CHAPTER 2
NEW FORMS OF FINANCIAL INTERMEDIATION: CONCEPTS, MACROMAPPING, IMPLICATIONS, PROSPECTS AND REGULATION

2.1 Concept and Scope of New Forms of Financial Intermediation

It is generally believed that financial intermediation is an activity that facilitates the channeling of funds from units in surplus to units in deficit. Bakk-Simon et al. (2012) also interpret credit intermediation as a lending activity where the surplus unit does not have to lend the funds directly to the borrower, but at least one institution is included. Financial institutions, most notably banks, often play a critical role in this activity which, in the long-term, obviously makes a pivotal contribution to boosting and sustaining economic growth. There is a considerable body of evidence showing that a country which utilises banking intermediation in its financial system will not only display higher economic growth but also wider financial services, advanced economic performance (Levine, 2005), poverty cutback (Beck et al., 2007) and diminished inequality (Demirgüç-Kunt and Levine, 2009).

The costs associated with financial intermediation constitute a significant drain on the banking system. The higher the costs, the lower the amount of credit channelled by lenders to borrowers, which is explained by credit rationing as described in Stiglitz and Weiss (1981). To estimate how high the costs of financial intermediation are, a commonly used proxy is the spread in interest rates, chiefly the difference between the deposit rate and the lending rate. According to Calice and Zhou (2018), countries with lower intermediation costs possess higher levels of financial advancement and higher infiltration in utilising financial services. Therefore, in order to improve bank efficiency and accomplish more financial deepening, it is crucial for policymakers to investigate and understand the determinants of intermediation costs.

Nevertheless, as authorities fail to keep up with the needs of the public – reflected in a decrease in financial intermediation costs, an easing of banking regulations, efficiency and cost effectiveness in transferring funds, the creation of financial institutions other than banks – unregulated financial institutions and the aforementioned shadow banks have an incentive to enter the financial system and seek a way to deal with this problem by utilising the inevitable advance in financial technology, which has led to tremendous innovation in how the financial world works and of course, its long-term effects on the economy.

This can be seen from the steadily rising number of new forms of financial activities and instruments which operate outside the traditional banking system, yet possesses the same characteristics as banks, e.g., P2P lending. For the purpose of this paper, the definition of shadow banking will be limited to the narrow measure as defined by the FSB (2014).

The rapid development of financial intermediation has had a sizeable impact on the rise of new forms or instruments in financing supported by financial innovation and FinTech, as well as efforts in regulatory arbitrage – avoiding regulation and taking
In this case, many of the activities that occur in shadow banking are supported by technology so as to create new activities in financial intermediation. The expansion of the global economy as well as the rapid growth of global financial markets create non-bank financial activities which have been expanding remarkably due to the lack of regulation in this sector, promising significant profits and accommodative monetary policies supportive of technological and market innovations. Since then, financial activities conducted by the two types of institutions have been implemented in parallel. This new phenomenon is supported by an open market system, financial innovation and technological developments leading to the creation of new forms of financial intermediation. Besides, the evolution of the shadow banking has been boosted as traditional banks themselves are striving to find ways of doing financial activities outside the regulatory perimeter in order to boost profits. Consequently, this has ignited the progress and growth of both shadow banking activities as well as traditional financial institutions. The emergence of shadow banking is also extensively used as a tool to increase leverage and circumvent regulatory capital or liquidity requirements. Another reason behind the growth of shadow banking is that existing traditional bank regulations have made the process of getting loans more difficult by prolonging the process and involving several precautionary steps, including the evaluation of the financial situation and the ability of potential borrower to pay back the loan. This makes shadow banking appear more attractive from the point of view of the borrower. Shadow banking may also benefit credit-constrained borrowers as it provides funds for those who cannot obtain credit from traditional banks (Pluksna, 2013).

In view of these considerations, shadow banking in this paper refers to activities related to credit intermediation as well as liquidity and maturity transformation that take place outside the regulated banking system. Credit intermediation can be defined broadly as any kind of lending activity where the saver does not lend directly to the borrower, but at least one intermediary is involved. Additionally, credit transformation can be achieved by dividing a portfolio of assets – like securitised loans – into tranches with a different risk profile than the underlying individual portfolio assets. Securitisation facilitated the large-scale use of this process, which was instrumental in the growth of the shadow banking system. Maturity transformation broadly relates to the use of short-term liabilities to fund investment in long-term assets. Both liquidity and maturity transformation take place during the process of credit intermediation. This quite broad definition that is proposed, which defines shadow banking by function/activities rather than entities, allows the monitoring of developments over time and may help in decreasing the scope for regulatory arbitrage. The financial institutions and segments of the financial sector included in this broad definition are finance companies, money market funds, some hedge funds, special-purpose vehicles and other vehicles that are involved in various activities related to securitisation.

But, trying to unequivocally define what shadow banking is remains difficult to this day. FSB (2012) tries to describe shadow banking as an intermediary for credit, involving several entities and where either the whole or part of the activity is carried out outside the regular banking system. Solarz (2013) sees shadow banking as a collection of transactions that represent traditional banking services, namely, obtaining financial means from savers and investors and lending these facilities to credit recipients, however, with different statuses. In this case, the possibility of avoiding banking regulations becomes undeniable, since these transactions are not controlled by the appropriate supervisory institutions. Moreover, according to Liu, Sheng and Ma (2014), non-financial enterprises
tend to enter the shadow banking’ category and categorise themselves as non-bank institutions on account of the lower, or even absent, regulatory requirements. Such firms are developing shadow banking activities through private lending and equity innovation with the intention of gaining investment earnings, improving operating performance and whitewashing financial statements. IMF (2018) attempts to extend the shadow banking term by classifying financial institutions based on their characteristics. Table 2.1 shows a clear distinction between financial institutions that is often misinterpreted.

Table 2.1
A Stylised View of Structural Characteristics of Credit-Based Intermediation

<table>
<thead>
<tr>
<th>Characteristic:</th>
<th>Traditional Banking</th>
<th>Shadow Banking</th>
<th>Market-based Finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Risk Transformation</td>
<td>Liquidity, maturity, leverage</td>
<td>Credit enhancement, liquidity, maturity, leverage</td>
<td>Less emphasis on credit enhancement and less opaque vs shadow banking</td>
</tr>
<tr>
<td>Institution Involved in Intermediation</td>
<td>Single entity</td>
<td>Can be many entities, interconnected through collateral chains and credit guarantee</td>
<td>Single/few entities</td>
</tr>
<tr>
<td>Formal Ex-ante Backstop</td>
<td>Yes</td>
<td>No/Indirect</td>
<td>No</td>
</tr>
<tr>
<td>Implied Sponsor Support</td>
<td>N.A.</td>
<td>Yes, can sometimes be contingent liabilities</td>
<td>No (insolvency remote)</td>
</tr>
<tr>
<td>Example of Entities</td>
<td>Commercial Bank</td>
<td>Synthetic CDO, Structured Investment Vehicles (SIV), CNAV MMF, ABCP Conduit</td>
<td>Bond mutual fund, Distressed debt or PE partnership, Direct lending by pension fund</td>
</tr>
<tr>
<td>Main Form of Liabilities</td>
<td>Debt and deposits, Wholesale and retail financed</td>
<td>Debt, mainly wholesale financed</td>
<td>Highly diverse- Short and long-term debt and equity, Retail and wholesale financed</td>
</tr>
<tr>
<td>Key Resulting Financial Stability Risk</td>
<td>Systemic risk (institutional spillovers)</td>
<td>Systemic risk (institutional spillovers)</td>
<td>Shift in price of risk (market risk premia)</td>
</tr>
</tbody>
</table>

Note:
1. Market-based finance in general is more capable of sharing risks and passing losses back to investors than the banking system. It also enables investors to put funds in equity, which is the most effective way to share risks for financial stability purposes (Bank of England, 2017).

Expanding on previous research, IMF (2014) encapsulates all definitions of shadow banking by declaring that shadow bank can broadly be divided into three categories: entity-based, activity-based and a mixture of the two. Briefly, the entity-based category can be interpreted as all financial activities, except traditional banking, which relies on personal or public backstops to operate (Claessens and Ratnovski, 2014). These authors use the backstop as the main feature of shadow banking practices – because it combines risk transformation, low margins and high scale. This definition certainly includes all financial activities that are often called shadow banking, as shown in Table 2.2.

### Table 2.2
**The Spectrum of Financial Activities**

<table>
<thead>
<tr>
<th>“Traditional” intermediation by institutions</th>
<th>Activities commonly referred to as forms of “shadow banking”</th>
<th>“Traditional” intermediation by market entities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional banking (deposit-taking and lending).</td>
<td>Securitization, including trenching of claims, maturity transformation, liquidity “puts” from banks to SIVs, support to par value money funds. Collateral services, primarily through dealer banks, including: supporting the efficient re-use of collateral in repo transactions, for OTC derivatives, and in prime brokerage; securities lending. Bank wholesale funding arrangement, including the use of collateral in repos and the operations of the tri-party repo market. Deposit-taking and/or lending by non-banks, including that by insurance companies (e.g., France) and bank-affiliated companies (e.g., India and China).</td>
<td>In capital markets: Hedge funds Investment companies Underwriters Market-makers Custodians Brokers In the non-bank sector: Leasing and finance companies Corporate tax vehicles</td>
</tr>
</tbody>
</table>

Source: Claessens and Ratnovski (2014).

Moreover, to be able to define shadow banks based on their activity, Ehlers, Kong and Zhu (2018), have created a map depicting how funds circulate in the shadow banking system. Figure 2.1 shows the interlinkages of the financial system generated by the essential role of commercial banks and shadow banks activities. The green arrows depict the fundamental instruments of shadow banks as well as the results, whereas the blue arrows indicate the formal credit channelled by traditional banks. As mentioned before, this map derived from the activity-based approach distinguishes three particular stages of shadow credit intermediation in China, namely the ultimate creditor stage, the intermediate stage, and the ultimate borrower stage – in which each stage not only consists of different types of instruments and entities but also serves different economic functions.
According to Ehlers, Kong and Zhu (2018), the ultimate creditor stage (Figure 2.1, right-hand side) can be defined as the ultimate supply of funding, consisting primarily of private and company depositors. The instruments involved at this stage are wealth management (WMPs) and trust products. While WMPs are issued by banks and serve just like other savings instruments, they provide higher compensations than traditional bank deposits. Here, individual investors play a major part in bankrolling WMPs. Trust companies have also issued another instrument serving similar functions to traditional banks, yet not subject to the same regulations, namely trust product. Also, there is another relevant party, namely small private lenders which provide informal credit; however, this sector is hard to quantify and does not form part of the map. Furthermore, earned funds are then transferred and converted into a different kind of shadow banking assets, meaning that we can classify this activity as the intermediate stage (Figure 2.1, centre). At this stage, funds are intermediated from banks to shadow lenders. By doing so, commercial banks are not only creating strong connections but also undoubtedly boosting the amount of shadow credit, as commercial banks efficiently transform the collected funds into shadow banking instruments. The third stage is the ultimate borrower stage (Figure 2.1, left-hand side). This is the end of the transformation of shadow credit. At this point, shadow credit provides financing for companies and individuals who have restricted access to commercial banks credit.
At the end of 2018, the FSB changed the “shadow banking” terminology to “non-bank financial intermediation (NIFI)”, which affects either the substance or the coverage of the new definition. The new nomenclature encompasses all forms of credit originated by all non-bank institutions involving asset management companies and funds that issue and buy debt and money instruments. While very broad and comprehensive, the reference to “credit” is partially misleading. Non-bank financial intermediation is more widely connected to financial intermediation that involves maturity transformation, relying on liquidity inside the intermediation chain rather than credit that emphasise leverage. NBFIs have become a preferred option to bank loans for many companies and households, bolstering competition in the supply of financing as well as strengthening economic activity notably from the emergence of FinTech that can create a more efficient financial system. NBFIs are increasingly supplying the need for medium- and long-term credit, while commercial banks take advantage of short-term funds for trading and commerce. They also tend to focus on accommodating the part of the population that is not covered by banks in terms of financial access. Regarding the role of NBFIs, FSB (2018) perceives them as complementary institutions to traditional banks, as they commonly borrow funds from banks and convey them as loans to their clients. But as NBFIs also compete with banks in deposit collection and loan disbursement, they attract customers by offering attractive interest rates and extending efficient services.

