



FINTECH: THE EXPERIENCE SO FAR

May 17, 2019

EXECUTIVE SUMMARY

The Bali Fintech Agenda (BFA) was approved last year by the IMF and World Bank Group. It lays out key issues to consider in how technological innovation is changing the provision of financial services with implications for economic efficiency and growth, financial stability, inclusion, and integrity.

In approving the BFA, IMF Executive Directors asked staff to review fintech developments and consider their implications within the mandates of the IMF and the World Bank. This paper responds to this call and takes stock of country fintech experiences and identifies key fintech-related issues that merit further attention by the membership and international bodies. It draws upon (a) discussions with country authorities raised in the context of IMF surveillance and World Bank country work; (b) the findings of a survey of the membership on their approach to the BFA; and (c) deeper exploration on selected fintech topics by staff.

The paper finds that while there are important regional and national differences, countries are broadly embracing the opportunities of fintech to boost economic growth and inclusion, while balancing risks to stability and integrity.

- Fintech is having global impact on the provision of financial services. Mobile payments have been a key early developer with broad implications for inclusion. New entrants are challenging incumbents who are responding. The evolving market structure could boost competition and efficiency, while raising new risks to financial stability and integrity. Balancing competing policy priorities is a key challenge.
- Africa has seen rapid growth in mobile money as a driver for greater financial inclusion; Asia has made advances in nearly every aspect of fintech; the European fintech market is growing rapidly but remains unevenly distributed; the Middle East, North Africa, Afghanistan, and Pakistan (MENAP) and Caucasus and Central Asia (CCA) regions are seeing a gradual pick-up in activity, especially in some countries; and the LAC region is taking off, albeit at an earlier stage than other regions.
- Countries are seeking to provide an enabling environment, including open and affordable access to core digital services and infrastructures. But important infrastructural gaps and regulatory impediments remain. Significant gains are expected from fintech advances in payments, clearing, and settlement.

- While concerns of increased risks posed by fintech arise, monitoring is still largely confined to activities and entities within the traditional regulatory perimeter. Gaps in the legal framework to address fintech issues are widely acknowledged, while there is a need to modernize data frameworks.

The paper identifies key areas for international cooperation—including roles for the IMF and World Bank—and in which further work is needed at the national level and by relevant international organizations and standard-setting bodies (SSB). In their responses to the survey, countries called for greater international cooperation in many areas, prioritizing: cybersecurity; anti-money laundering and combating the financing of terrorism (AML/CFT); development of legal, regulatory, and supervisory frameworks; payment and securities settlement systems and cross-border payments. They also saw these as areas for seeking technical support and policy advice from the IMF and World Bank staff. The paper suggests further work on international dimensions of data policy frameworks, while there is a clear demand also for considering new international standards by standard-setting bodies (SSBs), including on crypto-assets, mobile money services, and peer-to-peer (P2P) lending.

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Glossary

AE	Advanced economies
AFIN	Asean Financial Innovation Network
AFRITAC	African Regional Technical Assistance Center
AI	Artificial Intelligence
AML/CFT	Anti-Money Laundering and Combating the Financing of Terrorism
APEC	Asia-Pacific Economic Cooperation
API	Application Programming Interfaces
ASEAN	Association of Southeast Asian Nations
BCBS	Basel Committee for Banking Supervision
BIS	Bank for International Settlements
CBDC	Central Bank Digital Currency
CBRs	Correspondent Banking Relationships
CCA	Caucasus and Central Asia
CD	Capacity Development
CDD	Customer Due Diligence
CGFS	Committee on the Global Financial System
CPMI	Committee on Payments and Market Infrastructures
DFC	Digital Fiat Currency
DLT	Distributed Ledger Technology
ECF	Equity Crowd Funding
ECOWAS	Economic Community of West African States
eKYC	electronic Know-Your-Customer
EMDE	Emerging Markets and Developing Economies
FATF	Financial Action Task Force
FSAP	Financial Sector Assessment Program
FSB	Financial Stability Board
GDPR	General Data Privacy Regulation
GFS	IMF-World Bank Global Fintech Survey
GFSN	Global Financial Safety Net
GPII	Global Partnership for Financial Inclusion
IAIS	International Association of Insurance Supervisors
ICO	Initial Coin Offering
IMFC	International Monetary and Financial Committee
IMS	International Monetary System
IOSCO	International Organization of Securities Commissions
IT	Information Technology
KYC	Know-Your-Customer
LAC	Latin America and the Caribbean
LAT	Ledger-and-Transfer process
LIC	Low-income countries
LVPS	Large Value Payments System
MENAP	Middle East, North Africa, Afghanistan, and Pakistan

