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# Electronic Money in Indonesia and Thailand

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## Abstract

Over the past several years, electronic money (e-money) has emerged as an increasingly important means of payment in many countries. Focusing on Indonesia and Thailand, this paper takes stock of recent developments in e-money and examines concepts and risks related to e-money, as well as implications for monetary policy. The paper also analyses the two countries' e-money regulatory frameworks in comparison to those of other countries and discusses opportunities and challenges for the future of the e-money industry.

JEL classification: E42, E51

Keywords: Electronic Money; Electronic Payment; Payment Systems; Money Supply; Thailand; Indonesia

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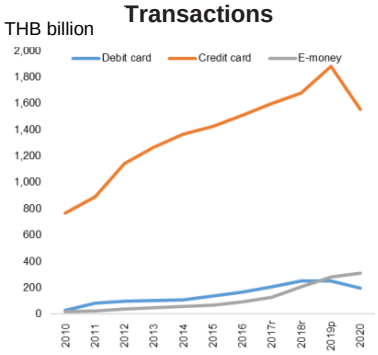
## I. Recent Developments

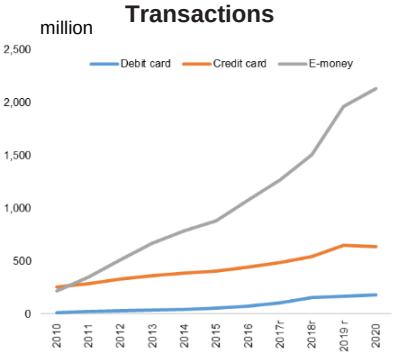
**1. While electronic money (e-money) usage has been around in the ASEAN region for quite sometime, the increase in e-money transactions in the region over the past several years has mainly been driven by Thailand and Indonesia.**[2] Although retail electronic payment systems in the two countries are still largely dominated by credit and debit cards, e-money—a type of privately issued asset that functions as money and is primarily stored and exchanged on computer systems, generally over the internet—has emerged as an increasingly popular means of payment.[3] In terms of value, bank-issued cards, in the form of credit and debit cards, still account for the lion's share of retail electronic transactions, representing 85 percent and 72 percent of total value of transactions in Thailand and Indonesia, respectively, as of 2020 (Figures 1 and 3). However, in terms of number of transactions, e-money has eclipsed credit and debit cards in recent years, accounting for 72 percent and 83 percent of total number of retail economic transactions, respectively, in the same period (Figures 2 and 4). More recently, the COVID-19 outbreak has boosted the popularity of e-money, to the detriment of bank-issued cards.

