Impact of digital financial inclusion on ASEAN banking stability: Implications for the post-Covid-19 era

Hasanul Banna
UAC, FEA, Universiti Malaya, Malaysia.

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What I will discuss

- Why we should care about this study?
- What is DFI
- Prospects of DFI
- DFI and banking sector
- How it contributes to the literature?
- Data and Methods
- Results and Analysis
- Conclusion and Policy recommendation
Why we should care

When in a country the stability of the banking industry becomes questioned, the country’s overall economic condition is thought to be collapsed

- Banking stability is a must for SEG

- FS is one of the goals of SDGs - where every individual is expected to enjoy a better and quality living without feeling the fear of any threat, conspiracy, conflict and war as well

- To achieve SDGs by 2030 – SEG
  - To minimize the investment gap of $2.5 trillion
    - can be reduced by the banking sector along with other FIs
    - To bank the unbanked people specially the underprivileged people

- As a matter of great regret, still a sizable number of adults are unbanked

According to KPMG:
73% adults – without a bank account
(Around 438 million unbanked individuals)
Cash based- Thailand, Indonesia, the Philippines or Vietnam
Why we should care

- COVID-19 pandemic
  - Embargo on usual human movement - Social distancing, quarantine, lockdown and abrupt closure of all types of financial and non-financial institutions
  - A grave and unprecedented strain on markets, businesses, societies, and individuals as well (Arner et al., 2020; Banna, 2020a).
  - Devastating effect on the global financial sector - an unimaginable economic crisis that is predicted to break all the past records
  - The restrictions on the lifestyle of mankind, economic growth gets hindered showing lower inflation, higher unemployment, and bigger debt (Miller, 2020) that has affected the American economy (Atkeson, 2020), Chinese economy (Qiu et al., 2020), African, European, Latin American, and ASEAN economy too (George et al., 2020).
  - IMF – beginning of the year – 82% of the country’s GDP will rise, but later realising the intensity of this pandemic they again predicted that overall GDP of the world will decline by 3%
  - The biggest test of the post-crisis financial system to date (FSB, 2020) - uncertain magnitude and duration of the recession
Why we should care (cont..)

- Though Covid-19 has departed human being from their daily activities
  - Human being cannot be departed from the financial affairs
  - Human activities are directly or indirectly related to financial affairs
- Best means of carrying out financial affairs is the banking sector
- Stimulus (bailout) packages of govt. are disbursed through banking channel
- Banks are required to carry out their operations by any means (McKibbin & Fernando, 2020)
- Banking industry is one of the worst victim of this crisis (Banna et al., 2020) – i) Credit/Liquidity crisis, ii) Operational risk
- Pressure on global banking systems is growing at a fast rate
- As the outbreak continues, banks see covenant breaches and it is very tough for the banks to retain their stability
- Scholars (e.g., Sahay et al., 2020) think DFI can be a solution in this regard to retain banks’ stability based on the previous experience in the post-GFC
- “the experience of the last few months leaves us with a lot of useful lessons that can be used to map out the future of Europe’s digital finance strategy” - Pablo Urbiola, Head of Digital Regulation at BBVA
What is DFI

Digital access to, and the use of, formal financial services by the excluded and underserved population (CGAP, 2015).

Financial services delivered via mobile phones, the internet or cards (Manyika et al., 2016)

DFS - innovative financial products, finance related software and a great way of interaction and communication with the customers - FinTech and other finance (Gomber et al., 2017)
What is DFI (cont..)

Perform all the financial operations through a cashless manner by which both the service provider and receiver get benefit (Klapper, 2017).

Cash-based to cashless transaction (CGAP) - a mobile phone which – in DevCont. almost 50% (World Bank, 2014).

By 2030, 2 billion people who don’t have a bank account today will be storing money and making payment with their phones (Bill & Melinda Gates Foundation, 2015).

Latest innovation of modern advanced technology and Extension of financial inclusion - An innovation that is thought to bring a revolutionary development in the overall financial sector (Ozili (2018))
Prospects of DFI

✓ “The adoption of digital finance will have a significant impact not only on financial inclusion, but also inclusive economic growth”

✓ (6% GDP) - alleviate poverty - inclusive economic growth - SDGs - GDP is seen as a key index of development of a country (Banna, 2020).

✓ The study of Klapper et al. (2019) – transformation of informal biz to formal biz – more taxes can be collected

✓ More tax collection contributes to the national revenue sector and eventually makes country’s economic growth stable.

