	46%	24	10%	219	93%	178	75%	237
Philippines	126	2%	60	1%	52	1%	93	1%	8,126
Singapore	3,116	38%	24,093	296%	1,865	23%	10,603	130%	8,126
Thailand	388	5%	5,033	62%	4,514	56%	3,789	47%	8,126
Vietnam	1,774	46%	94	2%	327	8%	892	23%	3,867
China	0	0%	34,643	256%	154,863	1146%	92,954	688%	13,508
Hong Kong	3,622	160%	0	0%	0	0%	1,442	64%	2,268
Japan	1,094	7%	0	0%	21,593	142%	5,398	36%	15,167
Korea	166	2%	0	0%	0	0%	0	0%	9,023
Total	13,640	16%	68,473 (44,381)	80% (59%)	187,501	220%	120,325 (108,280)	141% (144%)	85,412 (75,017)

40. The demand for other currencies is substantial too. The aggregate demand is larger than the maximum size of withdrawals from other members in the CMIM based on two measures. The numbers based on the four measures are 16 percent, 80 percent (59 percent), 220 percent, and 141 percent (144 percent). Except for Korea, Indonesia and the Philippines, the demand for local currency is larger than 20 percent of the maximum withdrawal from China in CMIM based on at least two measures.

41. **Table 4.2.6 reports the aggregate ASEAN+3 demand for each local currency in foreign exchange reserves.** Except for the Indonesian rupiah, Philippines peso and RMB, aggregate demand for the currency of each member in foreign exchange reserves is larger than 100 percent of the maximum withdrawal from each member based on at least one measure. For those three members, the numbers are larger than 30 percent based on at least one measure.

Table 4.2.6. Aggregate Demand for Each Local Currency in Foreign Exchange Reserves (USD millions, 2017)

	Three months of imports		100% of short-term debt		20% of M2		IMF rule		Maximum withdrawal from relevant country (CMIM)
Indonesian rupiah	404 (1,250)	5% (17%)	2,331 (1,250)	28% (17%)	5,320	64%	3,717 (3,178)	44% (44%)	8,373 (7,270)
Malaysian ringgit	792	9%	3,978 (2,041)	48% (28%)	9,304	111%	6,460 (5,493)	77% (76%)	8,373 (7,270)
Philippine peso	261	3%	1,626 (872)	19% (12%)	3,709	44%	2,585 (2,209)	31% (30%)	8,373 (7,270)
Singapore dollar	4,851	58%	12,110 (12,110)	145% (149%)	47,639	569%	30,446 (29,870)	364% (367%)	8,373 (8,134)
Thai baht	2,205	26%	4,254 (2,301)	51% (32%)	9,443	113%	6,801 (5,826)	81% (80%)	8,373 (7,270)
Chinese yuan	12,389	21%	26,392 (4,756)	44% (9%)	46,634	78%	26,244 (15,449)	44% (30%)	59,651 (51,368)
Hong Kong dollar	1,992	24%	21,213 (11,822)	256% (158%)	67,827	817%	37,585 (33,453)	453% (446%)	8,302 (7,505)
Japanese yen	71,712	109%	333,954 (145,378)	509% (258%)	588,523	897%	446,839 (351,757)	681% (624%)	65,632 (56,333)
Korean won	3,046	9%	19,423 (10,445)	59% (37%)	44,202	135%	30,818 (26,338)	94% (94%)	32,816 (28,166)
Other ASEAN currency	89	4%	3,539 (3,539)	146% (166%)	56	2%	1,912 (1,912)	79% (90%)	2,430 (2,130)
Total	97,741	46%	428,819 (194,514)	204% (106%)	822,658	390%	593,408 (475,486)	282% (260%)	210,694 (182,719)

42. **In sum, there is substantial demand for local currencies in foreign exchange reserves.** The size of the demand is large in comparison with the size of the maximum withdrawal from CMIM. This result can support the idea of introducing local currency contribution to CMIM arrangements.

4.2.3 Net Demand for Local Currencies in CMIM

43. **In this section, net demand for local currencies in CMIM arrangements is inferred by subtracting estimated actual foreign exchange reserves from demand for local currencies in foreign exchange reserves calculated in Section 3.2.2.** This net demand

can represent the demand for local currencies in CMIM arrangements after excluding the demand that is satisfied by the actual holding of local currency foreign exchange reserves.

44.   However, the exact information on actual local currency holdings in foreign exchange reserves is difficult to obtain. **To roughly infer the size of local currencies in foreign exchange reserves, we simply multiply the actual reserve holdings by the local currency ratio in the world international reserves.** For local currencies, we only consider Chinese yuan and Japanese yen in which the numbers are provided.[6] However, this is a very rough method, and the correct numbers can be different from the numbers calculated here; thus, we opt to use these numbers as rough reference points only, without drawing a strong conclusion based on these numbers.

45.   Note that each member can decrease the size of actual local currency holdings when local currency contribution to CMIM arrangements is introduced if the net demand is small or negative. **Therefore, a small or negative net demand is not necessarily a big hurdle for introducing local currency contribution to CMIM arrangements if enough demand for local currency in foreign exchange reserves exists, as shown in the previous section.**

46.   **Table 4.2.7 reports the net demand for local currencies in CMIM arrangements based on four measures.** The last column of Table 4.2.7 presents estimated numbers for actual local currency holdings. We see that the estimated size of the actual foreign exchange reserves in local currencies tends to be smaller than the maximum withdrawal from CMIM in all members, except for China. The net demand for local currencies in CMIM is still more than 100 percent of maximum withdrawal of CMIM based on the third and fourth measures for the aggregate of ASEAN+3, which may suggest enough demand for local currency use in CMIM arrangements, even after considering the existing local currency foreign exchange reserves. In all members, except for Cambodia, Indonesia and the Philippines, net demand is positive based on at least one measure.