MIs	Middle-income countries
ML/TF	Money Laundering and Terrorist Financing
MNO	Mobile network operators
MSME	Micro-, Small-, and Medium-sized Enterprises
MTO	Money Transfer Operator
NFIS	National Financial Inclusion Strategy
NPPS	New Payment Products and Services
OIC	Organization of Islamic Conference
P2P	Peer-to-Peer
PIC	Pacific Island countries
PNG	Papua New Guinea
PoC	Proofs of concept
PSD2	Payments Services Directive 2
PSP	Payment Service Providers
QR	Quick Response
Regtech	Regulatory Technology
STO	Securities Token Offerings
Suptech	Supervisory Technology
SSB	Standard-Setting Body

BACKGROUND

1. **The IMF and the World Bank Group launched at the 2018 Annual Meetings the Bali Fintech Agenda (BFA), a framework of high-level issues that countries should consider in their own domestic fintech policy discussions.**¹ The BFA is organized around a set of 12 elements (Box 1) aimed at helping member countries to harness the benefits and opportunities of rapid advances in financial technology that are transforming the provision of financial services, while, at the same time, managing its risks. The BFA elements cover topics relating broadly to enabling fintech; ensuring financial sector resilience; addressing risks; and promoting international cooperation. This paper is a follow up to the BFA and takes stock of country fintech experiences and identifies key emerging trends and policy issues confronting member countries and the international community, in light of the rapid transformation brought about by fintech and the rising engagements of the IMF and the World Bank regarding fintech-related issues and within their respective mandates.

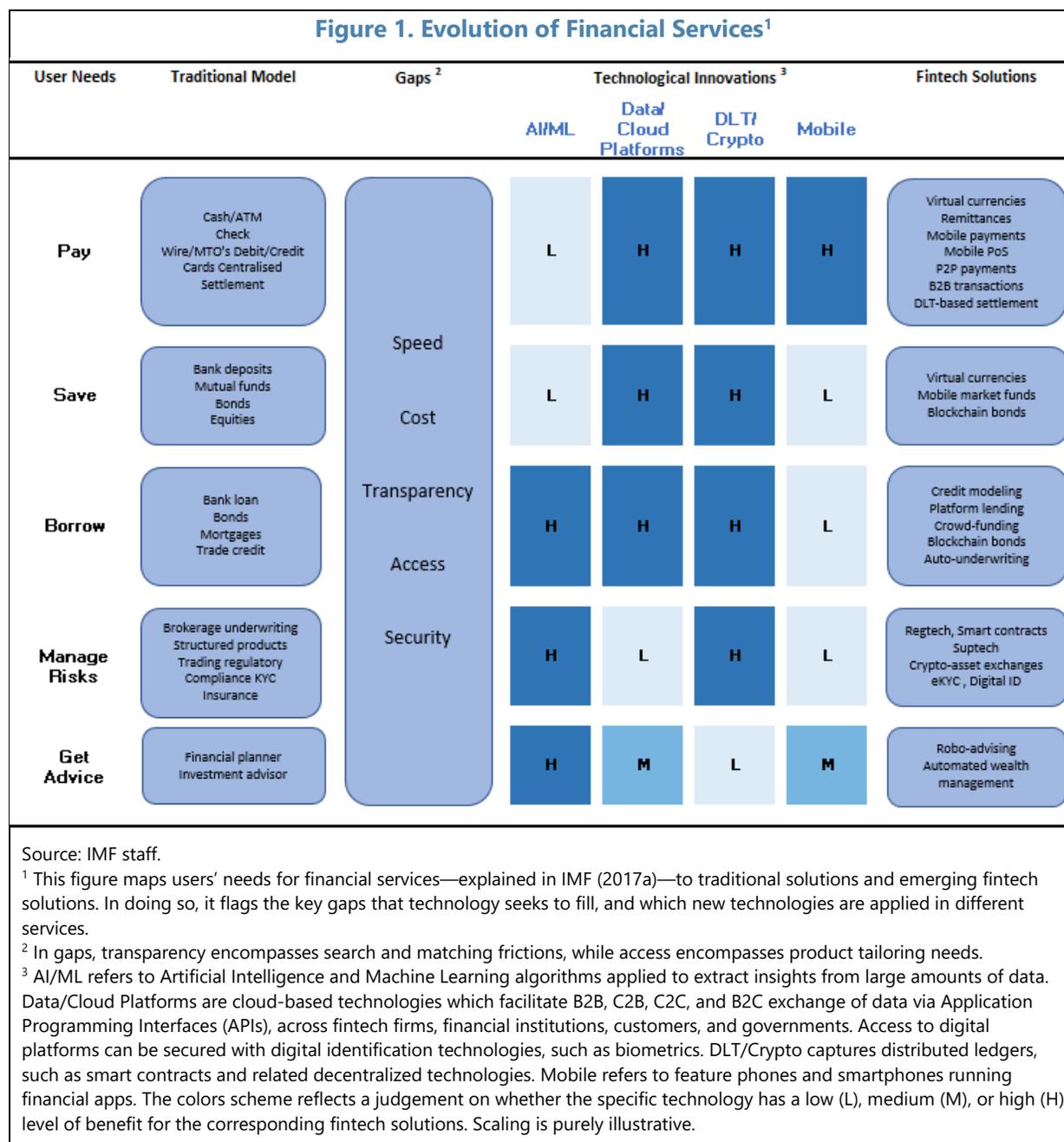
Box 1. BFA Elements: Balancing Opportunities and Risks