Alleviating constraints to financial access: The role of DFS (Pazarbasioglu et al, 2020)
### Evolution of financial services as a result of digital technologies and new business models (Pazarbasioglu et al, 2020)

<table>
<thead>
<tr>
<th>User Needs</th>
<th>Traditional Model</th>
<th>Gaps</th>
<th>Technological Innovations</th>
<th>Fintech/Digital Solutions</th>
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<tbody>
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<td>AI/ML</td>
<td>Data Could Platforms</td>
<td>DLT/Crypto</td>
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<td>Save</td>
<td>Bank Deposits Mutual funds Bonds Equities</td>
<td>Cost</td>
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<td>Borrow</td>
<td>Bank loans Bonds Mortgages Trade credit</td>
<td>Transparency</td>
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<td>Manage risk</td>
<td>Brokerages underwriting Structured products Trading regulatory Compliance KYC Insurance</td>
<td>Access</td>
<td>H</td>
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<td>Get Advice</td>
<td>Financial planner Investment advisor</td>
<td>Security</td>
<td>H</td>
<td>M</td>
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</table>
Development stages of DFS

STAGE 1
Basic access to transaction Accounts
- Bangladesh, Ghana, Tanzania, Algeria, Côte d'Ivoire, Egypt, Ethiopia, Indonesia, Morocco, Nigeria, Mozambique, Rwanda, Pakistan, Peru, Senegal, Vietnam, Zambia

STAGE 2
More intensive usage of transaction accounts for digital payments
- Brazil, India, Thailand, Turkey, Kazakhstan

STAGE 3
Moving beyond payments to other DFS products (e.g., credit, insurance)
- Kenya

STAGE 4
Widespread adoption and usage of DFS by individuals and MSMEs
- China, USA, Sweden

Predominantly Cash Based

Increased penetration of and usage of digital financial services

Fully Digital
DFI and banking sector

- Studies show that wider inclusion of easily accessible financial services -
  - Helps banks attain stability (Ahamed & Mallick, 2019),
  - Push for financial advancement (Demirguc-Kunt et al., 2015),
  - Increase banks’ revenue by reducing cost (Van et al., 2020), and
  - Advance the global financial sector (Iqbal & Llewellyn, 2002)

- DFI is faster, efficient, time saving, and cheaper
  - Many countries of the world have already started practising it in full swing (Ellis, 2020) to retain their financial and banking sector stability

- ASEAN countries have started too. For example, the trend of opening bank account in ASEAN countries through online platform has visibly increased (Hoe, 2020).

- DFI has the potential to lower costs by maximizing economies of scale, to increase the speed, security and transparency of transactions and to allow for more tailored financial services that serve the poor.
Contrastive effect of DFI:
- Excessive financial innovations might affect financial stability distressingly (Mani, 2016)
- Disrupt the regulatory and supervisory activities by the regulatory authority
- Predatory lending practice (ex: Indonesia banned 1000 illegal P2P lending agents)
- Data privacy might be leaked by cyberattacks
- Money laundering and financing in terrorism may be increased
- Sim cloning, Mobile hijacking

However, both the negative and positive effects of DFI bring the question of whether the proper and full pledge implementation of DFI in the ASEAN banking sector, especially in post-pandemic period can be a solution for attaining the banking stability or not.

Based on the previous experience as seen in the post GFC period, we apprehend that the proper application of DFI can be a solution to retain BS during and after this uncertainty.

This study aims to empirically examine the relationship between DFI and banking stability in the ASEAN countries.
How it contributes to the literature

- This study, from an empirical perspective, focuses on the relationship between digital financial inclusion and bank stability (using bank-level data).
- The current study measures a comprehensive digital financial inclusion index - demand-side and supply-side & the demographic and geographic penetrations.
- Motto of ASEAN to be a cashless society by the year 2022. Hence, this empirical evidence will provide insightful implications for the policymakers of this region.
- Finally, this study shows how the proper application of DFI ensures ASEAN banking stability, especially in times of the Covid-19 pandemic crisis.