A very unexpected statement subsequently comes from Landau (2019), who declared that the ECB in 2012 has provided a better, although less official, definition of shadow banking, which states that “…shadow banking refers to activities related to credit intermediation, liquidity and maturity transformation that take place outside the regulated banking system”. The author also mentions that the definition of shadow banking is very country specific. By adding this statement, Landau proposes to reverse the previous research done by Ehlers, Kong and Zhu (2018). He states that the definition of shadow bank falls into two new categories, namely Chinese style and Western style.

In China, the activity of shadow banks mostly comprises intermediation activities, where traditional banks run a major role as operators but strive to keep transactions off their own balance sheets – hence averting capital, liquidity and regulatory requirements. Chinese banks or “trust companies” aim to arrange loans between companies while avoiding the use of their own balance sheets. These products are called “entrusted loans”. In order to collect funds without falling under interest rate regulations, trust companies produce “bankers’ notes” or sell WMPs to various households, whereby they offer a low-risk instrument that still provides higher yields than bank deposit rates. The same does not hold for “Western style” shadow banking.

“Western style” shadow banking is quite different and more complex. In contrast to the previous version, whereby deposit banks play the central role in the intermediation activity, “Western style” has Other Financial Institutions (OFI), such as mutual funds, dealer banks, money market funds and asset management companies, performing the dominant role. To be able to more fully understand the complicated structure of this new category, Landau subdivides the players based on the time horizon: a narrow shadow banking definition corresponding to the short-term intermediation occurring in debt and money markets, and a broader definition where shadow banking encompasses investment funds and asset managers divesting immediately cashable shares and investing the outcome into long-term securities.
Landau then explains that in the first case, the major cash users who manage long-term portfolios, yet lack the cash to be able to do business on those portfolios, are called “institutional cash pools”. These users of cash consist of insurers, hedge funds and pension funds. The shaded financial activity allows them to quickly collect their part of their portfolio and earn the needed cash to finance their transactions. To put it in another way, the exchange of collateral for cash through repurchase operations (repos) represents the main engine that keeps shadow banking running. Here, repos offer the maximum security for the circulation of cash by assuring that each transaction is guaranteed by warrant. Therefore, the availability of collateral is crucial for shadow banks to operate. Although government bonds provide the most assurance, a substantial part reportedly relies on privately created collateral. This type of collateral is created through securitisation: the issuance of short-term debt, such as asset-backed securities (ABS) along with the bundling and tranching of current loans, can under certain circumstances legally serve as collateral. Additionally, shadow banking is not only benefitting from transforming long-term into short-term assets, but also producing the collateral itself through the securitisation of loans performed by asset managers and investment banks. To sum up, Landau declares that the deep link between securitisation, repos and collateral constitutes the backbone of shadow banking.

Surprisingly, however, in the second stage, Landau extends the definition of shadow banking by introducing the asset management industry as a new, modern and contemporary form of shadow banking. This is due to the shrinking volume and importance of traditional shadow banks as another form of non-bank intermediation rapidly takes its place in advanced financial systems. These institutions operate as open-ended funds that issue short-term or redeemable liabilities and transform them into long-term securities.

The changes in shadow banking structure are critical for the financial world, notably for emerging markets today, which are at the acquiring end of shadow banking and directly affected by the system. According to current evidence, shadow banks in advanced countries can cause financial problems in the shape of “large and volatile capital flows”. In addition, research by Malatesta, Masciantonia and Zaghi (2016) shows that the shadow banking industry in the euro-area has grown in importance in the wake of the GFC, although there is significant heterogeneity across countries. They also find that shadow banking interconnectedness with the commercial banking system has increased over time. The latter means that risks have become more contagious, raising the spectre of the “too-big-to-fail” issue in developed financial markets.

In line with the previous statement, Landau then warns authorities to rigorously acknowledge future risks and vulnerabilities that may arise from the activity of this new institution. The main function of shadow banks that looks innocuous at first may therefore not be as beneficial as it might seem. The ability to directly transform large funds for issuers depends on the process working well at all times. Shadow banks are very susceptible to runs as they only have limited backstops that rely on illiquid future deposits, which may eventually jeopardise other financial institutions. This is further aggravated by the existence of an exceptionally and durably low interest rate environment. Such an environment not only discourages investors from investing but also leads them to pursue assets with high returns, which are usually those with lower liquidity. In other words, an adverse financial environment may create a higher demand for shadow bank assets which would exacerbate...
the risks. Landau also adds that imminent shocks may materialise from exactly those elements of the financial system. He very forcefully regards shadow banks as the main source of any future financial tensions and crises.

“Western style” shadow banking appears not to be a new thing in financial markets since Pozsar et al. (2010) discussed it a few years before Landau. They stated that in the shadow banking system, mortgages, loans and leases were converted into marketable instruments. Capitalisation was also in the shape of sellable securities, e.g., commercial paper.

Like traditional banking, the shadow banking system performs credit intermediation. Nevertheless, in contrast to the traditional banking system, in which credit intermediation is carried out “under one roof”, in the shadow banking system, credit intermediation is executed through a chain of non-bank financial intermediaries consisting of a multi-step process. These steps still require the role of traditional banks and they contain (1) loan origination, (2) loan warehousing, (3) ABS issuance, (4) ABS warehousing, (5) ABS CDO issuance, (6) ABS “intermediation” and (7) wholesale funding. According to Pozsar et al. (2010), the shadow banking system implements these steps in a rigorous and successive order, with each step operated by a particular type of shadow bank and via a definitive financing technique.

1. Loan origination is carried out by finance companies which are supported by medium-term notes (MTNs) and commercial paper (CP).

2. Loan warehousing is managed by single and multi-seller channels and is financed through asset backed commercial paper (ABCP).

3. The pooling of loans into term asset-backed securities (ABS) is operated by broker dealers’ ABS.

4. ABS warehousing is funded through repurchase (repo) agreements or total return swaps and promoted through trading books.

5. The pooling and arranging of ABS into CDOs are also performed by broker-dealers’ ABS.

6. ABS intermediation is accomplished by structured investment vehicles (SIVs), securities arbitrage conduits, limited purpose finance companies (LPFCs) and credit hedge funds, which are financed in a variety of ways containing ABCP, repo, bonds, capital notes and MTNs.

7. The financing of all these institutions and activities is executed in wholesale funding markets by funding providers such as money market investors, securities lenders and regulated and unregulated money market intermediaries. Aside from these investors, which provide money for shadow banks through short-term repo, ABCP instruments and CP, pension funds, fixed income mutual funds and insurance companies also bankroll shadow banks by lending in their longer-term bonds and MTNs.
The Scope, Prospects and Implications of New Forms of Financial Intermediation for Monetary Policy in ASEAN Economies

The Credit Intermediation Chain

<table>
<thead>
<tr>
<th>Step</th>
<th>Function</th>
<th>Shadow Banks</th>
<th>Shadow Banks’ Funding*</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Loan Origination</td>
<td>Finance Companies</td>
<td>CP, MTNs, bonds</td>
</tr>
<tr>
<td>(2)</td>
<td>Loan Warehousing</td>
<td>Single and multi-seller conduits</td>
<td>ABCP</td>
</tr>
<tr>
<td>(3)</td>
<td>ABS Issuance</td>
<td>SPVs, structured by broker-dealers</td>
<td>ABS</td>
</tr>
<tr>
<td></td>
<td>ABS Warehousing</td>
<td>Hybrid, TRS/ repo conduits, broker-dealers’ trading books</td>
<td>ABCP, repo</td>
</tr>
<tr>
<td>(4)</td>
<td>ABS CDO Issuance</td>
<td>SPVs, structured by broker-dealers</td>
<td>ABS CDOs, CDO-squared</td>
</tr>
<tr>
<td>(5)</td>
<td>ABS Intermediation</td>
<td>LPFCs, SIVs, securities arbitrage conduits, credit hedge funds</td>
<td>ABCP, MTN, repo</td>
</tr>
<tr>
<td>(6)</td>
<td>Wholesale Funding</td>
<td>MMMFs, enchanter cash funds, securities lenders, etc.</td>
<td>USD1 NAV shares (shadow bank “deposits”)</td>
</tr>
</tbody>
</table>

Note: ABS is asset-backed security; CDO is collateralised debt obligation; CP is commercial paper; ABCP is asset-backed commercial paper; NAV is net asset value.

Source: Pozsar et al. (2010).
While shadow banks perform an economic role similar to that of traditional banks, which is to intermediate funds from surplus units to deficit units, a longer mechanism is involved. The shadow banking system alters the simple process of deposit-funded transaction conducted by commercial banks into a more sophisticated, securitisation-based, wholesale-funded lending process. Amplifying previous statements, Pozsar et al. also add that through this intermediation process, shadow banking transforms long-term risky loans into seemingly short-term credit-risk free, stable net asset value (NAV) shares that are issued by financial institutions requiring day-to-day liquidity, e.g., money market mutual funds. This critical part is pictured by the first and last links in Figure 2.2, which illustrates the flow of assets and funding of the credit intermediation mechanism by the shadow banking system.

Based on the seven steps of credit intermediation process exhibited in Figure 2.2, some intermediation chains may either stop after the sixth step already or even continue after the seventh step. For instance, supposing that a set of prime loans is converted from cash by a bound finance company to a bank-promoted seller for period warehousing, an intermediation transaction might end at “Step 2”. Moreover, another factor that might affect the length of the credit intermediation chain is the quality of the underlying loan pool; the more adverse the quality, the more extensive the process will be. In other words, poor-quality long-term loans usually involve all seven or more steps of intermediation, whereas liquid and good-quality short- to medium-term loans involve merely three steps. This is required in order to enhance the quality of the underlying loans to the stringent requirements of money market mutual funds (Pozsar et al., 2010). The process of credit intermediation will always begin with creation and come to an end with wholesale funding, and a shadow bank emerges once in the practice.