**Figure 1. Thailand: Total Value of Retail Electronic Transactions**



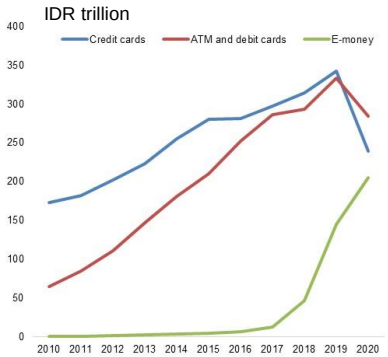

Source: Bank of Thailand, CEIC, and AMRO calculations

**Figure 2. Thailand: Total Number of Retail Electronic Transactions**



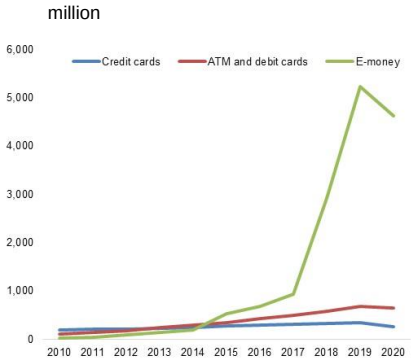

Source: Bank of Thailand, CEIC, and AMRO calculations

**Figure 3. Indonesia: Total Value of Retail Electronic Transactions**




Source: Bank Indonesia, CEIC, and AMRO calculations

**Figure 4. Indonesia: Total Number of Retail Electronic Transactions**



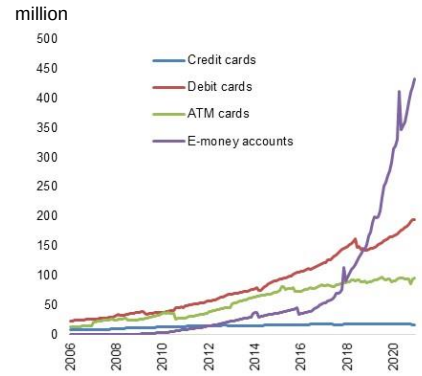

Source: Bank Indonesia, CEIC, and AMRO calculations

[2] E-money transactions rose from around 7 billion transactions in 2016 to over 10 billion transactions in 2018. Singapore and Malaysia account for a significant share of these transactions, but their transaction volumes have been relatively stable in recent years.

[3] Publicly issued electronic money is generally known as central bank digital currencies (CBDCs).

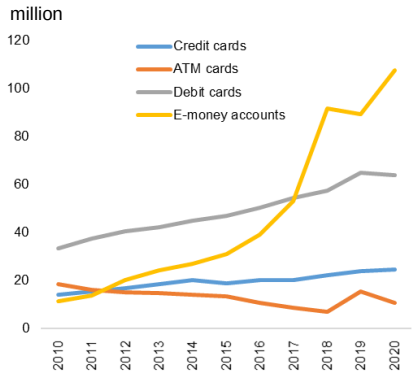
**2. Among the key drivers of growth in e-money usage are low transaction costs, fast expansion of the digital economy, and, for Indonesia, a large population of unbanked individuals.** On the supply side, the primary driver is lower transaction costs (compared to traditional electronic payment methods such as credit cards), which are passed on to users in the form of discounts and promotions. Meanwhile, the rapidly expanding digital economy (e-commerce), especially over the past five years, has naturally translated into rising demand for digital payment, for which e-money is one of the more convenient and cheaper methods. In addition, the rapid growth of e-money in Indonesia benefits from the country's relatively low rate of bank penetration, with some e-money issuers specifically targeting unbanked individuals; by 2019, the number of e-money accounts overtook all types of bank-based card accounts combined (Figure 5). The trend is similar in Thailand, although less stark, largely due to a higher level of accessibility of banks to the Thai population (Figure 6).[4]

**Figure 5. Indonesia: Total Number of Accounts**




Source: Bank Indonesia, CEIC, and AMRO calculations

**Figure 6. Thailand: Total Number of Accounts**



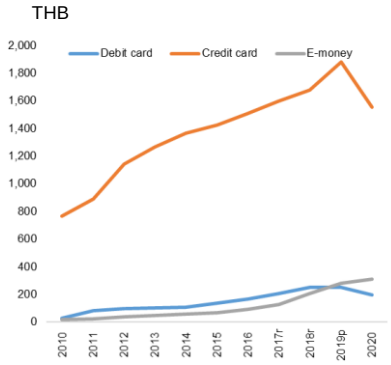

Source: Bank of Thailand, CEIC, and AMRO calculations

**3. To some extent, the relatively small value of e-money transactions compared to bank-card transactions is due to regulatory limits on account balances and monthly usage in Indonesia.** In Indonesia, as of 2020, the average value of an e-money transaction is about 44,000 rupiah, while those of credit-card and ATM/debit-card transactions are around 890,000 rupiah and 440,000 rupiah, respectively (Figure 7). The pattern is similar in Thailand, with e-money transactions averaging about 150 baht, and credit card and debit card transactions averaging around 2,400 baht and 1,100 baht, respectively, in 2020 (Figure 8). In part, such disparity between e-money and bank cards reflects the nature of spending that differs between the two methods, whereby higher-value transactions are more likely to take place in brick-and-mortar stores, locations where e-money may not be accepted (except food and beverage businesses, which are more likely than other types of businesses to accept e-money). In Indonesia, the disparity could also be a consequence of regulations on the maximum amount of e-money held in an account and on the maximum monthly usage: the maximum account balance is 2 million rupiah for an unregistered e-money account and 10

[4] According to Macquarie (2021), 18 percent of Thailand's population was unbanked, compared to 51 percent in the case of Indonesia, as of 2018.