- I. Embrace the opportunities of Fintech
- II. Enable New Technologies to Enhance Financial Service Provision
- III. Reinforce Competition and Commitment to Open, Free, and Contestable Markets
- IV. Foster Fintech to Promote Financial Inclusion and Develop Financial Markets
- V. Monitor Developments Closely to Deepen Understanding of Evolving Financial Systems
- VI. Adapt Regulatory Framework and Supervisory Practices for Orderly Development and Stability of the Financial System
- VII. Safeguard the Integrity of Financial Systems
- VIII. Modernize Legal Frameworks to Provide an Enabling Legal Landscape
- IX. Ensure the Stability of Monetary and Financial Systems
- X. Develop Robust Financial and Data Infrastructure to Sustain Fintech Benefits
- XI. Encourage International Coordination and Cooperation, and Information Sharing
- XII. Enhance Collective Surveillance and Assessment of the Financial Sector

2. **The BFA is motivated by the need to deepen understanding of how technological innovation is changing financial services provision and the implications for efficiency, financial stability, integrity and inclusion.** Previous staff analysis has emphasized that financial services arise to meet user needs—to make payments, to save, to borrow to finance consumption and investment, to manage risks including around all these activities, and to get advice on how best

¹ <https://www.imf.org/en/Publications/Policy-Papers/Issues/2018/10/11/pp101118-bali-fintech-agenda>

to handle all these needs for services—and that technological innovations have offered improvements in service provision. Figure 1 below provides a stylized road map on how user needs for financial services have traditionally been provided, the key gaps that have been issues for finance, and the new fintech solutions on offer to potentially address these problems.