Another way to comprehend the financial institutions categorised as shadow banks is to follow the FSB (2019), which proposed a two-step methodology to divide financial entities into NBFIs and shadow banks. The first step is to capture an aggregate measure of all NBFIs, referred to as the monitoring universe of non-bank financial intermediation (MUNFI). Here, MUNFI involves pension funds, financial associates, OFIs and insurance corporations. Next, the second step narrows the analysis to non-bank financial institutions that may present risks to financial stability, producing the FSB’s “narrow measure” of NBFI. This phase commences by creating a subdivision of institutions which classifies MUNFI into five economic functions (EFs). Some institutions may be put into more than one EF.

In order to apply this EF approach in categorising NBFIs, regulators scrutinise non-bank financial institutions’ activities, business models and related bank-like risks to financial stability and then distribute the selected institutional types into one or more of the five EFs. The methodology rejects institutions that are either not commonly part of an intermediation chain or part of which is yet to be engaged in important maturity transformation and/or leverage. The method embodies regulators’ supervisory judgement due to the non-availability of data. Each EF encompasses a number of distinct institutional classes, and the financial stability risks arising from various entity types, as well as inside an entity type, may diverge.

The EF1 category contains collective investment vehicles (CIVs) which are known to have features that may expose them to runs. Most of the time, CIVs may be expected to perform as shock buffers in the financial system as costs from an institution’s calamity or from unfavourable market conditions are distributed amid a wide group of heterogenous investors. But some CIVs exposed to maturity/liquidity transformation and/or leverage can be susceptible to runs in severe circumstances.
Furthermore, many entities in EF2 participate in loan provisioning which relies on short-term financing. The EF2 category includes finance companies that are frequently concentrated in fields such as auto finance, retail mortgage provision, consumer finance, equipment finance and commercial property finance. Institutions involved in these activities either compete with commercial banks or provide services in niche markets where banks are generally not active players, and usually they concentrate their loans in particular sectors on account of their expertise and other factors. Such behaviour is harmful as it may cause substantial risks if the areas they centre on are cyclical. Also, if these non-bank institutions are heavily reliant on short-term financing or are still dependent on parent corporations for financing and the parent corporations are in the same cyclical fields, such risks would be aggravated.

Moreover, in the EF3 category, financial institutions have a new way of utilising their short-term funding, which is by borrowing and lending securities and securing funding of client assets. Here, entities such as broker-dealers achieve many purposes, including supplying liquidity through market-making activities, providing short-term credit to their clients in wrapping their positions, providing investment advice to clients, facilitating trading activities, helping raise capital for corporates and publishing investment research. In addition, EF4 members help with the origination of credit, for instance, when financial guarantors extend various forms of guarantees to non-bank financial entities and commercial banks, in particular derivatives and off-balance sheet commitments. This credit preservation appears as full repayment to investors, even if the borrower cannot meet its obligations. From the borrower’s perspective, a lender’s creditworthiness is enhanced by the credit quality of the insurer creating a reduction in costs. Credit insurer and sellers of credit default swaps (CDS) promote credit creation through their activities, thereby improving their marketability.

Lastly, entities in the EF5 category influence the financing of financial institutions and securitisation-based credit intermediation. In this case, bank and non-bank financial intermediaries frequently adopt securitisation for capital management and financing objectives as well as boosting their lending portfolios. Aside from that, as a result of having the ability to transfer credit risk off-balance sheet, securitisation is able to reduce funding costs for financial institutions as well as facilitate the availability of credit to the real sector. But these profitable effects more often than not create excessive maturity/liquidity transformation, regulatory arbitrage and leverage in the system, which may later lead to more considerable risks in the financial system with less rigid loan guidelines. In this case, the securitisation market should be more conscious of unexpected declines in market liquidity, notably in terms of sophisticated securitisations. Furthermore, aside from EF, the second step also has other indicators to delineate whether a non-bank financial institution can be classified as narrow or not. These are the systemic risk indicators (SRs) which are defined as follows:

1. SR 1 – Maturity Transformation: Short-term liabilities are utilised to finance long-term assets in the credit provision by financial institutions.
2. SR 2 – Liquidity Transformation: The extent of liquidity transformation in the provision of credit within financial institutions.
3. SR 3 – Credit Risk Transfer: The balance sheet disclosure (e.g., commitments) provided by financial entities.
4. SR 4 – Leverage: The extent of leverage in financial institutions.
Furthermore, the FSB (2014) also states that financial institutions may not always be categorised as shadow banks if:

1. The NBFI are subject to a relevant regulatory regime;
2. The financial activities are not generating systemic risks; or
3. Credit intermediation activities are not implemented.

Non-bank financial institutions in Asia can be broadly classified as (1) insurance companies and pension funds – this category is not considered to be part of conventional credit intermediation, (2) public financial institutions (PFIs) – this type of financial institution is owned by the government and commonly provides particular services, (3) OFIs – all remaining financial intermediaries that are not included in the above classifications. The topography of narrow-measure NBFI in the ASEAN region is described in Table 2.4.

### Table 2.4

<table>
<thead>
<tr>
<th>Entity</th>
<th>Indonesia</th>
<th>Thailand</th>
<th>Malaysia</th>
<th>Singapore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance companies and pension funds¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pension funds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public financial institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit unions / Cooperatives (CUCs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building societies²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structured finance vehicles (SFVs)³</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary dealers and portfolio managers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brokers⁴</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Money market corporations (MMCs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pawnshops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mortgage corporations⁵</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development financial institutions (DFIs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microfinance institutions (MFIs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance companies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Money market funds (MMFs)⁶</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collective investment schemes (CIS)⁷</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hedge funds⁸</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust companies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Yellow = Identified as shadow banks

Notes:
1. All surveyed members with insurance companies in their jurisdictions do not consider insurance company activities as shadow banking activities. An exception is that all members agree that insurance companies, to a certain extent, facilitate credit creation (i.e., EF4) via types of credit insurance and financial (mortgage) guarantees. Similarly, pension funds should not be categorised as shadow banking because they do not engage in credit intermediation.
2. In Malaysia, building societies are identified as shadow banking based on FSB indicators, as these institutions are involved in maturity/liquidity transformation, leverage and are primarily funded by short-term deposits (i.e. SR 1, SR 2, SR 4 and EF2). These institutions are not subject to any formal prudential oversight.

3. SFVs are not considered shadow banking in Indonesia as they are prohibited from certain activities, including the redemption of asset-backed securities or engaging in borrowing activities. Consequently, their capacity to carry out maturity/liquidity transformation is significantly curtailed.

4. In Malaysia, brokers are mainly funded by shareholders, while the margin loans granted by them to clients are on at-call basis. On the other hand, Thailand considers that brokers undertake a host of economic functions and display certain systemic risk indicators, albeit at minimal level. They classify brokers as shadow banking in line with the FSB’s broader definition of shadow banking. Singapore also identifies brokers to be shadow banking as they intermediate credit with little or no prudential and supervisory oversight.

5. Only Malaysia and Thailand reported that their mortgage corporations are exposed to risks of maturity/liquidity transformation and leverage and are involved in facilitation of credit creation and securitisation (i.e. SR 1 and SR 2; EF 4 and EF 5). Malaysia and Thailand consider their mortgage corporations to be shadow banking based on FSB indicators, as they are involved in maturity and liquidity transformation, as well as leverage, and are only subject to limited prudential requirements (SR 1, SR 2 and SR 4). Mortgage corporations in Thailand, however, are allowed to engage only in securitisation.

6. Only Singapore and Thailand consider MMFs as shadow banking. Although Singapore and Thailand consider them to be shadow banking, they believe the risks are generally addressed within their existing regulatory or supervisory framework. Singapore points out that MMFs should be identified as shadow banking only to the extent they intermediate credit (i.e., placing assets backed by liabilities or pooled equity into credit instruments) and where there are little or no prudential regulatory standards and supervisory oversight. Thailand also noted that domestic MMFs only pose risks at a minimal level and all of which are mitigated by several regulatory measures. Indonesia does not consider MMFs as shadow banking. Indonesia considers that MMFs are subject to a supervisory and regulatory regime in its jurisdiction and do not constitute shadow banking. Moreover, these funds are required to comply with the general principle of fair value when valuing the securities held in their portfolio, thus making them less susceptible to runs.

7. Thailand and Singapore are considering CIS to be shadow banking. Singapore identifies CIS as potentially giving rise to maturity and liquidity transformation risks and categorises CIS as shadow banking but emphasises that the focus should be only on those that invest in credit instruments. Thailand also identified CIS as having similar risks and categorises CIS as shadow banking but considers that the degree to which CIS are susceptible to a run is minimal. Indonesia and Malaysia do not classify CIS as shadow banking primarily because risks posed by CIS are either minimal, mitigated or CIS are already subject to proper regulatory oversight. Indonesia is of the view that none of the systemic risk indicators are applicable to their CIS, which are subject to existing regulations that mitigate excessive risk taking. While Malaysia recognises that some large CIS may pose systemic risk due to the size the interconnectedness within the banking system, CIS in Malaysia are highly regulated and subject to reporting requirements and appropriate regulatory oversight.

8. Only Singapore provided data on hedge funds. Singapore believes that hedge funds should be categorised as shadow banking, but only to the extent these entities intermediate credit (i.e., placing assets backed by liabilities or pooled equity into credit instruments) and where there are no or little prudential regulatory standards and supervisory oversight.
Furthermore, based in an FSB report in 2019 (FSB, 2019), the relationship between MUNFI (USD185.0 trillion for the 29-Group) and the EF-based narrow measure presented in this section (USD51.6 trillion) is illustrated in Figure 2.3. There are several steps in obtaining the narrow measure:

1. Insurance corporations, pension funds, financial auxiliaries and certain OFIs not classified as falling into one of the five EFs are excluded. These entities, which do not tend to directly engage in credit intermediation or have been appraised as not being involved in liquidity/maturity transformation, leverage and/or imperfect credit risk transfer, totalled USD122.3 trillion at end-2017;

2. Entities potentially incorporated into banking groups are excluded. These entities are already subject to prudential regulation and supervision, including maturity/liquidity transformation, leverage and inexact credit risk transfer, and are consequently excluded from the narrow measure. These banking groups usually contain bank-affiliated broker-dealers, finance companies and SFVs. Self-securitisation assets are also excluded from the narrow measure, as under prudential association rules they are regarded as banking groups’ own assets. The amount of prudentially consolidated assets, including self-securitisation, as of end-2017 was USD9.0 trillion.

3. The statistical residual category, consisting of residuals created in some jurisdictions’ national financial accounts (NFA), is eliminated from the narrow measure. These residuals are the difference between a jurisdiction’s total OFI financial assets, as they are reported in sectoral balance-sheet statistics, and the sum of all known sub-sectors therein. While in theory this residual should be zero, in practice it is quite large in some jurisdictions. This may be the consequence of inconsistencies between “top-down” NFA estimation and “bottom-up” coverage of OFI sub-sectors, as well as challenges in aligning these two approaches and differences in data granularity.