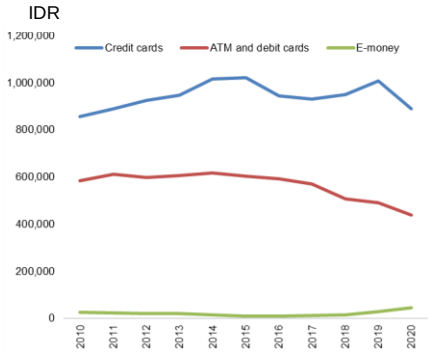
million rupiah for a registered e-money account, and the total transaction value of an e-money account cannot exceed 20 million rupiah per month.[5,6]

**Figure 7. Thailand: Average Transaction Value**




Source: Bank of Thailand, CEIC, and AMRO calculations

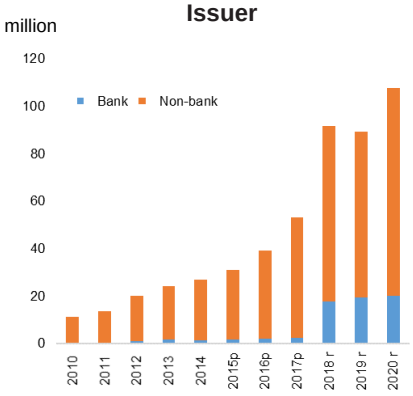
**Figure 8. Indonesia: Average Transaction Value**




Source: Bank Indonesia, CEIC, and AMRO calculations

**4. In Thailand, the majority of e-money issuers are non-bank institutions wishing to capture a slice of the payment market traditionally dominated by banks, although banks have joined the fray in recent years.** As of 2020, 81 percent of the e-money accounts are those with non-bank-issued e-money, and 89 percent of the total value of e-money transactions were conducted through non-bank-issued e-money (Figure 9). In a bid to remain relevant in the provision of payment services, many banks in Thailand have begun issuing their own e-money since 2018.

**Figure 9. Thailand: E-money Accounts by Type of Issuer**




Source: Bank of Thailand, CEIC, and AMRO calculations

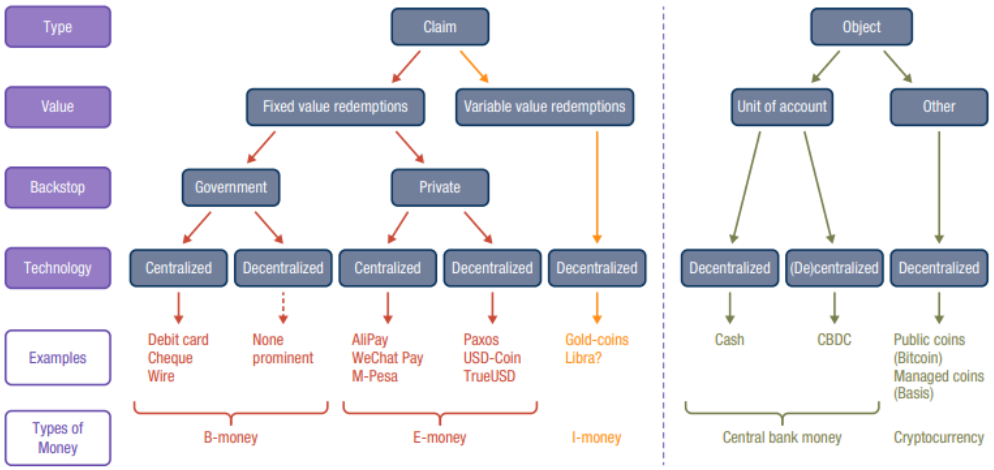
[5] The main difference between unregistered and registered e-money is that unregistered e-money is generally in the form of prepaid cards, whereby the issuer does not record owner identification data, while registered money is usually in the form of e-wallets, which contain owner identification data. Unregistered e-money transactions tend to take place offline, such as electronic toll cards used on toll roads, whereas registered e-money are transacted online (Rasyid and Natali 2019).

[6] In Thailand, e-money service providers themselves have to "specify the maximum value of electronic money that can be used per card or per account based on appropriateness to service users and sound risk management" (BOT's Regulation No. 7/2561).