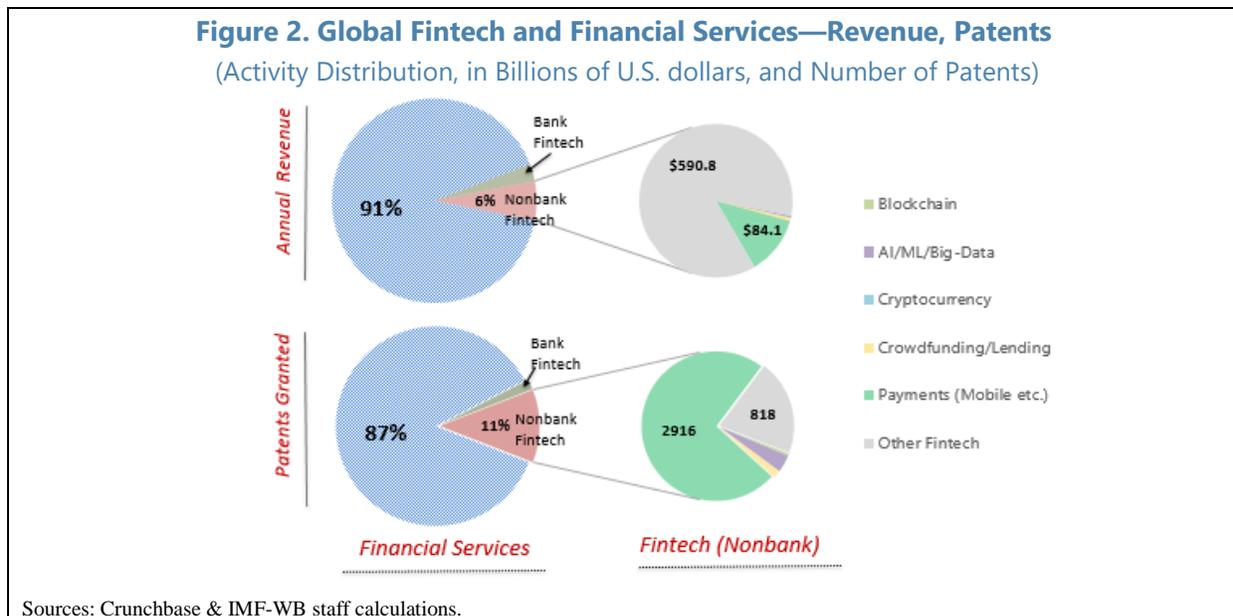


3. **Technologies, ranging from artificial intelligence (AI) to mobile applications are providing new solutions that seek to increase the efficiency, accessibility and security of financial services provision (Annex I).** For example, payments needs have in many jurisdictions been met by cash or for remittances by money transfer operators (MTO) and other payment service

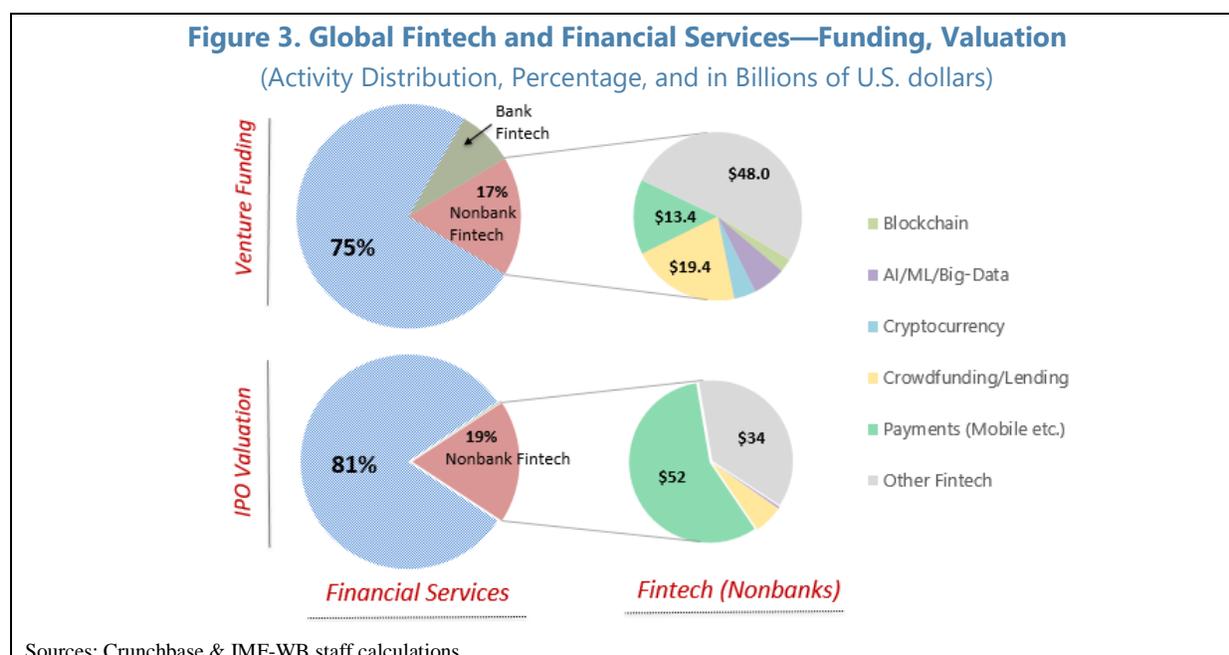
providers (PSP). These services have faced a range of problems, being slow, costly, hard to track and not always secure. New solutions, built on cloud, digital platforms and distributed ledger technologies (DLT), spanning mobile payments and peer-to-peer (P2P) applications, have arisen seeking to fill gaps. There has been a boom in Initial Coin Offerings (ICO) and surging interest in Securities Token Offerings (STOs), based on DLT and asset tokenization, enabling new investment products that offer a claim on potential earnings streams of new businesses. Borrowing services are impacted by new algorithms, such as smart contracts or AI/ML applied to large volumes of data collected by services providers, especially in payments and from e-commerce providers. This improves credit risk modelling and allows lending to new borrowers including MSMEs. Likewise, advances in AI, digital identification and cyber-security are enabling new models for managing risk for individuals, financial institutions, and regulators.