Figure 2.3 indicates that the narrow measure was USD51.6 trillion at end-2017. This is approximately equal to 28% of MUNFI (all NBFI), which is identical in magnitude to the 2017 monitoring exercise. The narrow measure grew by 8.5% in 2017, compared to a 7.1% growth rate for MUNFI. The narrow measure as a share of MUNFI varied significantly across jurisdictions, ranging from 3.3% to 75.9%, with the narrow measure averaging 27.9% of MUNFI. According to Nash and Beardsley (2015), this result – the expansion of non-bank lending – can be sourced to several factors, namely:

1. Regulatory arbitrage: Most of these regulations came into effect during the period from 2010 to 2013. The consistent theme in all of these regulations is that (1) they have made the “cost of doing business” more expensive for regulated banks and caused many to exit or downsize lines of business, and (2) products were forced to “re-price” due to new rules which led to the emergence of new players at lower prices. Interestingly, the new entrants are not subject to most of these regulations, putting them at an advantage versus the traditional players. Nash and Beardsley (2015) provide additional context on each of these asset classes and regulations. But it remains ambiguous as to how long this arbitrage will continue as regulators may be forced to act at some point.
2. Technology lowers barriers to entry: Big data analytics and the pervasive use of the internet for financial transactions have created opportunities for start-up tech companies to extend loans directly to consumers, offering a lower cost and sometimes more beneficial alternative to banks.

3. Favourable macro environment: The combination of historically low interest and delinquency rates for consumer loans has also contributed to credit creation, as investors search for higher yielding assets and new entrants are more comfortable with the risk profile of borrowers.

Figure 2.3
Monitoring Aggregates: Narrowing Down

<table>
<thead>
<tr>
<th>Total Financial Assets</th>
<th>USD382 trillion</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUNFI</td>
<td>USD184 trillion</td>
</tr>
<tr>
<td>OFIs</td>
<td>USD117 trillion</td>
</tr>
<tr>
<td>Narrow measure</td>
<td>USD52 trillion</td>
</tr>
</tbody>
</table>

Note:
1. Total financial assets in US dollar, MUNFI and OFIs are based on the 21+EA Group due to its broader sample. The narrow measure is based on data from the 29-Group, as the data from eight participating euro area jurisdictions are more granular than aggregate euro data from the European Central Bank (ECB). For the 29-Group, the corresponding aggregates are: total global financial assets (USD377.8 trillion); MUNFI (USD185.0 trillion); and OFIs (USD117.0 trillion).

Source: FSB (2019).
Table 2.5
Definition and Composition of the Narrow Measure at End-2017

<table>
<thead>
<tr>
<th>EF</th>
<th>Definition</th>
<th>Typical entity types</th>
<th>Size (USD trillion)</th>
<th>Share (%)</th>
<th>Change in 2017 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF1</td>
<td>Management of collective investment vehicles with features that make them susceptible to runs</td>
<td>MMFs, fixed income funds, mixed funds, credit hedge funds, real estate funds</td>
<td>36.7</td>
<td>71.2</td>
<td>9.1</td>
</tr>
<tr>
<td>EF2</td>
<td>Loan provision that is dependent on short-term funding</td>
<td>Finance companies, leasing/factoring companies, consumer credit companies</td>
<td>3.5</td>
<td>6.7</td>
<td>5.8</td>
</tr>
<tr>
<td>EF3</td>
<td>Intermediation of market activities that is dependent on short-term funding or on secured funding of client assets</td>
<td>Broker-dealers, securities finance companies</td>
<td>4.2</td>
<td>8.2</td>
<td>5.2</td>
</tr>
<tr>
<td>EF4</td>
<td>Facilitation of credit creation</td>
<td>Credit insurance companies, financial guarantors, monolines</td>
<td>0.2</td>
<td>0.3</td>
<td>4.4</td>
</tr>
<tr>
<td>EF5</td>
<td>Securitisation-based credit intermediation and funding of financial entities</td>
<td>Securitisation vehicles, structured finance vehicles, asset-backed securities</td>
<td>5.0</td>
<td>9.6</td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td>Unallocated</td>
<td></td>
<td>2.0</td>
<td>4.0</td>
<td>9.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>51.6</td>
<td>100.0</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Notes:
1. Some exchange rate effects have been netted out by using a constant exchange rate (from 2017). Net of prudential consolidation into banking groups.
2. Unallocated category which captures OFIs that the relevant authorities assessed to be involved in bank-like financial stability risks from NBFI, but which could not be assigned to a specific EF.
Source: FSB (2019).

Moving on to shadow banking’s interconnectedness with other sectors, it is well known that financial interrelatedness is invariably present in an integrated and open global financial system (FSB, 2019). While linkages between financial institutions may help to alter risks, connections can also facilitate in managing risks during stress periods. Interconnectedness has implications for financial soundness through credit risk and financing channels, chiefly because these approaches are essential to leverage and/or maturity/liquidity mismatches. As a result, connections among OFIs, banks and other non-bank entities can be important gauges of possible contagion channels.
Correlation can occur either directly or indirectly. Direct interconnectedness takes place when direct lending and investment is present between two counterparties, while indirect correlation develops when two entities have similar assets or when the market price of debt securities or their equity change. This argument fundamentally intensifies the direct domestic interconnections among OFIs, banks, pension funds, cross-border interrelatedness and insurance corporations.

Non-bank entities initiate the connection with commercial banks through two-way financing channels. OFIs gathered more loans from pension funds and insurance companies than from commercial banks. But financial system interrelatedness differs across regions and many of the authorities have reported higher OFI financing from traditional banks than from pension funds or insurance companies. For instance, in Europe, the interrelations between OFIs and banks are greater than the connections between OFIs and either insurance companies or pension funds. By contrast, OFIs in the United States appear to be more associated with insurance companies or pension funds than with traditional banks.

Furthermore, interconnectedness can be measured as a distribution involving total financial assets of the related entities. Gauged as a percentage of insurance companies and pension funds’ assets, the numbers, at 28% and 24% respectively, are significant. Although pension funds, insurance companies and banks have cross-border connections, shadow entities display the broadest cross-border relationship to the whole financial world when calculated as a percentage of OFI total assets. While the interconnectedness between banks and OFIs was lower than that between the rest-of-the-world (ROW) and OFIs in aggregate, many regulators perceived higher OFI linkages to commercial banks than to the ROW.

Equally important, interconnectedness can also be calculated from the viewpoint of OFIs. This is done in order to expose the related matter of these OFI interlinkages. The interrelation between commercial banks and OFIs is wholly the reflection of traditional banks’ interrelatedness with OFIs. This condition will be intensified when banks dominate a region; but it will become more crucial to OFIs than to banks at some point. FSB (2019) assesses a fraction of OFIs assets and finds that in 2017, the use of bank loans by OFI has slightly increased from 6.1% to 6.2%, whereas OFIs’ liabilities to commercial banks declined slightly from 6.4% to 6.3%.

The FSB also states that bank loans to OFIs remain vital in several jurisdictions, at more than 10% of total OFI financial assets in eleven administrations and over 15% in five territories. In other words, banking sectors have a crucial role in financial systems by being the vital source of OFI funding.

As mentioned above, FinTech is used as a tool for the shadow banking system, because it entails all electronic products and services of the financial sector like credit and chip cards, home banking and mobile banking. FinTech relies heavily on internet-related technologies. For that reason, Accenture (2017) states that global investment in FinTech rose significantly from USD930 million in 2008 to more than USD40 billion in 2017. Ernst and Young (2017) pronounced that in 20 major world markets which are forecast to achieve 52% FinTech adoption, the infiltration of FinTech is larger at the wholesale level than at other market levels.
FinTech as a tool of shadow banking has accelerated the spread of the shadow banking system around the world. For instance, China’s giant shadow banking system can be divided into three parts. The first segment consists of security, entrusted loan, insurance, private equity investment and money market funds; the second contains credit creation for small entities, financial assurance companies, investment corporations and other financial institutions; and the last part consists of chambers of trade and also encompasses the non-public financial system made up of entrepreneur clubs, internet finance and private banks (Han, Hus and Li, 2019). But shadow financing in China entails big risks as there is no integrated regulation overseeing the products. More specifically, there are at least four risks, namely bad assets at banks, the default of debt obligations on bonds, the so-called shadow financing and online financial services. Although new regulation has been drafted, if the scope of the regulatory system is either unclear or badly enforced, risks might spread rapidly and with a significant impact. Moreover, the relevant authorities which will be legally responsible for this part are still unclear (Nikkei Asian Review, 2017).

Besides FinTech, monetary policy also plays a role in developing shadow banking activities. Adrian and Shin (2008; 2010) argued that monetary policy is an important factor in affecting the balance sheets of financial intermediaries. The study by Angeloni, Faia and Lo Duca (2015) employed a structural VAR model and showed that a monetary policy shock had a notable and long-lasting impact on numerous bank risk measures. Moreover, using the VAR model, Nelson, Pinter and Theodoridis (2017) found that the monetary policy shock had a significant effect on the balance sheets of both regulated banks and the shadow banking sector. Using the econometrics model from Errico et al. (2014), Malatesta, Masciantonia and Zaghini (2016) showed that macroeconomic variables were the main determinants of loan growth to non-financial corporations.

2.2 Financial Technology and Its Role in Shadow Banking

As mentioned earlier, the concept of new forms of financial intermediation can be perceived as a financial intermediation activity conducted by one or more non-bank entities supported by technology. Financial technology or FinTech is frequently recognised as a recent amalgamation of information technology and financial services. But it appears that the affinity between technology and finance has a long history. As a matter of fact, technological and financial advancements have long been intertwined and mutually reinforcing. The Great Financial Crisis in 2008 proved to be a turning point and is undoubtedly one of the key components in FinTech’s evolution into a new model. The broadest definition of FinTech is the utilization of technology in finance (Arner, Buckley and Barberis, 2016). This interpretation can be elaborated upon further by reference to three periods – FinTech 1.0, FinTech 2.0, and FinTech 3.0. In the first period, the influence of FinTech on finance could not be regarded as a “new thing” as it was established in parallel with first the telegraph in 1838 and then the first transatlantic cable in 1869, both of which contributed the essential infrastructure for the first vital phase of financial development in the nineteenth century. This era approximately occurred from around 1870 to the eve of the First World War. Later, the launch of the Automatic Teller Machine (ATM) by Barclays Bank in 1967 arguably marked the start of the modern development of today’s FinTech. The purpose of the ATM was to prevent customers from going to their banks for the sole purpose of doing a simple transaction. This turned out to be hugely advantageous to
regulated financial institutions and led to a boon in investment in information technology (IT) products and services. Hence, banks not only boosted their own performance and role in the financial system, but also became a vital driver in the expansion of the IT industry. As a matter of fact, the banking sector is projected to increase its IT investment partly as a result of the modern transformation of FinTech. This era up until 2008 can be described as FinTech 2.0.