## II. Concepts, Risks, and Implications on Monetary Policy

**5. E-money is a fixed-value claim with a private backstop.** To understand the implications of e-money on the economy, it is useful to understand the nature of e-money compared to other types of money, as illustrated by what is commonly referred to as a money tree (Figure 10). In contrast to some types of money, such as cash or central bank digital currency (CBDC) that can be considered an object (physical or virtual), e-money is a claim. In terms of value, similar to bank deposits, the value of e-money is fixed, as opposed to some types of money with variable value such as Bitcoin or Libra. However, e-money differs from bank-issued money, or "b-money," (such as bank deposits) in that it has a private backstop (largely in the form of the e-money issuer's prudent business practice and legal frameworks), whereas b-money has a government backstop, in the form of deposit insurance as well as the central bank's role as a lender of last resort. Lastly, e-money transactions may be centrally processed, as is the case for most types of e-money currently in use, or decentralized, as is the case for certain types of e-money such as Paxos or TrueUSD.

**Figure 10. Money Tree**




Source: Adrian and Mancini-Griffoli (2019)

**6. Market risk, liquidity risk, and fraud risk are some of the key risks facing an e-money issuer.** An e-money issuer's balance sheet primarily consists of funds it has received from customers and other assets on the asset side and e-money balances and capital on the liability side. As such, one of the main risks is what is usually referred to as market risk, i.e. volatility in the value of assets, generally in the form of bank deposits and, in some cases, government securities. Liquidity risk constitutes another key risk facing e-money issuers, which need to have adequate funds to meet redemption requests. In addition, e-money issuers have to manage fraud and other cyber risks sufficiently well to ensure security for customer funds and transactions. It is important that risks facing e-money issuers are well-managed in order to limit any potential spillover to e-money users, other financial companies, and the financial system at large.

**7. A number of regulatory requirements are essential in containing such risks.** As suggested by Adrian and Mancini-Griffoli (2019), a prudent regulatory framework is one that

makes e-money resemble a currency board, which would minimize market and liquidity risks. First, assets backing e-money should be invested in safe and liquid assets, such as cash, government securities, or central bank reserves. Second, the amount of e-money created should not exceed the funds e-money issuers receive from customers; in other words, e-money issuers should not be allowed to act like commercial banks as far as money creation is concerned.[7] Third, assets backing e-money should be unencumbered (i.e. not pledged as collateral for loans) and kept in an account that backs e-money balances, separate from other accounts belonging to e-money issuers (e.g. accounts for their other lines of business). Lastly, e-money issuers should have adequate capital to cushion market losses and ensure that they can fully meet redemption requests. Meanwhile, emphasis on the security of e-money issuers' IT systems is vital in reducing fraud and other cyber risks.

**8. As far as e-money's implications on monetary policy are concerned, there is a potential that it may increase the velocity of money.** Compared to conventional forms of money such as cash or bank deposits, the velocity of e-money may be higher to the extent that e-money transactions are easier to facilitate. As e-money is increasingly becoming a common method of payment, the average velocity of the "effective" monetary aggregate can be expected to rise accordingly and potentially become more volatile.[8] This could potentially result in a decline in monetary policy's effectiveness, as has been suggested by Craig, Lindley, and Bergh (1996) and Palley (2001).

**9. Meanwhile, e-money's effect on money supply depends on the extent to which it replaces cash, as well as on regulations governing assets that back e-money balances.** To the extent that in the long term, demand for e-money replaces demand for cash and bank deposits (the same way that bank deposits overtook cash in the past), there may not be a significant change in overall money demand, only a compositional change that leaves money supply unchanged. Another factor that may affect money supply is what e-money issuers are allowed to do with the funds (i.e. non-e-money) that they receive in exchange for the e-money issued. For example, if the funds received by e-money issuers is legally mandated to be put into accounts at commercial banks for the purpose of backing e-money balances, then such funds are no longer in circulation and thus cease to be part of the money supply (until e-money balances are redeemed).[9] If, however, e-money issuers are allowed to invest in, say, government securities, the funds that they receive will be transferred to other parties, who may use the funds for any economic transactions, thus keeping the funds as part of the money supply.