Table 4.2.7. Net Demand for Local Currencies in CMIM
(USD million, 2017)

	Three months of imports		100% of short-term debt		20% of M2		IMF rule		Maximum withdrawal (CMIM)	FX reserves in LCY
Brunei	27	9%	..	..	122	41%	..	..	300	213
Cambodia	-218	-18%	-471	-39%	-123	-10%	-98	-8%	1,199	746
Indonesia	-4,750	-22%	-3,954	-18%	-7,355	-34%	-4,380	-20%	21,896	7,962
Lao P.D.R.	136	45%	35	12%	4	1%	136	45%	300	78
Malaysia	-2,421	-11%	16,309	74%	-1,329	-6%	7,686	35%	21,896	6,265
Myanmar	238	40%	-198	-33%	799	133%	591	99%	600	319
Philippines	-4,129	-19%	-4,249	-19%	-4,382	-20%	-4,044	-18%	21,896	4,988
Singapore	3,973	18%	145,924	666%	-4,494	-21%	54,635	250%	21,896	17,117
Thailand	-6,716	-31%	-4,262	-19%	2,666	12%	-3,796	-17%	21,896	12,387
Vietnam	6,022	61%	-2,446	-25%	-1,005	-10%	1,746	18%	9,917	3,027
China	-148,106	-606%	-5,652	-23%	530,734	2170%	258,935	1059%	24,452	160,221
Hong Kong	-2,216	-36%	44,880	738%	-9,952	-164%	19,786	325%	6,079	26,384
Japan	-13,202	-51%	-16,265	-62%	7,727	30%	-9,597	-37%	26,111	16,265
Korea	-10,672	-33%	-20,395	-63%	29,470	91%	-7,756	-24%	32,255	23,804
Total	-182,035	-86%	149,043 (-41,761)	71% (-23%)	542,882	258%	313,632 (239,211)	149% (131%)	210,694 (182,719)	279,776 (236,275)

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[6] We assume that China does not hold RMB as reserves and Japan does not hold yen as reserves.

47. Table 4.2.8 reports the net demand for yen in CMIM arrangements. For the aggregate of ASEAN+3, net demand is 142 percent (-108 percent), 530 percent and 314 percent of maximum withdrawal from Japan in CMIM arrangements based on the last three measures. For eight members, the net demand is larger than 80 percent of the maximum withdrawal from Japan in CMIM. The results generally confirm the substantial demand of many members for the yen.

Table 4.2.8. Net Demand for Japanese Yen in Foreign Exchange Reserves
(USD millions, 2017)

	Three months of imports		100% of short-term debt		20% of M2		IMF rule		Maximum withdrawal from Japan (CMIM)	FX reserves in yen
Brunei	-8	-8%	..	..	56	59%	..	..	96	171
Cambodia	-238	-62%	-410	-107%	-174	-45%	-157	-41%	384	597
Indonesia	-4,546	-62%	-2,700	-37%	-6,329	-87%	-3,325	-46%	7,283	6,369
Lao P.D.R.	83	86%	15	15%	-6	-6%	83	87%	96	62
Malaysia	-3,657	-50%	10,485	144%	-4,441	-61%	2,693	37%	7,283	5,011
Myanmar	123	64%	-173	-90%	504	262%	363	189%	192	2,55
Philippines	-3,320	-46%	-3,331	-46%	-3,470	-48%	-3,180	-44%	7,283	3,990
Singapore	1,483	20%	103,620	1423%	-4,610	-63%	37,935	521%	7,283	13,692
Thailand	-5,170	-71%	-6,817	-94%	630	9%	-5,144	-71%	7,283	9.909
Vietnam	3,721	116%	-1,934	-60%	-725	-23%	1,023	32%	3,200	2,421
China	-148,106	-1353%	-40,296	-368%	375,870	3434%	165,981	1517%	10,944	160,221
Hong Kong	-3,758	-186%	50,160	2488%	-4,672	-232%	22,350	1109%	2,016	21,104
Japan	..	..	..	..	..	..	..	..	..	..
Korea	-7,737	-63%	-17,336	-141%	-6,953	-57%	-14,454	-118%	12,288	19,040
Total	-169,129	-258%	93,113 (-60,667)	142% (-108%)	347,682	530%	205,998 (145,712)	314% (259%)	65,632 (56,333)	240,841 (206,045)

48. Table 4.2.9 reports the net demand for RMB in CMIM arrangements. For the aggregate of ASEAN+3, the net demand is positive based on 20 percent of M2 measure, although negative based on the other three measures. For members such as Lao P.D.R., Malaysia, Myanmar, Singapore and Korea, the net demand is positive based on at least one measure, although negative numbers are found in many cases.

Table 4.2.9. Net Demand for RMB in Foreign Exchange Reserves
(USD millions, 2017)

	Three months of imports		100% of short-term debt		20% of M2		IMF rule		Maximum withdrawal from China (CMIM)	FX reserves in RMB
Brunei	-13	-15%	..	..	-1	-1%	..	..	86	43
Cambodia	-83	-24%	-115	-33%	-71	-21%	-68	-20%	342	149
Indonesia	-1,286	-20%	-1,483	-23%	-1,026	-16%	-1,331	-21%	6,487	1,593
Lao P.D.R.	11	12%	-2	-2%	-6	-7%	11	13%	86	16
Malaysia	-733	-11%	1,604	25%	-752	-12%	463	7%	6,487	1,254
Myanmar	6	3%	-49	-29%	76	44%	50	29%	171	64
Philippines	-935	-14%	-978	-15%	-964	-15%	-957	-15%	6,487	998
Singapore	-626	-10%	18,211	281%	-1,750	-27%	6,097	94%	6,487	3,425

Thailand	-1,935	-30%	-2,479	-38%	-2,479	-38%	-2,442	-38%	6,487	2,479
Vietnam	527	18%	-606	-21%	-606	-21%	-168	-6%	2,850	606
China	..	..	..	..	..	..	..	..	..	..
Hong Kong	-2,081	-116%	-5,280	-294%	-5,280	-294%	-4,006	-223%	1,796	5,280
Japan	-14,296	-131%	-16,265	-149%	-13,866	-127%	-14,995	-137%	10,944	16,265
Korea	-3,101	-28%	-3,059	-28%	36,424	333%	6,699	61%	10,944	4,763
Total	-24,546	-41%	-10,543 (-23,474)	-18% (-46%)	9,699	16%	-10,691 (-12,781)	-18% (-25%)	59,651 (51,368)	36,935 (-28,230)

49.   In sum, the net demand for local currency in CMIM, after subtracting estimated actual foreign exchange reserves, tends to be positive. This result suggests there is room for introducing local currency contribution to CMIM arrangements, even after considering the current level of local currencies in actual foreign exchange reserves. However, this result should be interpreted with caution because the data used in this analysis, especially the estimates for actual foreign exchange reserves, is not perfect.