Nevertheless, the period since 2008 has seen a shift of perspective with the emergence of the FinTech 3.0 period. Newly established technology firms have started to supply financial services and products directly to corporates and households. This has happened because they possess the legitimacy and resources to provide financial services. In short, the definition of FinTech is no longer restricted to business models (e.g. peer-to-peer (P2P) lending) or particular areas but comprises the whole range of products and services which are customarily catered by financial institutions. While it is difficult to determine where and how the trend began, it is fair to say that the GFC starting in 2008, constituted a tipping point which has enhanced the evolution of the FinTech 3.0 period.

Schueffel (2016) tries to elaborate on the content of financial technology itself. In his study, he gathered much of the literature for comparative purposes. He found that many of the definitions are merely copies of others, allowing him to eliminate some of the definitions so as not to bias the results. By applying a semantic analysis, he then examined the similarity of the interpretations of FinTech that have been employed in the literature and revealed the major similarities. Focusing on the common principles embedded in these definitions, Schueffel extracted a new definition as the lowest common denominator, where FinTech is a new way of advancing financial activities by exercising technology in the process.
Table 2.6
Definitions of Term FinTech and Their Sources

<table>
<thead>
<tr>
<th>No.</th>
<th>Authors</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bettinger (1972)</td>
<td>FINTECH is an acronym which stands for financial technology, combining bank expertise with modern management science techniques and the computer.</td>
</tr>
<tr>
<td>2.</td>
<td>Micu and Micu (2016)</td>
<td>Financial Technology, also known as FinTech, is a new sector in the finance industry that incorporates the whole plethora of technology that is used in finance to facilitate trades, corporate business or interaction and services provided to the retail consumer.</td>
</tr>
<tr>
<td>3.</td>
<td>Shim and Shin (2016)</td>
<td>FinTech is an emerging financial services sector that includes third-party payment, MMF, insurance products, risk management, authentication, and peer-to-peer (P2P) lending.</td>
</tr>
<tr>
<td>4.</td>
<td>Maier (2016)</td>
<td>Driven by technological advances, new service models have developed in the financial industry which offer additional opportunities to customers. Under the common denominator “FinTech”, these new businesses aim to challenge existing financial institutions by using technology to deliver value to the customer in an alternative way.</td>
</tr>
<tr>
<td>5.</td>
<td>Cizinska, Krabec and Venegas (2016)</td>
<td>FinTech is an economic industry composed of companies that use technology to make financial services more efficient.</td>
</tr>
<tr>
<td>6.</td>
<td>Loncarski (2016)</td>
<td>In addition to this, a particular evolution and use of technology in finance is disrupting traditional business models in financial markets, as well as bringing about new and unchartered risk territories.</td>
</tr>
<tr>
<td>7.</td>
<td>Shen and Huang (2016)</td>
<td>Internet finance, which is often referred to as “digital finance” and “FinTech” outside China, was coined by Xie and Zou (2012).</td>
</tr>
<tr>
<td>8.</td>
<td>Xie, Zou and Liu (2016)</td>
<td>Internet finance is a spectral concept. It covers all forms of financial transactions and financial intermediaries and markets, such as commercial banks, securities firms, insurance companies, and stock exchanges, to the scenario under Walrasian equilibrium (where neither financial intermediaries nor markets exist) caused by the impacts of internet technologies. And we think internet finance and FinTech are essentially different words for the same concept.</td>
</tr>
<tr>
<td>9.</td>
<td>Jun and Yeo (2016)</td>
<td>Recent advances in information and communications technology (ICT) have led to the rapid development and expansion of new and innovative financial services, often termed FinTech.</td>
</tr>
<tr>
<td>10.</td>
<td>Kim, Park and Choi (2016)</td>
<td>FinTech is a service sector which uses mobile-centred IT technology to enhance the efficiency of the financial system. As a term, it is a compound of “finance” and “technology”, and collectively refers to industrial changes forged from the convergence of financial services and IT.</td>
</tr>
</tbody>
</table>
Beside indirect financing via commercial banks and direct financing through security markets, a third way to conduct financial activities will emerge, which we call “internet finance”.

FinTech refers to the application of technology within the financial industry. The sector covers a wide range of activities from payments to financial data and analysis, financial software, digitized processes and, perhaps most well-known to the wider public, payment platforms.

FinTech is an economic industry composed of companies that use technology to make financial systems more efficient.

Technology applied to financial services has a significant impact on our daily lives, from facilitating payments for goods and services to providing the infrastructure essential to the operation of the world’s financial institutions.

Based on this evolutionary analysis, Arner, Buckley and Barberis (2016) establish a comprehensive framework of the FinTech industry. They include five major fields: (1) investment and finance, (2) risk management and operations, (3) infrastructure and payments, (4) monetisation and data security, and (5) customer interface.

1. Finance and investment:
So far, the public, investors and regulatory bodies have all failed to focus on the actual purpose of FinTech by directing their attention to alternative financing mechanisms, particularly crowdfunding and P2P lending. Nevertheless, FinTech clearly progresses beyond this narrow scope to include financing of technology itself (e.g., via crowdfunding, venture capital, private equity, public offerings, listings, etc.). From an evolutionary perspective, the tech bubble phenomena of the 1990’s is a clear example of the negative outcome arising from the intersection of finance and technology. In addition to sustaining the development of alternative financing mechanisms, FinTech is also increasingly involved in areas such as robo-advisory services.

2. Financial operations and risk management:
These have been a major factor of IT spending by financial institutions, notably since 2008, as financial institutions have attempted to build better compliance systems to confront the massive volume of post-crisis regulatory changes.

3. Payments and infrastructure:
Internet and mobile communication payments have always been FinTech’s focus and driving force, particularly for financial deepening in developing countries. Similarly, infrastructure provision for securities trading and settlement and for OTC derivatives trading remains a significant aspect of the FinTech landscape and an area where IT and telecommunications companies are looking for opportunities to disintermediate traditional financial institutions.
4. Data security and monetisation:
These are crucial subjects for FinTech as both FinTech 2.0 and FinTech 3.0 started to exploit the monetary value of data. After the GFC, the stability of the financial system has become more significant as digitisation has affected the nature of the financial industry by making it more vulnerable to cybercrime and espionage. Nevertheless, the innovations arising from FinTech can be beneficial to the financial industry, e.g., “Big Data” can be employed to enhance the efficiency and availability of financial services.

5. Consumer interface:
This is another area which will continue to be a major focus of traditional financial services and non-traditional FinTech developments. Generally, newly established IT and telecommunications companies are looking to directly compete with traditional financial services firms in this field. Interestingly, these firms thrive mainly in developing countries which provide a friendlier environment. Not only is competition welcomed and supported by economic agents, but so is the consumer interface which provides the facility for these tech companies to leverage off their pre-existing large customer bases in order to roll out new financial products and services.

To gain a better understanding of the advancements of FinTech in Asia, one has to move beyond simple investment figures: an assessment done by Accenture reports that of the USD12 billion new FinTech investment in 2014, just USD700 million has been invested in the Asia-Pacific region. One reason for this is that the growth rate of the market has been declining, which can be explained by several factors. Viewed from the institutional side, IT investment by commercial banks has declined to levels below those in the US and Europe. This could be because market conditions in Asia are not as competitive as in the US and Europe and the market is still densely concentrated in the hands of state-owned banks, which appear to have poor reliability and thus lower public trust in traditional banks. This provides an opportunity for non-bank entities to grow as the public switches to those institutions instead. On the infrastructure side, the provision of branch networks in the Asia Pacific region is still less developed than in the US or Europe. According to Arner, Buckley and Barberis (2016), FinTech 3.5 in developing countries is supported by strong fundamental forces, including: (1) young and digitally savvy populations, especially in China and India; (2) rapid growth of the middle class; (3) inefficient capital and financial markets; (4) scarcity of physical infrastructure related to banking; (5) behavioural predispositions favouring convenience over trust; (6) unexploited market opportunities; and (7) less stringent data competition and protection. These shifts are then amplifying the cooperation between a changing private sector looking to enlarge its financial services and a public sector seeking to derive the benefits of diversification in order to both boost economic growth and accelerate market reform. Arner, Buckley and Barberis (2016) conclude that the development of FinTech in Asia is not a recent post-crisis paradigm, but an amalgamation of regulatory and entrepreneurial forces.

Furthermore, in as far FinTech performs a role in the current revolution of the financial system, it is also to advance financial activity by improving its cost-effectiveness and efficiency. The main feature of FinTech is its capability to produce financial innovations – the creation of a modern banking and settlement system, the improvement of accounting systems, the origination of sophisticated (and complex) derivatives of credit and financial instruments as well as modern-day financial technologies – which are designed not only to boost profitability, but also to fundamentally alter the financial system itself. Buchak et al.
The Scope, Prospects and Implications of New Forms of Financial Intermediation for Monetary Policy in ASEAN Economies (2017) show that FinTech advances have failed to lower the costs of intermediation. With that in mind, their study illustrates that FinTech lenders charge higher interest rates than non-FinTech lenders. Despite the high prices, customers still profess a willingness to pay – reflecting the fact that FinTech lenders may provide more flexible services in intermediating loans. Concluding their study, Buchak et al. suggest caution: although FinTech lenders supply a push towards a fundamental adjustment of the financial sector by filling the gap left by commercial banks, they have managed to do so by having depended on implicit and explicit government guarantees as consumers.

On the other hand, Fuster et al. (2018) show that FinTech lenders are found to be more flexible in altering their supply than other lenders, such as converting the particular form of their mortgage loans as well as adjusting better to mortgage demand shocks. This suggests that innovation in technology may have boosted the efficiency of intermediation in the mortgage market. Moreover, Nash and Beardsley (2015) state that many large financial institutions are starting to leverage off advanced data analytics as well as technology involving anonymised and personalised data in favour of better serving customers, decrease fraud, preserve risk and ameliorate the process of underwriting. The possibility of utilising data analytics is supported by the following four important aspects:

1. Digital information is bolstering those small businesses, consumers and companies that progressively make use of accounting, online banking and other applications that capture a richer set of transactional data.

2. Access to structured data sets, including customised transactions data, which has grown with interconnectedness and data aggregation from cloud programs.

3. As a result, big data technology platforms have developed a cost-effective approach to evaluating huge data sets to better uncover behavioural effects and develop credit scoring algorithms.

4. Machine learning (ML) and artificial intelligence (AI) technologies are being used in order to automate the process of credit appraisal.

Banks, financial services firms and credit card companies have all gathered enormous data sets of previously unexploited historical transactions data and used them to enhance the traditional banking sector. New financial architecture and information technology procedures are designed to facilitate access to more extensive sets of data. While some industry participants note security, regulations and data governance as limitations, the wider tendency suggests that Hadoop adoption and the Data Lake concept are gaining momentum.