ASEAN banking sector:
- Most of the ASEAN countries have set their motto to be a cashless society by the year 2022 (ASEAN, 2019).
- Despite the rapid intensification in technology-based financial activities, still approximately 470 million of adults do not have a bank account and/or a mobile money account in this region (Prentice, 2020).
- The concurrence of banking and currency problems allied with the AFC and the current Covid-19 pandemic crisis – implementation of DFS.
Data

• 4 ASEAN countries: Indonesia, Malaysia, the Philippines, and Thailand
• 80% of the total ASEAN banking industry’s assets (including Singapore)
• Primarily the annual data of 256 commercial banks
• Final 253 banks - over the period of 2011 to 2019
• Indonesia conveys the highest proportion (45%) followed by the Philippines (26%), Malaysia (19%) and Thailand (10%)
• Sources:
  ✓ i) Orbis Bank-Focus database for bank-specific data;
  ✓ ii) Financial Access Survey (FAS), International Monetary Fund (IMF), Global Findex databases and individual country’s central bank’s report for DFI data; and
  ✓ iii) World Development Indicators (WDI), World Bank database for macroeconomic factors and
  ✓ iv) previous literature for instrumental variables’ data.
Methods (Bank stability)

- Bank stability:
  - i) $Z - score_{it} = \frac{ROAA_{it} + EQT_{it}}{\sigma(ROAA)_{it}}$ (Kim et al. (2020), Banna (2020) and Ahamed and Mallick (2019))
  - ii) the volatility of ROAA $[\ln(\text{sd}(ROAA))]$

- Bank and macro: Bank size, Loan ratio, LLPR, Revenue div., Management quality, Cap., HHI, Specialisation, GDP, Inflation, good governance

- OLS, PCSE, 2 SLS-IV

- $Y_{ijt} = \alpha + \beta DFI_{jt} + \gamma B_{ijt} + \varphi M_{jt} + \varepsilon_{ijt}$
Digital Financial Inclusion (DFI) Index

Since the proxies used in building the DFI index are highly correlated with each other, hence, this study develops an inclusive index of DFI to capture the common variation among the proxies using principal components analysis.

This index will sufficiently deal with the setback of multicollinearity and over-parameterisation as a single measure of DFI (Ahamed & Mallick, 2019).

We have measured both the supply side (access) index and the demand side (usage) index separately using the PCA. Finally, we combine these two indices to create a comprehensive digital financial index using PCA.

All these three indices have been normalised using minimum-maximum normalisation technique to avoid the unnecessary negative value.

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**Digital Financial Inclusion (DFI) proxies**

<table>
<thead>
<tr>
<th>Supply side (Access to digital finance)</th>
<th>Demand side (usage of digital finance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile money agent outlets per 100,000 adults (Demographic penetration)</td>
<td>Number of mobile money accounts per 1,000 adults</td>
</tr>
<tr>
<td>Mobile money agent outlets per 1,000 km² (Geographic penetration)</td>
<td>Number of mobile and internet banking transaction (during reference year) per 1,000 adults</td>
</tr>
<tr>
<td></td>
<td>Value of mobile and internet banking transaction (during reference year) (% of GDP)</td>
</tr>
</tbody>
</table>

**Alternative proxy**

Made or received digital payments in the past year (% age 15+)
ASEAN -4: Banking stability

![Banking Stability (Z-score)]
DFI Index (by year-country)
Results and Analysis

Digital financial Inclusion Index (by country)

- Thailand
- Philippines
- Malaysia
- Indonesia

DFI - Usage  DFI - Access  DFI
Results and Analysis

- Overall digital financial inclusion has a significant positive relationship with ASEAN banking stability (z-score)
- A significant negative relationship with the volatility of ROAA with controlling of bank-specific but without controlling macroeconomic factors at 1% level of significance
- A higher level of DFI is significantly related to a higher level of banking stability (a high Z-score indicates greater stability, i.e., less risk taking)
- When DFI is enhanced in a country, the volatility of the ROAA is less and hence, more stability is obtained
- Usage – significant but Access – insignificant
- Have lack of access to digital financial services as banks did not provide sufficient mobile banking facilities and/or agent outlets services in this area specially the remote area of this region and hence, they are unable to open an account. However, those who have access, can utilise such services properly.