4.3   Stability of Local Currencies

50.   If certain parts of arranged local currencies are not needed by receiving the members when they experience balance of payments and/ or short-term liquidity difficulties, then this situation will be inefficient and there will be costs involved. The receiving member will subsequently need to exchange local currencies for the currencies needed, such as USD. In such a case, when local currencies are unstable, the cost is likely to be large.

51.   First, we calculate the measure of volatility in the value or exchange rate of local currencies. If the value of local currencies is unstable, then receiving members would incur higher costs in exchanging local currencies for the currencies needed. However, this measure has one drawback. The volatility of the exchange rate is likely to depend on the exchange rate regime. For instance, if one member adopts a fixed exchange rate regime, then the volatility of the exchange rate is likely to be small, except during crisis. Nonetheless, this situation does not necessarily imply that the currency is stable. The country with a fixed exchange rate regime potentially has a greater chance of experiencing a currency crisis and the exchange rate volatility can be very high during such a crisis. Therefore, we consider the next measure.

52.   Second, we calculate the exchange market pressure index. The measure captures total pressure on an exchange rate. Instead of simply considering exchange rate movements, the measure also considers the degree of foreign exchange managements. In that way, the measure tries to capture the size of the fundamental source of exchange rate instability that each member faces. For instance, suppose, in a flexible exchange rate regime, the sales of domestic currency under an economic event leads to exchange rate depreciation. However, the sales of domestic currency do not lead to exchange rate depreciation in a fixed exchange rate regime in most cases. Instead, foreign exchange intervention is needed to prevent an exchange rate depreciation. Therefore, by considering exchange rate changes and the degree

of foreign exchange market intervention, one may capture the total pressure on exchange rate or the size of the fundamental source of exchange rate instability that each country faces.

53.   In addition, the exchange market pressure index has been widely used in past studies to measure the severity of speculative attacks and to define a currency crisis. If local currencies tend to be subject to large speculative attacks, then the currencies are more likely to experience a currency crisis and lose value, which also leads to high costs for receiving and providing members (as their chance of crisis increases).

54.   Note that we mostly compare the stability of currencies of ASEAN+3 members with well-known international currencies, such as the Euro, U.K. pound, Canadian dollar and Swiss franc, instead of U.S. dollars. First, to define the value of currency, a base currency is needed, and thus, we use the U.S. dollar as the base currency. Second, U.S. dollars are likely more stable than other currencies in the world. Therefore, the results should be interpreted with caution.

4.3.1 Stability for the Value of Local Currencies

55.   We first calculate the standard deviation of the growth rate of the value of local currencies. Ideally, we must consider the value of local currencies against the currencies needed for each country. However, we do not know the exact currency composition needed for each country. Therefore, we first consider the exchange rate of local currencies against the U.S. dollar as it is the representative international reserve currency. In addition, we construct an effective exchange rate against the actual currency composition of foreign exchange reserves in the world, as reported in COFER from IMF. We use the most recent composition reported by COFER. In the first quarter of 2018, for allocated reserves, U.S. dollars, euros, RMB, yen, pound sterling, Australian dollars, Canadian dollars and Swiss francs take up 62.48 percent, 20.39 percent, 1.39 percent, 4.81 percent, 4.68 percent, 1.70 percent, 1.86 percent and 0.17 percent respectively. Other currencies make up 2.5 percent, but we do not know the exact currency composition in that category; thus, we normalize the weights of each currency to sum up to 100 percent after excluding other currencies.

56.   We calculate the standard deviation of the growth rate of these exchange rates for each ASEAN+3 member's currency. We also calculate the standard deviation for six world reserve currencies outside the region (U.S. dollars, euros, pound sterling, Australian dollars, Canadian dollars and Swiss francs) for comparison. By using monthly data, we calculate the standard deviation from 2000 to 2017. We also consider various sub-periods, such as after 2010 to check more recent trends. In addition, we consider 2007-2009 to check the stability during the global crisis period. To check the stability during the recent U.S. tapering, we consider 2013 to 2017 (including taper tantrum during 2013) and 2015 to 2017 (the periods os U.S. interest rate increase).

57.   The results are reported in Table 4.3.1. As expected, they depend on the exchange rate regime. The volatility of the exchange rate tends to be very high for the free

floating exchange rate regime. The floating exchange rate regime is adopted in countries/ regions with most well-known international reserve currencies, such as the U.S., the U.K., Japan, Canada, Switzerland and the E.U. The exchange rate volatility of those countries, except for the U.S., is fairly high. For the entire sample period, the standard deviation of exchange rate growth ranges from 2 to 2.4 percent for the exchange rate against the U.S. and from 1.7 percent to 2.2 percent for the effective exchange rate. For the period after 2010, they range from 1.8 to 2.4 percent and from 1.6 percent to 2.2 percent for the exchange rate against the U.S. and for the effective exchange rate, respectively. The value is low for the U.S. given that the exchange rate is mostly calculated against the value of own currency. For the exchange rate against the U.S. dollar, the volatility of the exchange rate is not clearly larger than these numbers for any members. However, this situation does not necessarily mean that the currencies of these members are as stable as the more well-known international reserve currencies. These members tend to have taken more rigid exchange rate regime, which may explain low volatility. For other three sub-periods, the results are similar. For all ASEAN+3 members, exchange rate volatility is not clearly larger than that of well-known international reserve currencies. Again, this result can be mostly explained by the differences in exchange rate regime. Finally, from both tables, numbers for the U.S. dollar are the lowest mostly because the U.S. dollar is used as the most important numeraire currency.