Additionally, according to Koutroumpis and Lafond (2018), technological progress has generated a roughly 30 times increase in workforce productivity from 1760 until now. The fastest technological expansion has been seen in the last 150 years – inventions such as automobiles, electricity, telephones and the internet have boosted productivity and output, increased welfare and promoted economic growth. Nevertheless, amid these positive impacts, banking entities are experiencing the greatest dangers associated with the growth of FinTech, particularly in terms of payments and money transfers. According to PriceWaterhouseCoopers (2016), about 24% to 28% of the traditional banking industry can migrate to non-financial institutions.
In order to prevent this number from going up, commercial banks must enhance competitiveness by actively implementing digital banking, notably in the financial asset trading sector, as it is strongly influenced by financial technology, and providing financial services through mobile and online platforms. Other than that, Azarenkova et al. (2018) uncovers another negative impact of the introduction of new financial technologies which can lead to the increasing possibility of a cyberattack – the major threat to financial stability. Supporting this, Bouveret (2018) developed a model built on the examination of numerous cybercrimes to estimate cyber-risk for the financial industry. The study suggests that total losses from cybercrime for the financial industry can reach 10% to 30% of total net income.

Advanced information technology permits financial market participants to generate more agreements in “dark pools” – this term captures the possibility that financial activity is done in the absence of data transparency. As a result, such activities do not convert savings into investment, escalate speculation, distort the pricing mechanism and increase risk-taking of the whole financial system (Azarenkova et al., 2018). As a consequence, the financial system changes as it has failed to preserve the characters of traditional markets. The advancement of artificial intelligence and its application to financial transactions can jeopardize the soundness of financial market as it can lead to ultra-low volatility in different types of investments given that the chances for investing in new financial technologies are limited to large companies, consolidation of firms, concentration of capital and monopolisation. The most substantial concentration of capital is deposited in the technology field. Still, spending on innovation in artificial intelligence is seen as more advantageous as it can boost the profitability of financial transactions. In about 25 years, artificial intelligence is projected to perform up to 99% of financial analyses, employing enormous data sets involving billions of economic players and forecasting the behaviour of economic agents and prices. A number of non-bank entities are also utilising AI to automate trading in diversified financial assets, automatically authorise credit and to detect financial fraud.

2.3 The Implications of New Forms of Financial Intermediation: Banks versus Non-Banks

2.3.1 Potential Benefits and Risks

Jagtiani and Lemiux (2016) demonstrated that advanced financial technologies over the last decade created greater competition in supporting various economic activities including small business lending. It also increased the share of local small business loans and encouraged people to start and develop businesses. Despite community banks competing with FinTech lenders, the opportunity for partnerships also exists, whereby FinTech can help customers access their accounts more easily and conveniently and banks can help provide capital for loans. Under certain conditions, this could lead to a fall in the bank’s overall cost. Shadow banking uses reduced costs and the lower burden of regulation as the main arguments to expand their range and scope at the expense of commercial banks. FSB (2012) explained the difference between shadow banks and officially licensed banks, with shadow banks lacking access to a depositor base, sources of emergency liquidity from the central bank and public sources of insurance. Consequently, systemic risk can be created as a result of the lack of access to public liquidity or to the public sector in an emergency.
In a survey of their members, the FSB (2014) reinforced their previous research results by stating that there are two crucial potential risks emerging directly from the shadow banking sector: leverage risk and maturity and liquidity mismatch. Moreover, due to the development of technology, other risks, namely cyber risks, may arise other than leverage risks and maturity and liquidity mismatches. Cyber risks are considered one of the systemic risk problems arising from cyber incidents, or often referred to as cyber attacks (Boer and Vazquez 2017). In fact, India, Japan, Korea, Malaysia, Pakistan, the Philippines and Thailand identified either one of these risks as representing a substantial potential risk in their shadow banking sector.

**Leverage risk.** The procyclical nature of leverage implies that companies will most likely increase their leverage during good times and when credit conditions subsequently deteriorate, highly leveraged firms may become overburdened. Such a scenario could lead to the fire-sale of assets. A build-up of leverage in the shadow banking sector can be boosted by active market intermediation and the use of securities financing transactions such as repurchase agreements (repos) and securities lending. In contrast to the regular banking sector, the shadow banking sector may not be subject to regulatory caps (e.g., leverage ratio requirements) on their balance-sheet. Japan, Korea and Thailand regard leverage as posing a great risk to their shadow banking sectors. Leverage in securities firms was determined as the biggest shadow banking risk in Korea on account of its high growth rate in recent years.

**Maturity and liquidity mismatch.** Just like banks, some shadow banking institutions generate maturity and liquidity mismatches in their day-to-day operations. As short-term funding is used to support longer term investments, they are susceptible to similar liquidity and financing risks as are traditional banks. Any interruption in market conditions may have therefore a disadvantageous effect on the shadow banking sector.

**Cyber risk.** According to Cebula and Young (2010), cyber risk can be defined as operational risk which can cause problems in the confidentiality, availability, or integrity of information systems of information assets and technology. According to the Bouveret (2018), there are three direct impacts due to cyber attacks, namely (1) business disruptions that can prevent companies from operating, resulting in loss of profits; (2) fraud that can cause direct losses; (3) reputational effects and litigation costs arising from data breaches. The financial sector is a sector that has a high level of vulnerability to cyber attacks due to the dependence between financial institutions and the trust of their customers, as well as dependence on highly interconnected networks and critical infrastructure, so that it can have long-term transmission effects. Therefore, financial institutions need to have strong Information and Technology (IT) security in protecting customers as well as possible policy interventions to mitigate cyber-risk.

Potential risks originate from the interrelatedness between banks and shadow banking entities, such as direct credit exposures and funding interdependence on each other. Interconnectedness in the financial system may allow financial distress to cascade more readily between entities. The relationship with the traditional banking system creates transmission channels for financial stress from the shadow banking sector to the traditional banking sector and *vice versa*. But the traditional banking sector’s vulnerability to risks in the shadow banking sector is less of a problem in Asian jurisdictions, where most financial systems are dominated by banks.
The risks resulting from spillovers from the shadow banking sector to the formal banking sector were recorded as a possible risk by Australia, India, Korea, Malaysia and the Philippines. Korea reported that this scenario had been rapidly escalating since 2005. Pakistan highlighted the shadow banks’ reliance on traditional bank financing, with bank funding seen as a valuable source of funding for shadow banks to match their financial obligations as they fall due. Above all, shadow banking institutions in Pakistan such as leasing companies, investment banks and Modarabas are highly dependent on bank funding.

Wu and Shen (2018) report that a traditional bank involved in some form of shadow banking activity tends to take on more risks than other traditional banks that do not participate in such activities. On the plus side, banks could undertake securities and bond transactions whereas commercial banks are barred from such activities by regulations. Furthermore, their study shows that principled governance tends to reduce the effect of the positive linkage between risk-taking and shadow banking significantly.

Other than that, the shadow banking sector and commercial banks may have other relationships. For example, the study of Tan (2017) shows that in China’s case, shadow banking improves the profitability of commercial banks. The study confirms that the non-interest income market has a greater level of competition than the deposit market and loan market, and that the profitability of commercial banks increases simultaneously with a reduced level of competition in deposit market. Han, Hus and Li (2019) studied the impact of corporates’ shadow banking activities on business performance using regression analysis. They find that non-financial corporates’ shadow banking business leads to a financial advantage seen from the view of the earnings structure, but simultaneously has a significantly negative effect on operating income. Overall, the activity of shadow banking on corporates increases operating income. Moreover, Serletis and Xu (2019) investigated the demand for banking and shadow banking services and concluded that the emergence of shadow banking had a part in increasing the stability of the money demand function. Moreover, their research argued that the money supply might be a better measure of the stance of monetary policy than the interest rate.

Stern, Makinen and Qian (2017) demonstrated that in a mobile phone subscription area, P2P lending as part of a shadow banking activity is wider, more extensive and better developed. As is well known, P2P lending facilitates the reaching out to isolated lenders and in so doing, P2P lending can help small business to develop but simultaneously may have a very large potential risk. Moreover, P2P platforms have a negative association with fixed-asset investments. By contrast, the average yield is positively related to the fixed-assets investments. In addition, the outstanding balance of P2P lenders in the mobile phone subscription region has a negative relationship with the size of the traditional banking sector. Tian et al. (2015) reviewed systemic risk in the Chinese shadow banking system, and the results show that trust companies were the main culprit of financial instability and commercial banks suffered the most adverse effect. Furthermore, to control systemic risk in the Chinese shadow banking, their paper argued that financial leverage of shadow banking institutions should be controlled. Using shadow banking data for 14 countries from 2001 to 2013, Hussain, Bao, and Fanli (2019) suggested that regulation should be created for the shadow banking system and its size should be controlled for the sake of financial system stability and in order to prevent a subsequent financial crisis.
2.3.2 The Systemic Risks Associated with New Forms of Financial Intermediation Activities

The new forms of non-bank financial intermediaries generated by shadow banking activities can be a significant source of systemic risk. After all, the Great Financial Crisis originated in the shadow banking sector in 2008. These risks may be amplified as they include the potential for excess leverage, amplification of procyclicality, instability of wholesale funding, modern-style bank runs, transmission of systemic risk and regulatory arbitrage and circumvention (Ghosh, Mazo and Robe, 2012). Furthermore, Ghosh, Mazo and Robe also find that the excess liquidity available in the shadow banking system has incentivised households to incur much higher debt levels because of less stringent loans conditions. Instead of the households’ economic situation improving; this results in graver poverty and more bad loans, also draining capacity from the shadow banks. Besides that, the operating income in a firm that participated in shadow banking activities will be influenced by two intermediary variables, namely, investment scale and investment efficiency. However, the efficiency-improving effect on operating income is still smaller than the negative effect of investment in crowding out operating income (Han, Hus and Li, 2019). Concerning the systemic risk that can arise from the activities of shadow banks, Li, Hsu and Qin (2014) ran a stress test on the Chinese financial system and concluded that there is some risk of bankruptcies and potentially a risk of liquidity shortages. Based on their network analysis, Hsu, Li and Xue (2014) concluded that trust companies present a systemic risk and banks absorb most of this risk. Furthermore, in conjunction with monetary policy, Li and Wu (2011) found that shadow banks can negatively impact the effectiveness of monetary policy pursued by the central bank. They analysed the effects of the shadow banking system on monetary supply and concluded that securitised financial products behave like new money, which is not issued by the central bank, but is still affecting the central bank’s money supply. Therefore, the implementation of easy or tight monetary policy by increasing or decreasing the benchmark interest rate would not be able to achieve the original goals due to the activities of the shadow banking system.