4. While fintech firms currently represent a small share of overall revenue of the financial services industry, their growth and contribution to innovation is apparent.

Figures 2 and 3 below show the distinction, in terms of key attributes between fintech and non-fintech firms within the financial services industry.² The share of revenues generated by fintech companies in the overall financial sector is relatively small but over one-third of global fintech revenues are being earned in Asia. Moreover, the fintech share of patenting activity in the financial sector is twice that of their revenue share, suggestive of their disproportionate role in innovation in the sector. The bulk of patents filed so far have been in the payments area, with the overwhelming majority registered in the United States.

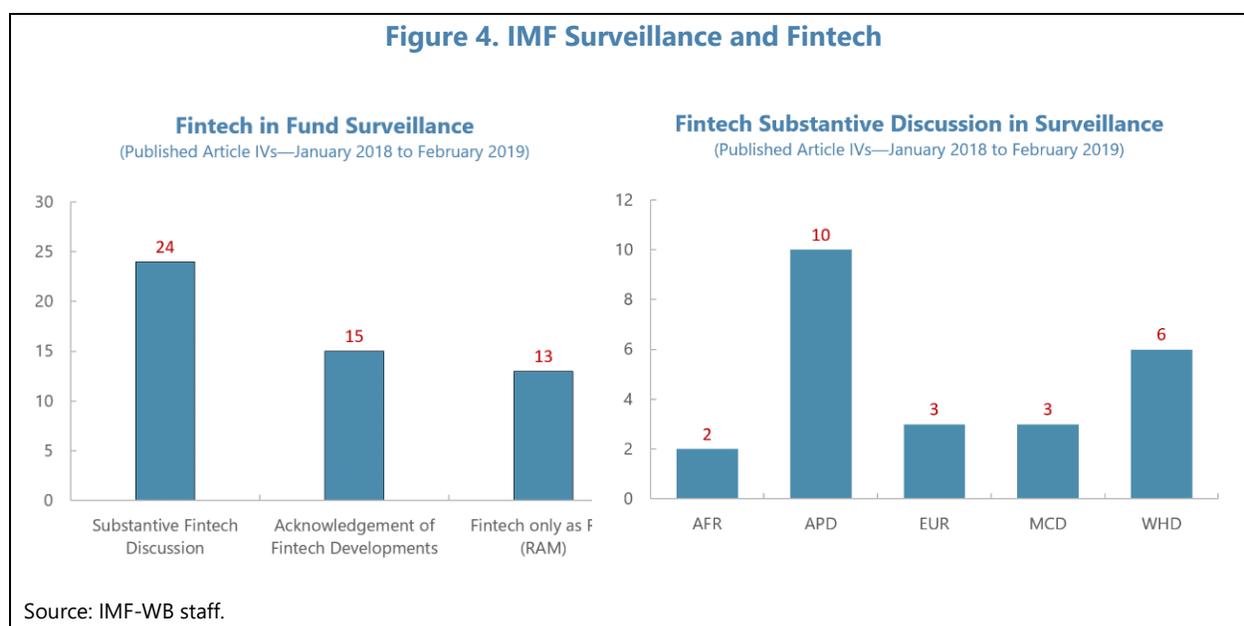


² The figures report data aggregated from CrunchBase which covers investment and funding information for over 52,000 public and private financial companies across the world (with the top 20 global firms in the financial services category holding over US\$46 trillion worth of assets). The data compiled by CrunchBase are sourced from quarterly and annual financial company reports, regulatory filings and market pricing data. The database was launched in 2007 but retrieves historical information on companies included in their database.