Table 4.3.1. Standard Deviation of Exchange Rate Growth
(1) Exchange Rate Against the U.S. Dollar

	From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017		From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017
Thailand	1.4%	1.3%	1.4%	1.3%	1.2%	U.K.	2.3%	2.1%	3.2%	2.1%	2.3%
Myanmar	1.5%	1.7%	1.3%	1.9%	2.1%	Switzerland	2.4%	2.4%	2.6%	1.7%	1.8%
Malaysia	1.5%	2.0%	1.6%	2.2%	2.5%	Canada	2.0%	1.8%	3.2%	1.9%	2.3%
Cambodia	0.6%	0.6%	0.6%	0.5%	0.5%	Euro	2.4%	2.2%	2.9%	1.9%	2.1%
Vietnam	0.9%	0.8%	0.9%	0.2%	0.3%	Australia	3.0%	2.4%	4.9%	2.3%	2.2%
Brunei	1.2%	1.2%	1.6%	1.1%	1.3%	U.S.	0.0%	0.0%	0.0%	0.0%	0.0%
Philippines	1.5%	1.1%	2.1%	1.0%	1.0%						
Laos	1.6%	0.5%	0.7%	0.5%	0.4%						
Indonesia	3.0%	1.7%	4.1%	2.0%	1.6%						
Singapore	1.2%	1.2%	1.5%	1.1%	1.3%						
China	0.5%	0.6%	0.5%	0.8%	0.9%						
Japan	2.4%	2.3%	2.8%	2.5%	2.2%						
Korea	2.4%	1.9%	4.1%	1.8%	1.9%						
Hong Kong	0.1%	0.1%	0.2%	0.1%	0.1%						

(2) Effective Exchange Rate (Against World International Reserves)

	From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017		From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017
Thailand	1.2%	1.2%	1.1%	1.3%	1.2%	U.K.	1.9%	1.8%	2.7%	1.9%	2.1%
Myanmar	1.1%	1.5%	0.5%	1.8%	2.1%	Switzerland	1.9%	2.0%	1.9%	1.4%	1.5%
Malaysia	1.4%	1.8%	1.1%	2.1%	2.3%	Canada	1.7%	1.6%	2.7%	1.6%	2.0%
Cambodia	0.9%	0.9%	1.0%	0.8%	0.9%	Euro	1.7%	1.6%	2.1%	1.4%	1.6%
Vietnam	1.1%	1.1%	1.1%	0.6%	0.6%	Australia	2.6%	2.1%	4.2%	2.1%	2.0%
Brunei	0.9%	0.9%	1.0%	0.9%	1.0%	U.S.	0.7%	0.6%	0.8%	0.5%	0.6%
Philippines	1.5%	1.1%	1.9%	1.1%	1.0%						
Laos	1.6%	0.7%	0.9%	0.7%	0.6%						
Indonesia	2.9%	1.7%	3.6%	2.0%	1.6%						
Singapore	0.9%	0.9%	0.8%	0.9%	1.0%						
China	0.7%	0.7%	0.8%	0.8%	0.9%						
Japan	2.2%	2.2%	2.7%	2.3%	2.0%						
Korea	2.2%	1.7%	3.6%	1.7%	1.9%						
Hong Kong	0.7%	0.6%	0.8%	0.5%	0.6%						

4.3.2 Exchange Market Pressure Index for Local Currencies

58. **We also calculate the exchange market pressure index.** In past studies, the index is widely used to identify currency crisis periods by capturing total pressure on an exchange rate. This measure can represent the size of the fundamental sources of exchange rate instability that can be applied to different exchange rate regimes, as discussed earlier. If local currencies are subject to more pressure or huge speculative attacks, then the currencies are more likely to experience currency crisis and lose their value. This situation implies that receiving members need to pay high costs when they exchange local currencies for the currencies needed. In addition, providing members are more likely to experience a crisis as they have more pressure in the foreign exchange market, and using local currencies may imply more chances of a crisis in providing members, as explained in the first section.

59. Various measures are suggested in past studies. **Here, we use the four alternative measures of exchange market pressure. First, we use the simplest form, as follows:**

$$EMP1 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{IR_{t-1}},$$

Where 'e'$_t$ is the exchange rate against the U.S. dollar and IR$_t$ is international reserves (in U.S. dollars). This index sums the rate of exchange rate depreciation and the rate of reserve loss. The index captures total pressure on exchange rate from (net) sales of domestic currency. The sales of domestic currency would lead to an exchange rate depreciation if no foreign exchange intervention is done. If the central bank intervenes in the foreign exchange market to stabilize the exchange rate, then international reserves would suffer losses resulting from intervention. This simple index has been widely used in past studies, such as Aizenman and Binici (2016) and Aizenman, Lee, and Sushko (2012).

60. Second, in addition to foreign exchange market intervention, the monetary authority may increase the interest rate to stabilize the exchange rate. That is, an increase in the interest rate would fend off depreciation pressure on the exchange rate. **Therefore, changes in the interest rate are added to the previous index.**

$$EMP2 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{IR_{t-1}} + (i_t - i_{t-1}),$$

where 'i_t' is domestic short-term interest rates. Sachs, Tornell, and Velasco (1996), Kaminsky, Lizondo, and Reinhart (1998) and Kaminsky and Reinhart (1999) added the short-term interest rate in the exchange rate market index.

61. The above indices are not formally derived from theoretical models. Thus, we also consider several indices derived from theoretical models. The third index is similar to the first one in having two components – exchange rate and foreign exchange reserves. However, **the international reserve changes are normalized by monetary base.** Girton and Roper (1977)

contended that such normalization is consistent with the theoretical model, such as the monetary model of exchange rate.

$$EMP3 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{M_{t-1}/e_{t-1}},$$

where M_t is the monetary base (in domestic currency). Note that IR is expressed in U.S. dollars, but M is expressed in domestic currency; thus, M is divided by 'e' to be expressed in U.S. dollars.

62. The fourth index is similar to the second one, in having three components – exchange rate, foreign exchange reserves and interest rate. However, the difference lies in two aspects**. First, as in the third measure, foreign exchange reserve changes are normalized by a monetary base. Second, the interest rate changes are entered with a negative sign.** Klaasen and Jager (2011) validated that the index can be derived from the monetary model. The index is also used in Aizenman and Binici (2016).

$$EMP4 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{\frac{M_{t-1}}{e_{t-1}}} - (i_t - i_{t-1})$$

63. **We calculate the average of absolute value of the index for each country for various sub-periods to show the stability of each currency during the considered periods.** We use the average of absolute value because non-zero value of the index implies the existence of pressure on exchange rate, and the size of (the absolute value of) the index shows the size of pressure on exchange rate. We calculate the standard deviation of the index, and report the results in the Appendix. The main implications of the results are not much different. As for the standard deviation of the exchange rate growth rate, we calculate the average of absolute value of the index for the currency of each ASEAN+3 member and six world reserve currencies outside the region, for 2000 to 2017, 2010 to 2017, 2007 to 2009, 2013 to 2017, and 2015 to 2017, by using monthly data.