Assuming the insurance sector forms part of the shadow banking system, Diallo and Al-Mansour (2017) investigated the link between insurance and financial sector stability. Employing a GMM system-panel, this research argued that the insurance sector and financial stability have a significant negative relationship - with the shadow banking acting as a channel, the insurance sector is detrimental for financial stability, particularly for a country with a high level of shadow banking assets. In terms of the relationship to GDP, Hussain, Bao and Fanli (2019) showed that nominal GDP is more sensitive than real GDP to an increase in shadow banking. This causes the nominal economic indicator to grow more than the real one. Other studies, such as Haisen and Yazdifar (2015), investigated the impact of the shadow banking system on monetary policy in China and found that an increase in the size of the shadow banking system results in the increase in the money supply and CPI. Gabrieli, Pilbeam and Shi (2017) found that shadow banking works in an unusual way to boost the increase in the money supply but weakens the effect of restrictive interest rate-based monetary policy. This research shows the linkages between shadow banking size and central bank policy, more specifically, that an increase in the size of the shadow banking sector heightens the independence of its lending from the policies of the Peoples’ Bank of China.
Furthermore, by creating and employing FinTech as a tool, shadow banks ameliorate their business environment, as FinTech makes it easier for shadow banks to transform and intermediate funds to private enterprises and local state-owned enterprises (SOEs). This new tool of financial intermediation might also boost economic growth as FinTech increases the speed and widens the coverage of capital circulation and distribution more effectively. Since the expansion of information technology, FinTech firms accounted for almost a third of shadow bank loan originations by 2015. FinTech lenders serve more creditworthy borrowers and are more active in the refinancing market. Furthermore, FinTech lenders also use different approaches in determining corresponding interest rates. Hence, they provide greater convenience for their borrowers. Navaretti et al. (2017) asserted that FinTech enhances competition in financial markets, provide services that traditional financial institutions do less efficiently or not at all and widen the pool of users of such services. But FinTech is unlikely to replace banks in most of their key functions. In most cases, FinTech simply provides a more efficient way to do the same transaction. Yet banks are well placed to adopt technological innovations and perform traditional transactions in a new and more efficient way themselves. Therefore, it could be argued that the role of FinTech in the financial sector is becoming more significant than ever. However, FinTech is unlikely to replace traditional banks or other financial institutions completely.

Although the application of FinTech in financial markets has been expanding very rapidly, its potential impact on financial institutions and banks is still unclear. The crucial question is whether and to what extent FinTech is influencing banks and other incumbent financial institutions. There could be several possibilities; either FinTech will create a healthy competitive process, enhancing efficiency in a market with high entry barriers, or it may cause disruption and financial instability.

In the case of a potential positive disruptive effect on financial institutions, Buchak et al. (2017) argued that the share of shadow banks has been steadily increasing over time due to the growth of financial technology. Based on Home Mortgage Disclosure data, the share of shadow banks has increased substantially, growing from roughly 30% in 2007 to 50% in 2015. Buchak et al. also estimated that the increased regulatory burden on traditional banks explained about 55% of shadow banking growth over that period, but that 35% of this dynamic was explained using financial technology. Indeed, it was found that financial technology outlets provided more convenience for borrowers. The authors observed an interest rate premium among the borrowers that valued this convenience more highly. Moreover, FinTech firms used superior statistical models based on big data to search for potential borrowers and were more capable of pricing mortgages appropriately. These innovations were mainly due to combining existing data or using other dimensions of data that are inaccessible to traditional banks. In conclusion, these trends explain why customers are becoming more and more engaged with a shadow banking system that is supported by financial technology.

In addition, Navaretti et al. (2017) argued that on account of the strong complementarities between banks and FinTech, convergence between financial technology and financial institutions such as banks could happen. On the one hand, banks have already started to incorporate digital innovations into their business models, allowing them to expand their range of activities. Large banks will likely be able to absorb and assimilate the digital innovations and converge towards a new type of modus operandi which bundles together financial services that are based on FinTech. On the other hand, a substantial
fraction (26.7%) of the P2P loan volume substitutes for personal loans issued by small commercial banks. This convergence is not new when it comes to technology firms. For example, Amazon, Apple, Facebook, Google and even Microsoft all started in different types of businesses (retail, computers and phones, social networks and search engines), but are now converging to a similar set of activities that mixes and combines all the initial areas of specialisation.

Furthermore, Vives (2017) argued that with the generation of new business models based on the use of big data, FinTech has the potential to disrupt established financial intermediaries and banks. The result of the application of these new techniques could lower the costs of financial intermediation and improve product quality and quantity for consumers. For example, FinTech facilities may help to better assess the creditworthiness of loan applicants when an institution screens them as well as improve the interface between financial clients and their service providers. Vives also quoted the Buchack et al. (2017) finding that the market share of shadow banks (that is, non-bank lenders) of the US mortgage market almost tripled in the period 2007-2015. At the end of that period, FinTech firms accounted for close to a third of shadow bank loan originations.

Knaack and Gruin (2017) highlighted the contrast between old and new finance, where the old financial system was characterised as elite-based and exclusive. Internet finance in contrast is driven by openness, simplification, fairness and freedom of choice. Internet finance in China took off in 2013 when the dominant internet companies made concerted moves to offer financial services; examples include Alibaba launching Yu’E Bao and Tencent unveiling its WeChat payment app. The digital financial services sector in China has grown significantly over the last few years. Two examples in particular serve to illustrate the significant overlap between internet finance and shadow banking: Yu’E Bao and P2P financing platforms.

Furthermore, Sheng and Soon (2016) noted that “leveraging on technology, shadow banking activities in China have increasingly become digitised, enabling them to scale up at low cost with wider geographical and market reach.” Similarly, Chen (2014) argued that dominant companies such as Alibaba, being outside the current regulatory framework, have become a “huge shadow bank.” Regarding the potential negative effect of financial technology on financial institutions, Buchak et al. (2017) reported that the growth of technology was an important force in the decline of traditional banks’ market share over the last decade. The additional regulatory burden faced by banks has opened a gap that has been filled by shadow banks. Hence, their research suggested that financial technology related to online lending platforms has partially disrupted the mortgage market by offering increased convenience to borrowers.

But the expansion of FinTech innovations and the accompanying changes to the financial landscape will eventually bring with them new types of economic and financial risks. The regulator will face evolving implications of unprecedented systemic financial stability risks. For instance, FinTech lenders have the potential to undermine existing financial regulations. Braggion, Albert and Haikun (2018) analysed how the supply and demand of P2P lending in China by the lender RenredDai were affected by regulatory changes in loan-to-value ratios for conventional intermediaries. FinTech players have found that such restrictions on lending in traditional markets have increased the demand for P2P-type lending, since the price of credit remained unchanged. Since P2P lending is a

The Scope, Prospects and Implications of New Forms of Financial Intermediation for Monetary Policy in ASEAN Economies
type of informal credit lending. Qin, Xu and Zhang (2014) investigated how much informal credit lending responded to monetary policy in the city of Wenzhou in China. The paper found that Wenzhou’s informal lending market had been responsive to a number of factors representing monetary policy, national banking sector and local economic conditions. This study also implies that Wenzhou’s market functioning could be guided by proper policy means. Meanwhile, Wenzhou lending market is a demand-driven market both in the short- and the long-run, although demand is also complementary to the formal bank lending market.

Subsequently, Navaretti et al. (2017) also found that the emergence of financial technology could be more “efficient” than traditional banks, but in a different and unrelated way. For example, financial technology will use information based on big data, not on long-term relationships; access to services is decentralised through internet platforms; there is no risk and maturity transformation; lenders and borrowers or investors and investment opportunities are matched directly. All of this means that there will be disintermediation as well as pure FinTech activities. In this case, these unbundled FinTech activities have limited scope. For example, it is difficult for platforms to offer diversified investment opportunities without keeping part of the risk on their books.

According to Pejkovska (2018), there are other potential threats related to the emergence of FinTech companies since they leverage the use of modern software and the internet to provide financial services at lower prices. Some very good complex and advanced examples of this include the blockchain and cryptocurrencies. Their anonymity and decentralised nature can be harmful as they can be used for illegal purposes such as money laundering, tax evasion and illegal transactions. Research by Atthey et al. (2016) illustrated the widespread use of bitcoin as a means of payment for purchasing drugs and weapons on dark-web platforms to the tune of USD11 billion. Due to the anonymous nature of bitcoin, parties involved in these illegal transactions cannot be identified. Such actions could further diminish the general public’s trust in the financial services sector and worsen the already fragile reputation of the sector. Another potential threat is a cyberattack that can put bank customers’ data privacy at risk. Atthey et al. (2016) also showed that contrary to their clients’ beliefs, most company’s cybersecurity systems were outdated. Hence, Pejkovska (2018) argued that the existence of FinTech should be “legitimised” and covered by suitable regulation. Otherwise, the lack of regulation may encourage risky behaviour.

2.3.3 Monetary Policy Transmission through the Asset Price Channel

Shadow banking activities are conducted differently from traditional banks. Nonetheless, these entities have a significant relationship with the banking system as shadow entities source their funding from banks, and banks in turn have not only provided these funds but also emulated some shadow banking business models and technology. In practice, shadow banking institutions should find it easier to attract customers since they are subject to fewer – if any – regulatory obligations than traditional banks. This benefits the shadow entities in originating varied financial products and services – thus creating new ways of financing. Furthermore, although shadow institutions are more exposed to runs as they do not benefit from emergency liquidity facilities provided by the authorities, these entities are also more protected from the negative impact of the monetary transmission channels (Falk, 2016).
Additionally, as policymakers tighten monetary policy, commercial banks start to reduce loan provisions to allow them to compete with shadow banks which face no such restrictions and can therefore sustain or even increase their lending. As a result, the impact of monetary policy is no longer fully comprehensible by the public. In other words, the influence of central banks over financial institutions is decreasing. This is supported by Boivin et al. (2011) who studied the evolution of the monetary transmission mechanism over time. The research examined the impact of monetary policy on the real sector aggregate variable which seems to have lessened in comparison with the earlier period. This development occurred as a result of a shift in the focus of policymakers and an adjustments of housing market credit qualities. Xiao (2018) continued this study and found that the rise of the shadow banking sector was a new factor that induced the weakening of monetary policy on the real sector. The study also asserted that monetary authorities were no longer adjusting the interest rate to induce financial institutions to follow suit, but to react to money supply changes originating from the shadow banks. Xiao also stated that when central banks raise interest rates, depositors will shift from regulated to unregulated entities, inducing a cutback in the stock of commercial bank funds. With more deposit inflows, shadow entities can enlarge their lending, which can compensate for the shrinkage in traditional bank lending.

2.4 Prospects for New Forms of Financial Intermediation

In the US, non-banks have always performed a key role in providing credit to consumers and businesses. Nonetheless, according to Nash and Beardsley (2015), there are basic questions as to whether the growth we have seen over the past few years is sustainable due to three factors:

1. Increased regulatory scrutiny as non-banks have become more important: Across several industries, among them insurance, a number of non-bank institutions are now being perceived as systemically important. Furthermore, outside of the systemic classification, there has been rapidly increasing regulatory scrutiny of non-banks such as the US mortgage loan company Ocwen Financial (OCN). Therefore, as the phrase goes, “if it looks and smells like a bank, it should be regulated like one.”

2. Expansion into other asset classes.

3. Competitive responses from incumbent banks: Much of the literature shows that banks respond to the rise of new players in several ways: (1) reduce pricing to compete, (2) acquire or build similar platforms or (3) advocate for additional regulatory scrutiny leading to a “levelling” of the playing field.