5. **Fintech firms have received a quarter of the financial service industry's venture and startup funding** (per latest estimates of these companies' funding history since inception) and account for almost 20 percent of the total US\$90 billion valuation of new IPO's (at launch) by global financial sector firms. Venture funding appears to be quite diversified geographically, with the main recipients including crowd-funding and payments services providers. The United States has accounted for about one-half of global venture capital fund-raising, followed by Asia and Europe roughly splitting the rest of the global total of about US\$85 billion in such financing for the fintech sector. Fintech IPOs on the other hand have been largely concentrated in the United States, which accounts for over three quarters of the global fund-raising total. The bottom line pattern that emerges is of rising investments and financing of fintech, especially in payments, but increasingly diversified going forward across sectors and regions.

6. **Discussions on fintech topics are taking place within a growing number of IMF Article IV consultations (Figure 4).** Discussions have focused on the case for fintech to spur digital payments and financial inclusion and setting up the appropriate frameworks and safeguards to develop crypto-assets, including digital currencies projects in small states (the Republic of Marshall Islands (RMI) and Sint Maarten). Fintech has featured in bilateral surveillance reports on Asian and Latin American economies, reflecting China's booming fintech industry triggered by well-developed infrastructure and soaring demand for financial services, the drive of financial centers to become fintech hubs (e.g., Hong Kong SAR (China) and Singapore), and the centrality of issues such as the desire to promote financial inclusion (e.g., Cambodia, Peru, Tuvalu), and the potential role of fintech in mitigating pressures on correspondent banking relationships, particularly in small islands.



7. **A number of issues have emerged from these fintech discussions, although the main concerns relate to AML/CFT.** The latter arise, in particular, against the background of crypto-assets or DLT (e.g., Malta and Mexico). Other topics discussed include the similarity of risks faced by fintech firms and traditional financial intermediaries (e.g., Mexico), the potential game changing nature of fintech for banking and asset management sectors (e.g., Luxembourg) and cyber risk (e.g., Chile). The descriptions of fintech risks have often been derived from the IMF global risk assessment matrix (G-RAM); 13 reports refer to fintech risk through the “risk assessment matrix annex”, either as pressures on traditional banking, or as disruptions generated by cyber-attacks. Two country-specific risks featuring in a risk assessment matrix (RAM) are for China (upside risk of a more dynamic private sector) and for RMI in the context of issuing cryptocurrency as legal tender.

8. **The staff’s approach to policy recommendations has been principles based.** Fintech developments are explicitly mentioned in eight Article IV Consultation “staff appraisals” and seven IMF Executive Board assessments. Policy recommendations are tilted towards risk mitigation, encouraging the authorities to develop a healthy fintech sector with adequate regulation and oversight (e.g., Chile, Japan, Mexico, Qatar, Singapore) or cautioning against the issuance of a digital currency as legal tender that would entail potential costs arising from economic, reputational, and governance risks, and that require strengthening AML/CFT frameworks (e.g., Palau and RMI).

9. **In-depth fintech discussions have been undertaken on a pilot basis in recent Financial Sector Assessment Programs (FSAPs).** The Malta FSAP that concluded in February 2019 reviewed the Virtual Financial Asset Act and recommended careful and gradual implementation to enable the regulator’s resource development and balance between embracing fintech benefits and risk mitigation. The Switzerland FSAP conducted a review of crypto-asset and blockchain related legislation, regulation, supervision and qualitative risk analysis. It identified significant data gaps and

recommended a more active supervision and data collection.³ The Singapore FSAP examined the implications of fintech for the regulation and supervision of the Singaporean financial services sector. All three countries had taken legislative steps to address some aspects of fintech, with focus on crypto-assets and blockchain in Malta and Switzerland and implemented AML/CFT measures on some crypto-asset service providers.