<table>
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<tr>
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<th>Ln (Z-score)</th>
<th>Ln (sd (ROAA))</th>
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<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>DFI</td>
<td>1.041***</td>
<td>0.295</td>
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<tr>
<td>DFI - Access</td>
<td>0.695***</td>
<td>-0.884***</td>
</tr>
<tr>
<td>DFI - Usage</td>
<td></td>
<td>0.023</td>
</tr>
<tr>
<td>DFI - Access</td>
<td></td>
<td>-0.740***</td>
</tr>
<tr>
<td>DFI - Usage</td>
<td></td>
<td>(0.262)</td>
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<td></td>
<td>(0.290)</td>
<td>(0.164)</td>
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<td>(0.270)</td>
<td>(0.303)</td>
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<tr>
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<td>(0.163)</td>
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</table>
Results and Analysis

- Overall DFI has a significant impact on ASEAN banking stability which means DFI enriches the soundness of individual ASEAN banks in the sample countries.

- A one standard deviation increases in the index of financial inclusion, which equals 0.16, is associated with an increase in the Z-score of 10.72% (0.67*0.16)

- These findings are similar with the previous studies (Ahmed & Mallick, 2019; Banna, 2020; Morgan & Pontines, 2018) who that show a financial system with inclusive DFS inclines to boost banking stability, and that the greater implementation of DFI moderates the excessive risk-taking drift of a particular bank.

- The results also indicate that conventional banks are in better position as compared to Islamic banks in terms of banking stability and DFI relationship in ASEAN region. Even while running the regression based on bank specialisation, the relationship between banking stability and DFI is insignificant for Islamic banks regardless of indices.

\[
\begin{array}{cccccc}
\text{Ln (Z-score)} & \text{Ln (sd (ROAA))} \\
(1) & (2) & (3) & (4) & (5) & (6) \\
\hline
\text{DFI} & 0.674^{**} & 0.556 & 0.457^{*} & -0.541^{**} & -0.407 & -0.399^{*} \\
& (0.300) & (0.338) & (0.238) & (0.216) & (0.363) & (0.236) \\
\text{SPECIAL} & 0.443^{**} & 0.452^{**} & 0.431^{**} & -0.414^{**} & -0.420^{**} & -0.408^{**} \\
& (0.204) & (0.205) & (0.203) & (0.203) & (0.204) & (0.202)
\end{array}
\]
Conclusion and Policy recommendations

- Though the proper implementation of DFI has been on the radar of global leaders and policy makers, since long before the Covid-19 crisis, however, the Covid-19 pandemic has put forward questions on how DFI can be a feasible solution to react the crisis and how the crisis in turn would accelerate DFI.

- DFI and Bank stability - positive relationship – digital finance are reachable through mobile phones or computers – can reduce face-to-face but keep connected to the financial transaction/activities even in the face of crisis.
  - Governments/standard setters/policy-makers should implement DFS at a rapid pace in a full-fledge.
    - Bank the unbanked people
    - Minimise liquidity issue/credit risk - by increasing cheap deposits from clients
    - Minimise operational cost - through maintaining minimum paperwork, documentation and fewer physical bank branches
    - Increase money circulation even in the mobility restriction
    - DFI, as an instrument, helps financial and monetary system regulators to reduce the level of inflation in both poor and developing countries by restricting the circulation of the amount of physical cash
    - Besides, DFI plays a significant role in enhancing the welfare of individuals and business sectors through which individuals can easily access funds in their bank accounts to perform financial transactions (CGAP, 2015)
    - During any pandemic such as Covid-19, DFI can help governments to reach out to those in the informal sector and those who do not have access to formal bank account to provide the emergency response.
Conclusion and Policy recommendations

- DFI access insignificant/ Low score
  - Policy makers should ask the banking sector in this region to expand their agent networks and other access points and improve the design of their existing DFS products (Aviles & Trujillo, 2019) by implementing artificial intelligence and machine learning to fascinate people of all economic classes.
  - Banks should also introduce services how these people can open an account sitting in the house through their electronic devices as Covid-19 crisis makes them reluctant to go to the bank branch/agent outlets physically to open an account.

- DFI usage low score
  - People, especially middle aged/aged, should be provided with proper digital financial literacy / find an alternative way of using.
  - Government can provide subsidies to those who are in need of cash to buy smartphone/ to use internet facilities.
  - People’s trust level need to increase – e.g. insured amount might be increased.
  - The regulatory body should ensure that the electronic devices of the clients have uninterrupted internet connection and are supported with latest technology.
  - Banks in the sample countries, to prevent the card cloning, should upgrade their databases and launch money withdrawal through scanning the QR code / NFC system by the mobile phone which already prevails in countries like Singapore, Turkey and Spain so on.