A study by the Group of Thirty (2016) suggested that after growing rapidly in the years before the GFC, several of the riskiest forms of pre-crisis shadow banking have decreased thereafter. But both FSB (2019) and International Monetary Fund (2019) highlight the still enormous size of non-bank credit intermediation. They also advise that narrowly defined shadow banking activities – a term that has been proposed and subsequently adopted in an FSB study – have grown as a percentage of global GDP since 2011. The growth rate of the shadow banking-to-GDP ratio is still sizeable, especially in several emerging markets and most notably in China. A FSB report shows a slight uptick in shadow banking as a percentage of GDP since 2010. Again, within the FSB’s five “economic functions” of shadow bank-type activities, the most brisk expanding segment is collective investment vehicles, with features that make them susceptible to runs.
At the same time, total real economy leverage – whether arranged through banks or non-bank intermediation channels – shows that there has been no deleveraging since 2008, but a continuous increase in global debt to GDP. Deleveraging by households has been replaced by widespread increases in advanced economies’ public debt and by large increases in private sector debt in many developing economies. Sustained loose monetary policy in systemically important countries helps to carry the burden of existing debt stocks and also creates incentives for new debt growth. The growth in real economy leverage not only creates macroeconomic risks, but also makes it more essential to determine whether the particular way in which credit flows are intermediated or managed is enhancing the fundamental risk.

There are three particular concerns that have been identified by the Group of Thirty: (1) The boom in emerging market corporate debt, notably when denominated in foreign currency (usually the US dollar), (2) The role that asset managers play in amplifying the inherent potential volatility and procyclicality of capital market credit, especially in illiquid markets such as emerging market corporate debt, and (3) The impressive growth of leverage in China, which has been accompanied by the growth of non-bank credit intermediation channels.

The Group of Thirty ends their study by stating that the financial system itself may be stronger than before 2008, and that the consolidation of increasing global leverage and new forms of financial system risk indicate that the overall vulnerability to financial and macroeconomic instability is as great now as it was then. The primary reasons that led to this conclusion are, first, that the banking system itself has been made more resilient by the introduction of new capital and liquidity requirements. Second, tighter regulation of banks may have encouraged the shift toward non-bank forms of credit intermediation that have appeared since 2008. Third, the sizeable growth in non-bank credit intermediation has mainly been in forms that do not raise the same financial stability concerns as pre-crisis shadow banking, and the importance of the particular forms of shadow banking most involved in the 2007–2008 financial crisis has diminished. Moreover, there is some evidence that the interconnectedness between the banking system and other financial institutions has decreased. Fourth, as a result of the foregoing, the financial system and the element associated with the intermediation of credit flows are probably more resilient than in 2008, making it less likely that we will see self-reinforcing cycles of financial instability going forward. Fifth, as the aggregate level of leverage in the global economy continues to grow, the risks to macroeconomic stability can persist even if the financial system has become more resilient. And even where credit flows are regulated rather than intermediated, new forms of financial stability risks can arise. Therefore, while the specific form that risk has taken in the past may have been transformed, risks are as great now as they were before the crisis. Essential policy actions need to mirror both the severity of the risks and the specific forms that risk takes.

2.5 Regulation

According to FSB (2014), the regulatory approach applied to NBFIs relies on the character of the authorities that inspect them. In general, these authorities can be classified into two groups: (1) authorities with detailed regulatory directives and objectives such as financial regulators (e.g., central banks, prudential regulators, market conduct regulators)
and (2) authorities that do not have a specific regulatory mandate but embark on regulation of particular NBFIs as part of a wider mandate (e.g., government ministries and agencies). For NBFIs that are monitored by a financial regulator (or regulators), surveyed FSB members have pointed to several dimensions of regulatory policies and measures for monitoring NBFIs, such as:

1. Registration and approval of endowment of entity and activity;
2. Acceptable activities, instruments and investments;
3. Corporate governance;
4. Risk management, compliance and internal control systems;
5. Prudential standards, limits, restrictions on assets, capital, liquidity and leverage;
6. Transparency and public disclosure;
7. Market conduct; and,
8. Consumer, investor and depositor protection.

In the case of NBFIs supervised by government agencies, FSB (2014) suggests that they should be regulated under the remit of the legislation determined to establish and govern NBFIs and their activities, which mostly encompasses licensing requirements, standards for market conduct and governance. Besides the regulatory boundaries set out by the respective legislation, the regulatory method is closely connected to the developmental target of the respective government ministries and agencies. Therefore, policy instruments and measures can change between government bureaus and between jurisdictions.

According to FSB (2014), most jurisdictions in Asia possess the capability to gather data and information for the most of the NBFIs. Nevertheless, the applicability, the regulatory regime and the type of data and information collected varies between supervisors and within jurisdictions when dealing with different NBFIs. Some regulators stipulate that NBFIs collect data and information annually, while others only ask for data and information on an as-needed basis. The amount of data and information collected also differs between jurisdictions.

Nevertheless, in some jurisdictions, not all NBFIs fall under the continuous supervisory inspections that are typical for banking institutions. All jurisdictions report the ability to take administrative actions against NBFIs. Enforcement actions may be required in the event of non-agreement, violation of legislation or illegal actions. Two authorities have reported to the FSB that depositor, investor or consumer protection are available for every NBFI in their jurisdiction. But some jurisdictions stated that while there was no specific protection system for particular NBFIs, comprehensive protection regimes were available under the corresponding regulations. Only a few jurisdictions had far-reaching resolution regimes for all NBFIs. Generally speaking, jurisdictions did not have a comprehensive resolution regime for all the NBFIs and mentioned that this was an area that required further reform if and when needed. At present, some jurisdictions are aiming to develop resolution regimes.

The FSB’s survey proves that participants continue to build up regulation and guidance on NBFIs. Some members launched various initiatives to focus on potential risks arising from the shadow banking system. The measures proposed up to now have been extensive – from increasing existing or announcing new regulations to address non-
bank financial entities, increasing coordination and cooperation, to extending legislative changes to allow authorities to collect vital data and information, and to carrying out other regulatory approaches to NBFIs. Based on the FSB survey, measures taken by members to support the existing regulatory framework include:

1. Indonesia reported that regulatory enhancements are in progress for insurance firms, finance companies and financial guarantee companies (FGCs).

2. Singapore has introduced amendments to its Collective Investment Schemes (CIS) Code to carry out additional safeguards on the use of financial derivatives and securities lending, to strengthen counterparty and collateral requirements and to enhance the registration and licensing regime for hedge fund managers.

3. In Malaysia, the Securities Commission Malaysia has strengthened its surveillance of CIS disclosures as well as its oversight over fund management companies. This involved the introduction of a Client Asset Report Requirement, performed by external auditors in conjunction with the statutory audit exercise. It has also implemented a comprehensive risk assessment methodology, which factors qualitative, quantitative and self-assessment components for fund management companies.

4. In the Philippines, proposals were being developed to improve prudential requirements for NBFIs, which involved corporate governance, exposure and capital adequacy requirements. The Philippines had also introduced new regulatory or supervisory requirements by enhancing monitoring and/or inter-agency coordination. Efforts in that country were ongoing to advance existing information sharing designs among the financial regulators in order to bolster regulation and supervision of financial conglomerates. Financial authorities were also developing accepted governance standards and adopting methods to establish consistent implementation.

Moreover, the FSB stated that some ASEAN authorities have initiated improvements to their legislative scheme to strengthen the oversight of NBFIs:

1. In 2013, Indonesia passed laws on microfinance institutions giving a mandate to the Financial Services Authority (OJK) to regulate and supervise microfinance institutions. The law was enacted in 2015.

2. Malaysia passed the new Financial Services Act 2013 which empowered Bank Negara Malaysia (BNM) to subject a NBFI to on-going regulation and supervision should an entity be deemed to pose, or be likely to pose, risks to financial stability. Meanwhile, the Central Bank of Malaysia Act 2009 accorded BNM with the necessary powers to collect information from NBFIs to facilitate financial stability assessments as well as issue orders requiring entities to undertake appropriate measures in the interest of financial stability.

2.6 Data and Methodology

There are three substantial objectives this study needs to achieve. The first is to uncover a coherent view of shadow banking activities in several Southeast Asian countries (Indonesia, Malaysia, Thailand and Singapore). In order to accomplish this goal, we will investigate and map the shadow banking activities in the respective ASEAN countries.
Thus, this study will be using the activity-based concept developed by Ehlers et al. (2018) as well as the narrow measure principle based on the five EFs and four systemic risk (SR) factors constructed by FSB (2019) to define the shadow banking system. The second objective of this research will be analysing the prospects of shadow banking activities in the respective Southeast Asian countries. The third objective is to understand the impact of monetary policy on shadow banks through the interest rate channel in those countries. To that end, not only will we employ the econometric model of Zhang and Wan (2017), but we will add a new variable, namely the exchange rate, since the open economic systems permit foreign investors to purchase shadow bank assets. Hence it follows that these purchases will affect the interest rate of shadow banks.

2.6.1 Data Description

Our sample is composed of the four ASEAN countries for the period from 2017 to 2019. Shadow bank interest rate data are collected from Bloomberg, while macroeconomic variables are constructed using the World Development Indicators database provided by the World Bank. Monetary interest rates come from different databases but are mainly sourced from the respective central banks. We begin by collecting the available monetary rates from central banks’ annual reports and we complement them with those provided by the International Financial Statistics database of the International Monetary Fund.

2.6.2 Empirical Model

In order to achieve the third objective of this study, namely to understand the impact of monetary policy on shadow banks through the asset price or interest rate channel in each ASEAN country, we employed Zhang and Wan’s (2017) empirical EGARCH model. The model specification is as follows:

\[ r_t = \sum_{i=1}^{5} \phi_i r_{t-1} + Z_m' X_t^m + u_t, \quad u_t \sim N(0, \sigma_t^2) \]  \hspace{1cm} (1)

\[ \ln(\sigma_t^2) = \omega + \sum_{j=1}^{q} \beta_j \ln(\sigma_{t-j}^2) + \sum_{i=1}^{p} \alpha_i \left| u_{t-i} \right| + \sum_{k=1}^{r} \gamma_k u_{t-k} + Z_v X_t^v \]  \hspace{1cm} (2)

where the endogenous variable, \( r_t \), is the shadow banking interest rate. Equation (1) is the mean equation of the shadow banking interest rate series and equation (2) is the corresponding variance equation, where \( \sum_{i=1}^{5} \phi_i r_{t-1} + Z_m' X_t^m \) represents the time-varying mean while \( \sigma_t^2 \) is the time-varying variance. The mean is assumed to show persistence in the shadow banking interest rate as well as in exogenous factors that should affect shadow banking, \( X_t^m \). The exogenous control variables include the market-based interbank interest rate, the seven-day repo rate, the benchmark interest rates as the price-based monetary tool and the exchange rate. The administrative monetary policy tool consists of the central bank lending rate and the deposit rate. \( X_t^e \) is the exogenous variable for the variance equation, and \( \gamma_k \) is the asymmetric impact of positive or negative innovations on the standardised residuals.