64. The numbers for the U.S. indicate the role of the second component only because the first component (growth rate of the exchange rate) is zero. In addition, evaluating the size of the second component may not be meaningful for the U.S. Therefore, comparing the results for the U.S. with the results for other countries/ regions is difficult. We first compare the results for the currencies of ASEAN+3 members with those for the euro, which is the second largest international reserve currency, making up more than 20 percent of world reserves. The average of absolute value of the exchange market index for euro is 2.9 percent and 2.2 percent for 2000 to 2017 and 2010 to 2017 respectively. Interestingly, several currencies show an even lower number for both periods, namely currencies of the Philippines, Singapore, China, Japan, Korea and Hong Kong. In addition, the currencies of Thailand, Malaysia and Cambodia show similar numbers. For countries/ regions with well-known international reserve currencies (U.K., Switzerland, Canada, the Euro area and Japan), the average of absolute value of exchange market index ranges from 2.4 percent to 4.3 percent and from 2.1 percent to 4.6

percent for 2000 to 2017 and 2010 to 2017 respectively. Most ASEAN+3 members have an average value that is not greater than those numbers. Only three members have numbers larger than those ranges – Myanmar for the period from 2000, and Brunei and Laos for both periods. For 2007 to 2009, 2013 to 2017 and 2015 to 2017, the results are similar in that the numbers for most ASEAN+3 members are not greater than those numbers.

Table 4.3.2. Average of Absolute Value of Exchange Market Index

$$(1)\ EMP1 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{IR_{t-1}}$$

	From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017		From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017
Thailand	2.5%	2.3%	3.3%	2.2%	2.4%	U.K.	3.5%	2.7%	6.0%	2.7%	2.9%
Myanmar	5.4%	3.9%	6.3%	4.5%	3.6%	Switzerland	4.3%	4.6%	5.2%	2.4%	2.6%
Malaysia	2.7%	2.6%	3.6%	2.8%	2.9%	Canada	2.4%	2.1%	3.7%	1.9%	2.1%
Cambodia	2.4%	2.2%	3.3%	2.4%	2.1%	Euro	2.9%	2.2%	4.5%	2.0%	2.3%
Vietnam	3.8%	4.1%	4.3%	3.4%	3.1%	Australia	7.7%	7.7%	9.7%	8.4%	9.4%
Brunei	4.6%	5.8%	4.8%	5.0%	5.6%	U.S.	2.0%	1.3%	4.0%	1.2%	1.2%
Philippines	2.6%	2.0%	3.4%	1.5%	1.4%						
Laos	5.3%	6.9%	3.7%	7.2%	6.2%						
Indonesia	3.8%	3.2%	4.7%	2.8%	2.8%						
Singapore	2.1%	2.1%	2.7%	1.7%	1.9%						
China	2.1%	1.4%	2.8%	1.3%	1.5%						
Japan	2.5%	2.1%	2.9%	2.1%	1.9%						
Korea	2.6%	2.1%	4.1%	1.9%	1.9%						
Hong Kong	1.2%	1.0%	2.4%	1.0%	1.1%						

$$(2)\ EMP2 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{IR_{t-1}} + (i_t - i_{t-1})$$

	From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017		From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017
Thailand	2.5%	2.3%	3.4%	2.2%	2.4%	U.K.	3.5%	2.7%	6.0%	2.7%	2.9%
Myanmar	5.4%	3.9%	6.3%	4.5%	3.6%	Switzerland	4.3%	4.6%	5.2%	2.5%	2.7%
Malaysia	2.7%	2.6%	3.6%	2.8%	2.9%	Canada	2.4%	2.1%	3.7%	1.9%	2.1%
Cambodia	2.4%	2.3%	3.4%	2.5%	2.1%	Euro	2.8%	2.2%	4.5%	2.0%	2.3%
Vietnam	3.9%	4.3%	4.7%	3.6%	3.4%	Australia	7.7%	7.7%	9.6%	8.4%	9.4%
Brunei	4.9%	5.8%	4.8%	5.0%	5.6%	U.S.	2.0%	1.3%	4.1%	1.2%	1.2%
Philippines	2.7%	2.0%	3.5%	1.5%	1.4%						
Laos	5.2%	6.8%	3.7%	7.2%	6.1%						
Indonesia	3.9%	3.2%	4.8%	2.9%	2.8%						
Singapore	2.1%	2.1%	2.8%	1.7%	1.8%						
China	2.1%	1.5%	2.8%	1.5%	1.5%						
Japan	2.5%	2.1%	2.9%	2.1%	1.9%						
Korea	2.6%	2.1%	4.1%	1.9%	1.9%						
Hong Kong	1.3%	1.0%	2.5%	1.0%	1.2%						

$$(3)\ EMP3 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{M_{t-1}/e_{t-1}}$$

	From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017		From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017
Thailand	6.8%	7.1%	10.4%	5.8%	6.5%	U.K.	1.7%	1.6%	2.2%	1.5%	1.6%
Myanmar	1.5%	2.3%	1.0%	2.8%	2.1%	Switzerland	2.7%	3.2%	2.5%	2.4%	2.7%
Malaysia	8.8%	6.6%	14.7%	5.3%	5.0%	Canada	1.5%	1.4%	2.3%	1.5%	1.9%
Cambodia	3.3%	3.0%	4.8%	3.3%	3.0%	Euro	1.9%	1.7%	2.3%	1.4%	1.6%
Vietnam	2.5%	2.3%	3.9%	1.9%	1.7%	Australia	2.9%	2.4%	4.3%	2.5%	2.3%
Brunei	5.1%	7.7%	3.9%	7.4%	8.4%	U.S.	0.1%	0.1%	0.2%	0.1%	0.0%
Philippines	3.9%	3.2%	4.7%	1.9%	1.7%						
Laos	7.7%	5.6%	6.0%	5.6%	5.4%						
Indonesia	4.5%	3.9%	5.2%	3.3%	3.3%						
Singapore	5.2%	3.9%	7.1%	2.6%	2.8%						
China	1.3%	1.1%	2.3%	1.0%	1.1%						
Japan	1.9%	1.8%	2.3%	1.9%	1.7%						
Korea	2.3%	1.9%	3.8%	1.7%	1.8%						
Hong Kong	3.2%	1.8%	7.1%	1.9%	2.0%						

$$(4)\ EMP4 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{\frac{M_{t-1}}{e_{t-1}}} - (i_t - i_{t-1})$$