**10. Furthermore, over the longer term, widespread adoption of e-money may lead to a decline in seigniorage revenue for the central bank.** The magnitude of the decline

[7] See, for example, Werner (2014) for more details on how banks generate money in practice.
[8] This "effective" monetary aggregate is defined here as the sum of the traditional monetary aggregate and e-money.
[9] See Popovska-Kamnar (2014), for example, for further discussion on e-money's impact on monetary aggregates and monetary policy.

depends on the extent to which e-money adoption results in a decrease in the central bank's interest-free liabilities (i.e. cash in circulation and any interest-free central bank reserves).[10]

## III. Regulatory Frameworks in Thailand and Indonesia[11]

**11. In Thailand and Indonesia, market and liquidity risks for e-money are relatively low, as the funds are required to be placed in full in safe and liquid assets (Table 1)**. In Thailand, the funds must be deposited at commercial banks or specialized financial institutions (SFIs) and, at all times, shall not be less than the outstanding balance of e-money. Meanwhile, Indonesia's regulation is slightly more flexible, specifying that 30-100 percent of the funds be placed in cash if the e-money issuer is a BUKU4 (category 4, i.e. very large) bank or in a current account at a BUKU4 bank if the issuer is not a BUKU4 bank and the remainder of the funds be placed in an account at Bank Indonesia (BI) or in securities issued by BI or the Indonesian government. As such requirements imply full backing of e-money balances, the two countries effectively prevent the type of money creation that banks perform. In fact, Bank of Thailand's e-money regulation states explicitly that e-money service shall not have the same characteristics as credit extension.

**Table 1. Regulatory Frameworks**

| | Thailand | Indonesia |
|---|---|---|
| **Backing funds** | The funds are required to be deposited at commercial banks or specialized financial institutions (SFIs) and, at any time, shall not be less than the outstanding balance of e-money. | 30-100 percent of the funds are required to be placed in cash if the e-money issuer is a BUKU4 bank or in a current account at a BUKU4 bank if the issuer is not a BUKU4 bank and the remainder of the funds are required to be placed in an account at Bank Indonesia (BI) or in securities issued by BI or the Indonesian government. |
| **Ring-fencing** | The funds are to be free from any obligation other than settlement relating to the provision of e-money services. | The funds need to be recorded and placed separately from other financial accounts belonging to the e-money issuer and cannot be used for purposes other than fulfilling the e-money issuer's obligations towards e-money users and providers of goods and services. |
| **Capital requirements** | Besides requirements on initial capital, required ongoing capital is 100 percent of the initial capital at the end of each quarter. | The minimum initial capital of a non-bank issuer is 3 trillion rupiah. If the average annual floating fund is 3-5 trillion rupiah, then capital has to be at least IDR 6 trillion. If the average annual floating fund is 5-9 trillion rupiah, then capital has to be at least 10 trillion rupiah. If the average annual floating fund is above 9 trillion rupiah, then capital has to be at least 10 trillion rupiah plus 3 percent of the floating fund. |

Source: AMRO compilation

**12. Compared to international practice, Thailand and Indonesia are comparable to most countries as far as the scope of assets in which e-money issuers are entitled to invest.** A study by Olivero and Pacheco (2016) shows that for non-bank e-money issuers, most countries require 100-percent backing of e-money balances in the form of safe and liquid investments, for the most part as deposits in well-regulated financial institutions such as

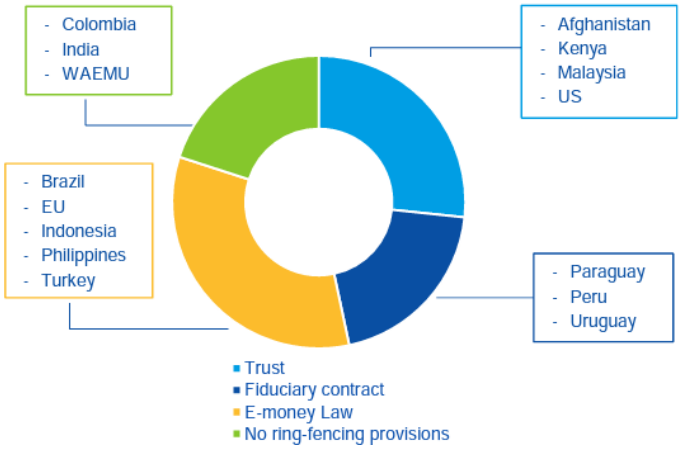
[10] If the central bank itself starts issuing a digital currency, such as CBDC, it can potentially reverse part of the loss in seigniorage revenue if the digital currency is non-interest-bearing.
[11] See BOT's Regulation No. 7/2561 and BI's Peraturan No. 20/6/PBI/2018 for details on the regulation.