	From 2000	From 2010	2007~2009	2013~2017	2015~2017		From 2000	From 2010	2007~2009	2013~2017	2015~2017
Thailand	6.8%	7.1%	10.3%	5.8%	6.5%	**U.K.**	1.8%	1.6%	2.4%	1.6%	1.6%
Myanmar	1.6%	2.3%	1.0%	2.8%	2.1%	**Switzerland**	2.7%	3.2%	2.6%	2.4%	2.8%
Malaysia	8.8%	6.6%	14.8%	5.3%	5.0%	**Canada**	1.6%	1.4%	2.4%	1.5%	1.9%
Cambodia	3.3%	2.9%	4.8%	3.3%	3.0%	**Euro**	1.9%	1.7%	2.3%	1.4%	1.6%
Vietnam	2.6%	2.5%	3.8%	2.3%	1.8%	**Australia**	3.0%	2.4%	4.4%	2.5%	2.3%
Brunei	5.6%	7.7%	3.9%	7.4%	8.3%	**U.S.**	0.1%	0.1%	0.3%	0.1%	0.1%
Philippines	3.9%	3.2%	4.7%	1.9%	1.7%						
Laos	7.7%	5.6%	6.0%	5.7%	5.4%						
Indonesia	4.5%	3.9%	5.2%	3.2%	3.3%						
Singapore	5.2%	3.9%	7.1%	2.6%	2.8%						
China	1.4%	1.2%	2.3%	1.1%	1.1%						
Japan	1.9%	1.8%	2.3%	1.9%	1.7%						
Korea	2.3%	1.9%	3.8%	1.7%	1.8%						
Hong Kong	3.2%	1.8%	7.1%	1.9%	2.1%						

65. **The results based on the second index are similar to the first index.** For all sub-periods, the numbers for the currencies of most ASEAN+3 members are not greater than those numbers of five international currencies. However, results based on the third and fourth indices are somewhat different in that fewer regional currencies have the numbers not greater than those numbers of the five international currencies.

66. **On the basis of the third index, for countries with five better known international reserve currencies (U.K., Switzerland, Canada, E.U. and Japan), the average of the absolute value of the exchange market index ranges from 1.5 percent to 2.7 percent and from 1.4 percent to 3.2 percent for 2000 to 2017 and 2010 to 2017 respectively. Among ASEAN+3 members, five (Myanmar, Vietnam, China, Japan and Korea) have an average value that is not greater than those numbers.** From 2007 to 2009, the average of absolute value of the exchange market index ranged from 2.2 percent to 2.5 percent in the U.K., Switzerland, Canada, E.U. and Japan. China and Japan have an average value that is smaller those numbers. Korea, Brunei and Vietnam show 3.8 percent to 3.9 percent, which is larger than those numbers but still smaller than the number for Australia (4.3 percent), which also has a popular international currency. The average of absolute value of the exchange market index ranges from 1.4 percent to 2.4 percent and from 1.6 percent to 2.8 percent from 2013 to 2017 and from 2015 to 2017 respectively, in countries with five well-known reserve currencies. Among ASEAN+3 members, six members (Vietnam, the Philippines, China, Japan, Hong Kong and Korea) show an average value that is not greater than those numbers.

67. **When we consider periods after 2010 (2010 to 2017, 2013 to 2017 and 2015 to 2017), China, Korea, and Japan have numbers smaller than 2 percent, which are similar to the numbers for the U.K., Canada, and E.U.** In addition, the numbers are smaller than those for Switzerland and Australia. Myanmar, Vietnam and Hong Kong also have numbers of about 2 percent, which is not clearly larger than those for Switzerland and Australia.

68. **The results based on the fourth index are similar to those based on the third index.** The results based on the third and fourth indices suggest that currencies of at least four members (China, Japan, Korea and Vietnam) are as stable as popular non-U.S. international currencies for various sub-periods, including global financial crisis and recent periods of U.S. interest rate rise. In addition, currencies of members such as Myanmar, Brunei,

the Philippines and Hong Kong tend to be as stable as popular non-U.S. international currencies at least for certain sub-periods. As we obtained more positive results based on the first two indices, these results can be regarded as conservative conclusions based on all these indices.

69. Finally, we review the results based on various exchange market pressure indices. The most conservative results are based on the third and fourth indices, which are summarized as follows. **Several currencies of ASEAN+3 members (China, Japan, Korea, and Vietnam) are as stable as popular non-U.S. international currencies for various sub-periods.** In recent years, the currencies of China, Japan and Korea have been as stable as those of the U.K., Canada and the Eurozone, and even more stable than those of Australia and Switzerland. In recent years, currencies of other members such as Myanmar, Vietnam and Hong Kong are also as stable as those of Australia and Switzerland.

4.3.3. Internationalization and Capital Controls

70. **In addition to the stability of the currency, several other features such as internationalization of the currency and liberalization of capital account transactions are important to implement local currency contributions to CMIM arrangements.** When currencies are more internationalized and members have more liberalized capital accounts, receiving members are likely to feel more comfortable receiving such currencies given that the management and exchange of such currencies are easier. In this regard, we discuss the degree of internationalization of each currency and the degree of capital controls in each member.

71. **We report three popular measures of currency internationalization in Table 4.3.3.** First, we consider the extent to which each currency is used in official foreign exchange reserves. The proportion of each currency in total international reserves globally is reported. Second, we consider the amount of international debt securities outstanding denominated in each currency. We report the proportions of international debt securities that are outstanding denominated in each currency in total international debt securities of the world. Then, we consider the size of turnover for each currency. The proportion of the size of turnover for each currency in the size of total turnover in foreign exchange market around the world is reported. These three measures are suggested in an IMF Staff Discussion Note by Maziad et al. (2011). Maziad et al. (2011) discussed "common measures of international use of a currency include a currency's use as an international reserve asset; its use in invoicing and settlement of international transactions; and trading volumes in foreign exchange markets". We report these three measures for certain ASEAN+3 members and countries with popular international currencies for comparison. We report the number for 2010 (or 2014) and 2017 (or 2016).

Table 4.3.3. Various Measures of Currency Internationalization (Proportion, %)

	Official foreign exchange reserves[1]		International debt securities outstanding[2]		Foreign exchange market turnover[3]	
	2014	2017	2010	2017	2010	2016
U.S. Dollars	63.67	62.72	31.66	45.07	84.86	87.58
Euros	21.03	20.15	46.93	39.20	39.04	31.39

Pounds sterling	4.07	4.54	9.87	8.27	12.88	12.80
Australian dollar	2.11	1.80	1.43	1.19	7.59	6.87
Canadian dollar	1.99	2.02	1.53	0.59	5.28	5.14
Swiss franc	0.23	0.18	1.97	0.88	6.30	4.80
Chinese renminbi	1.11	1.22	0.08	0.43	0.86	3.99
Hong Kong dollar	…	…	0.33	0.37	2.37	1.73
Japanese yen	3.45	4.89	3.70	1.80	18.99	21.62
Korean won	…	…	0.01	0.00	1.52	1.65
Indonesian rupiah	…	…	0.03	0.06	0.15	0.20
Malaysian ringgit	…	…	0.03	0.01	0.28	0.36
Philippine peso	…	…	0.01	0.01	0.17	0.14
Singapore dollar	0.06	…	0.15	0.18	1.42	1.81
Thailand baht	…	…	0.01	0.02	0.19	0.36

Note: "…" indicates that data are not available. Each foreign exchange transaction involves two currencies and the total share of all currencies in foreign exchange market turnover is 200 percent.
Source: IMF COFER (for 2017) and IMF survey on the holdings of currencies in official foreign currency assets (for 2014); BIS Quarterly Review; and BIS Triennial Central Bank Survey, Net-net basis, daily average in April, in percent

72.   The Japanese yen is clearly one of the most popular international currencies in the world, following the U.S. dollar and the euro, based on all three criteria. In 2016 or 2017, it was third in the world in terms of its share in global international reserves and in foreign exchange market turnover. Its share in international debt securities outstanding is fourth in the world, meanwhile. On the other hand, the RMB appears to be close to the level of minor international currencies such as the Swiss franc. The RMB is seventh in the world in terms of its share in global international reserves, just above the Swiss franc. Its share of international debt securities outstanding is below the other seven popular international currencies in foreign exchange market turnover rate is slightly lower than the Swiss franc and Canadian dollar. Among other local currencies, the Hong Kong dollar has a relatively high share in international debt securities outstanding, albeit slightly lower than that of China; and it enjoys a higher of foreign exchange market turnover than other ASEAN+3 members' currencies. The Singapore dollar and Korean won have relatively high shares in foreign exchange market turnover.

73.   Table 4.3.4 reports the capital control measures constructed by Fernandez, Klein, Schindler, and Uribe (2016) for ASEAN+3 members and countries with popular international currencies. The measure of overall restrictions, inflow restrictions and outflow restrictions are reported. The number is between 0 and 1. A higher number implies stronger restrictions. We report the measure for ASEAN+3 members and countries with popular international currencies. We consider Germany as a representative country from the euro area.

Table 4.3.4. Capital Control Measure (Fernandez, Klein, Schindler, and Uribe, 2016)

	Overall restrictions	Inflow restrictions	Outflow restrictions
US	0.13	0.10	0.15
Germany	0.30	0.10	0.50
UK	0.05	0.10	0.00
Switzerland	0.35	0.15	0.55
Canada	0.05	0.10	0.00
Australia	0.18	0.30	0.05
Brunei	0.05	0.10	0.00
Cambodia	…	…	…
Indonesia	0.63	0.65	0.60
Lao P.D.R.	…	…	…
Malaysia	0.88	0.80	0.95
Myanmar	0.90	0.90	0.90
Philippines	0.88	0.75	1.00
Singapore	0.13	0.10	0.15
Thailand	0.73	0.70	0.75
Vietnam	0.88	0.85	0.90

China	0.80	0.80	0.80
Hong Kong	0.05	0.10	0.00
Japan	0.00	0.00	0.00
Korea	0.15	0.15	0.15

74. For the six countries with popular international currencies, the number of overall restrictions ranges from 0.05 to 0.35. **Members such as Brunei, Singapore, Hong Kong, Japan and Korea have similar numbers but others such as Indonesia, Malaysia, Myanmar, the Philippines, Thailand, Vietnam and China have higher numbers, ranging from 0.63 to 0.90.** The two Asian countries with the most popular currencies have very different numbers. Japan has the lowest number of 0, showing the lowest degree of capital controls, while China's number stands at 0.80, suggesting a high degree of capital controls.

75. **In sum, the Japanese yen is one of the most popular international currencies in the world with a liberalized capital account. On the other hand, the RMB's internationalization is at about the same level as for the Swiss franc, but a high degree of capital controls is still in place in China. The Singapore dollar, Hong Kong dollar and Korean won are next in terms of their level of internationalization, and the degree of capital controls in these economies is low.**

76. **Finally, the results on currency stability, internationalization of the currency and liberalization of capital account transactions indicate that the Japanese yen, the RMB and the Korean won could be considered first as being eligible for local currency contribution to CMIM.**