commercial banks. A number of countries also require a certain degree of diversification, stipulating that a fraction of funds be invested in other safe and liquid assets such as government securities in addition to bank deposits, as is the case in Peru and Brazil. The European Union, however, stands out in not requiring 100-percent backing in bank deposits or government securities, as long as the funds are covered by private insurance.

**13. Consumer protection is also prioritized in Thailand and Indonesia, with funds required to be unencumbered and kept in a separate account (i.e. ring-fenced).** The Bank of Thailand (BOT) requires that the funds be free from any obligation other than settlement relating to the provision of e-money services (i.e. unencumbered). In addition, the funds are to be kept separately from other working capital of the e-money issuer and deposited separately from the provider's other deposit accounts. In Indonesia, the regulation is similar in that the funds need to be recorded and kept separately from other financial accounts belonging the e-money issuer, and they cannot be used for purposes other than fulfilling the e-money issuer's obligations towards e-money users and providers of goods and services. In addition, consumer protection is also undergirded by relatively prudent capital requirements. Thailand, in particular, requires that shareholders' equity be no less than paid-up capital, and if it is less than 50 percent of paid-up capital, the BOT shall consider temporarily suspending the e-money issuer's services. In Indonesia, the requirement is stricter, specifying that the capital has to exceed the average floating fund (i.e. assets backing e-money balances).[12]

**14. The two countries are similar to the rest of the world in their approaches to ring-fencing.** Most countries with e-money regulations have some form of ring-fencing mechanism to separate the assets backing e-money from other accounts belonging to the e-money issuer (Figure 11). In common law countries, the concept of trust is a popular method of ring-fencing, used in, for example, the US and Malaysia. In civil law countries, however, methods vary but the e-money regulation usually requires ring-fencing of some form.

**Figure 11. Ring-fencing Mechanisms**




Source: Olivero and Pacheco (2016)

[12] The minimum initial capital of a non-bank issuer is 3 trillion rupiah. If the average annual floating fund is 3-5 trillion rupiah, then capital has to be at least IDR 6 trillion. If the average annual floating fund is 5-9 trillion rupiah, then capital has to be at least 10 trillion rupiah. If the average annual floating fund is above 9 trillion rupiah, then capital has to be at least 10 trillion rupiah plus 3 percent of the floating fund.

**15. Thailand and Indonesia are also similar to most countries in the lack of deposit insurance for e-money accounts.** While it is hypothetically possible that the authorities may step in to aid e-money account holders in the event of default on the part of e-money issuers, there is no explicit mention of deposit insurance in the regulations of the two economies (as is the case in most countries), which is understandable given that e-money in Thailand and Indonesia is already required to be fully backed up by liquid assets in ring-fenced accounts. There are some countries, however, such as India and Colombia, that offer deposit insurance, although under the condition that e-money issuers be direct members of the deposit insurance system.

**16. However, e-money capital requirements in Thailand and Indonesia take different forms from those of many countries.** In a number of countries, besides requirements on initial capital, there are no requirements on ongoing capital.[13] When there are such requirements, they generally take the form of a percentage, usually around 2-3 percent, of e-money balances. In contrast, for e-money issuers in Thailand, besides requirements on initial capital, required ongoing capital is 100 percent of the initial capital at the end of each quarter (i.e. regardless of the value of e-money balances). Meanwhile, in Indonesia, in addition to requirements on initial capital, there are relatively high requirements on ongoing capital (even exceeding the average value of floating funds) for small e-money issuers (those with an average floating fund of less than 9 trillion rupiah), while such requirements for large issuers are comparable to those of other countries.