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Appendix

Table. Standard Deviation of Exchange Market Index

$$(1)\ EMP1 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{IR_{t-1}}$$

	From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017		From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017
Thailand	3.1%	2.9%	3.8%	2.7%	2.8%	U.K.	4.8%	3.5%	7.8%	3.6%	4.0%
Myanmar	10.2%	7.2%	11.8%	8.7%	5.6%	Switzerland	7.3%	7.8%	9.1%	3.0%	3.2%
Malaysia	3.7%	3.8%	4.8%	3.7%	3.9%	Canada	3.4%	2.6%	5.6%	2.4%	2.6%
Cambodia	2.8%	2.7%	3.6%	3.0%	1.5%	Euro	3.9%	2.8%	6.5%	2.5%	2.8%
Vietnam	5.0%	5.6%	5.5%	4.8%	4.4%	Australia	9.8%	9.9%	12.0%	10.8%	11.7%
Brunei	7.6%	9.2%	8.1%	6.2%	7.0%	U.S.	4.8%	1.7%	10.5%	1.5%	1.6%
Philippines	3.5%	2.8%	3.8%	1.9%	1.8%						
Laos	7.3%	9.2%	4.7%	9.2%	8.0%						
Indonesia	5.1%	4.1%	6.3%	3.5%	3.5%						
Singapore	2.6%	2.6%	3.3%	2.0%	2.2%						
China	2.1%	1.9%	1.7%	1.8%	1.9%						
Japan	3.4%	2.9%	3.3%	2.8%	2.6%						
Korea	3.7%	2.6%	6.8%	2.3%	2.4%						
Hong Kong	1.8%	1.3%	3.0%	1.4%	1.5%						

$$(2)\ EMP2 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{IR_{t-1}} + (i_t - i_{t-1})$$

	From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017		From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017
Thailand	3.1%	2.9%	3.9%	2.7%	2.8%	U.K.	4.8%	3.5%	7.7%	3.6%	4.0%
Myanmar	10.2%	7.2%	11.8%	8.7%	5.6%	Switzerland	7.4%	7.8%	9.0%	3.0%	3.3%
Malaysia	3.7%	3.8%	4.8%	3.7%	3.9%	Canada	3.4%	2.6%	5.5%	2.4%	2.6%
Cambodia	2.9%	2.7%	3.7%	3.0%	1.5%	Euro	3.9%	2.8%	6.4%	2.5%	2.8%
Vietnam	5.3%	5.9%	6.0%	4.9%	4.7%	Australia	9.8%	9.9%	12.0%	10.8%	11.7%
Brunei	8.1%	9.2%	8.1%	6.2%	7.0%	U.S.	4.8%	1.7%	10.5%	1.5%	1.6%
Philippines	3.6%	2.8%	3.9%	1.9%	1.8%						
Laos	7.3%	9.2%	4.7%	9.2%	7.9%						
Indonesia	5.2%	4.1%	6.4%	3.6%	3.6%						
Singapore	2.6%	2.6%	3.3%	2.0%	2.1%						
China	2.1%	2.1%	1.7%	2.0%	2.0%						
Japan	3.4%	2.9%	3.3%	2.8%	2.6%						
Korea	3.7%	2.6%	6.7%	2.3%	2.4%						
Hong Kong	1.8%	1.3%	3.0%	1.4%	1.5%						

$$(3)\ EMP3 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{M_{t-1}/e_{t-1}}$$

	From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017		From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017
Thailand	8.6%	8.9%	11.4%	7.3%	7.7%	U.K.	2.3%	2.1%	3.2%	2.1%	2.3%
Myanmar	3.6%	5.1%	1.3%	6.3%	3.1%	Switzerland	3.7%	4.3%	3.2%	2.9%	3.2%
Malaysia	13.6%	11.9%	21.2%	7.8%	7.5%	Canada	2.1%	1.8%	3.3%	1.9%	2.3%
Cambodia	3.9%	3.4%	5.2%	3.8%	2.1%	Euro	2.4%	2.2%	3.0%	1.9%	2.1%
Vietnam	3.3%	3.2%	4.9%	2.8%	2.4%	Australia	3.8%	3.0%	5.8%	3.1%	3.0%
Brunei	8.7%	11.6%	6.3%	9.2%	10.3%	U.S.	0.2%	0.1%	0.5%	0.1%	0.1%
Philippines	5.4%	5.0%	5.1%	2.6%	2.2%						
Laos	10.9%	7.2%	7.9%	7.1%	6.9%						
Indonesia	6.1%	5.1%	6.8%	4.1%	4.2%						
Singapore	6.5%	5.0%	8.0%	3.2%	3.3%						
China	1.4%	1.5%	1.4%	1.4%	1.4%						
Japan	2.5%	2.4%	2.9%	2.6%	2.3%						
Korea	3.4%	2.4%	6.3%	2.1%	2.2%						
Hong Kong	5.0%	2.4%	8.8%	2.6%	2.7%						

$$(4) \ EMP4 = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{IR_t - IR_{t-1}}{\frac{M_{t-1}}{e_{t-1}}} - (i_t - i_{t-1})$$

	From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017		From 2000	From 2010	2007~ 2009	2013~ 2017	2015~ 2017
Thailand	8.6%	8.9%	11.2%	7.2%	7.6%	**U.K.**	2.4%	2.1%	3.4%	2.1%	2.3%
Myanmar	3.6%	5.1%	1.3%	6.3%	3.1%	**Switzerland**	3.7%	4.3%	3.3%	2.9%	3.3%
Malaysia	13.6%	11.8%	20.9%	7.8%	7.3%	**Canada**	2.1%	1.8%	3.4%	1.9%	2.3%
Cambodia	4.0%	3.4%	5.2%	3.8%	2.1%	**Euro**	2.5%	2.2%	3.0%	1.9%	2.1%
Vietnam	3.4%	3.3%	4.8%	3.1%	2.5%	**Australia**	3.9%	3.0%	5.8%	3.0%	2.9%
Brunei	9.3%	11.5%	6.2%	9.1%	10.1%	**U.S.**	0.3%	0.1%	0.5%	0.1%	0.1%
Philippines	5.4%	5.0%	4.9%	2.6%	2.2%						
Laos	11.0%	7.2%	7.8%	7.1%	6.8%						
Indonesia	6.0%	5.0%	6.7%	4.0%	4.1%						
Singapore	6.5%	5.0%	7.9%	3.2%	3.3%						
China	1.5%	1.6%	1.5%	1.4%	1.4%						
Japan	2.5%	2.4%	2.8%	2.5%	2.2%						
Korea	3.4%	2.4%	6.3%	2.1%	2.2%						
Hong Kong	5.0%	2.4%	8.7%	2.6%	2.7%						