**17. As far as monetary policy implications are concerned, the impact on money supply may be different between Thailand and Indonesia.** In both countries, base money will be affected to the extent that e-money replaces cash, but since cash is a relatively small fraction of base money, the impact of e-money on base money is likely to be small. In Thailand, the requirement of full backing of e-money balances with unencumbered deposits in commercial banks or SFIs means that any increase in e-money is equally matched by a decrease in bank deposits that can circulate in the economy, so that there is no effect of e-money creation on money supply. In Indonesia, however, the level of broad money is affected to the extent that floating funds are invested in non-money assets (government or central bank securities),[14] but most of the movements in broad money are largely driven by banks' multiplier effect (i.e. credit extension), so any effect of e-money creation on money supply is likely to be tiny. In both countries, money velocity is expected to increase in tandem with increasing use of e-money due to the convenience of e-money transactions relative to other types of payment.

## IV. Opportunities and Challenges

**18. Business models of e-money issuers are varied, but the use of customer data for commercial purposes could be the most important source of revenue in the medium to long term.** At present, the regulatory frameworks governing e-money issuers' latitude in asset allocation in Thailand and Indonesia, as with most countries in the world, is quite strict,

[13] The implicit assumption is that requirements on the backing of e-money balances are sufficiently prudent.
[14] The money supply will not increase, however, if those securities are purchased from banks using bank deposits.

rendering earnings from their asset holdings relatively modest. Instead, transaction-based income is the major source of revenue, but it will likely decline going forward with greater competition in the field.[15] Furthermore, discounts offered by e-money issuers to attract new customers would also erode their income. As such, the use of customer data for commercial purposes is likely to become the main revenue generator going forward. In particular, considerable potential lies in the use of customer data for e-money issuers' other activities, such as the selling of financial products (such as insurance and investment products) through the existing platform and peer-to-peer (P2P) lending.

**19. Among the main challenges facing e-money issuers in Thailand are the relatively strict regulatory framework, the complexity of permit applications, and an uneven playing field.** The requirement of full backing for e-money with deposits at banks or specialized financial institutions limits e-money issuers' ability to generate revenue through their asset holdings, although this restriction is to a certain extent justified and is also applicable in other countries. A greater obstacle is the process of permit applications, which can at times be confusing and complicated, making it difficult for e-money issuers to understand and comply with the requirements needed in order to expand their business activities beyond e-money issuance and payment processing, such as lending. Lastly, in practice, many recent initiatives by the authorities (e.g. PromptPay, which facilitates interbank transfers), tend to favor traditional players such as commercial banks at the expense of fintech companies.

**20. Some of the key challenges for Indonesian e-money issuers are regulatory in nature.** Limits on e-money balances as well as monthly transaction value have been cited by e-money issuers as an obstacle to growth.[16] Another regulatory challenge is the limit on foreign ownership in e-money business (currently at 49 percent), which is said to deprive e-money issuers of foreign know-how and funding on a greater scale than is available at the moment, particularly as e-money issuers are competing—against each other as well as against traditional payment service providers—by "burning cash" (i.e. offering steep discounts and numerous promotion schemes). Furthermore, e-money issuers have to continue expending resources on technological improvements to limit fraud and other cyber risks. Lastly, financial literacy poses a challenge for some e-money providers, especially those that target the lower-income segment of the population; for many unbanked citizens living far from cities, there is not a strong reason to switch from cash to e-money, as it requires owning a smartphone and understanding how to make online payments.

**21. In conclusion, given its great potential as an alternative means of payment, e-money usage will likely continue to rise and present opportunities as well as challenges for the economy.** The growing use of e-money is making economic transactions increasingly convenient for both merchants and consumers, especially individuals with limited access to

[15] In Indonesia, Merchant Discount Rate (MDR) revenue, which constitutes the main revenue source for many e-money issuers, is relatively low, with MDR currently set at 0.7 percent. MDR revenue is split among different parties for certain transactions (e.g. transactions involving merchants that are not in direct partnership with the e-money issuer).

[16] Bank Indonesia views these limits as justified, given that e-money issuers are generally less regulated than commercial banks. As such, e-money issuers would have an unfair competitive advantage if the limits were not in place. At any rate, these limits are currently under review and may be revised upward in the near future.

the banking system. While the regulations governing e-money in Thailand and Indonesia are relatively conservative with respect to limiting market and liquidity risks, the increasing popularity of e-money may have some implications for the conduct of monetary policy, at least in the long term.

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