10. **IMF capacity development (CD) efforts have mainly focused on facilitating peer-to-peer information exchange and workshops discussing emerging trends and practices.** To some extent, this reflects the lack of international standards and consensus on regulatory approaches and the very dynamic nature of developments. The Annual Fintech Roundtable held in IMF's headquarters brings together practitioners to share country experience; high level regional conferences are being organized with senior policymakers to discuss the BFA, and senior management participate frequently in speaking engagements on the need to preserve balance between risks and opportunities in fintech. In addition, technical assistance and training courses focused on risk-based supervision, emerging issues in financial regulation and supervision, and risk management, e.g., training courses focused on fintech for Chinese officials in 2019, a three-day fintech seminar in South Africa sponsored by AFRITAC East and AFRITAC South, and the fintech workshop for Arab central bank governors organized jointly with the Arab Monetary Fund in 2018. In-house expertise on the topics is being built supported by monthly seminars from policymakers and industry experts and has been aided by the creation of the IMF's Information Technology Department (ITD) Digital Advisory Service Unit and the Innovation Unit of the Office of the Managing Director.

11. **Fintech is increasingly integrated into the World Bank's operations, country policy dialogues, global knowledge activities, and diagnostic work.** More broadly, the fintech work is closely linked to the World Bank's broader agenda on disruptive technologies and the digital economy. The World Bank undertakes global and regional studies on fintech trends and thematic analytical reports, and directly supports country authorities in adopting fintech through technical assistance and lending projects. The World Bank is also increasingly incorporating an analysis of fintech developments in FSAPs (e.g., India, Indonesia, and Thailand). More broadly, access to digital financial services is seen as pivotal to advance broader development objectives such as improving the efficiency of government services delivery; access to services like water⁴ and electricity; strengthening human capital in terms of health, education and work; and addressing cross-cutting priority areas like climate change and gender. World Bank Group activities include:

- a. **ID for Development:** This is a cross-sectoral program to support the development of safe, reliable and efficient ID systems many of which also include specific financial sector

³ It is likely that significant fintech data gaps exist in other European countries, including the absence of consistent definitions.

⁴ <http://documents.worldbank.org/curated/en/387931552667416907/Fintech-for-the-Water-Sector-Advancing-Financial-Inclusion-for-More-Equitable-Access-to-Water>

applications such as eKYC (e.g., Economic Community of West African States (ECOWAS) countries, Morocco, and Philippines).

- b. **The Digital Economy for Africa Moonshot** aims, by 2030, to digitally connect every individual, business and government and ensure they thrive in the digital economy.
- c. **Govtech** seeks to intensify usage of digitization to advance public service delivery, reduce corruption, provide user-friendly services to companies, and engage citizens; modernizing core government systems; and creating public data platform for use by government, citizens and the private sector. The World Bank is aiding (e.g., Cote d'Ivoire, Lebanon) in digitizing government-to person (G2P) payments and payments to Governments (e.g., tax payments, conditional cash transfers).
- d. **The International Finance Corporation** is investing in fintech companies; working with existing banks and clients to help them adopt digital financial services into traditional banking platforms; and working with donors and development partners to accelerate the adoption of fintech and achieve responsible financial inclusion.

12. **The World Bank works with client countries on fintech issues in five key thematic areas:**

- a. **Legal and regulatory framework:** This work reviews existing frameworks to identify potential reforms that would provide a more conducive environment for fintech innovation and adoption whilst mitigating risks, including support for and design of regulatory sandboxes and other approaches (e.g., India, Jordan, Rwanda, Saudi Arabia, Sri Lanka, and Vietnam), and reforms of legal and regulatory framework for fintech (e.g., Colombia, Kenya, Mexico, Peru, and Philippines).
- b. **Financial infrastructure:** Work in this area covers legal and regulatory aspects, institutional arrangements, and the design of financial infrastructure. In this context fintech approaches like digital identification, faster payments, the use of application programming interface (API) and the use of alternative data for credit decisioning are being incorporated. Examples include, application of data and analytics to improve access to finance (e.g., Ethiopia, Uzbekistan, and Zambia); and modernization of financial infrastructure (e.g., Guyana, Lao, Madagascar, Mozambique, Pacific Islands, Pakistan).
- c. **Enhancing access to transaction accounts:** Transaction accounts are a gateway to financial inclusion and broader use of financial services. Under the Universal Financial Access 2020 agenda, the World Bank is supporting countries to harness the potential of fintech to achieve universal access to transaction accounts. Examples of interventions include support to developing interoperability arrangements for mobile money and e-money systems (e.g., Afghanistan, Madagascar, Pakistan); development of acceptance infrastructure (e.g., Mozambique, Sierra Leone); and digitization of G2P payment services to enhance access to payment services for individuals (e.g., Bangladesh, Ethiopia).

- d. **Enhancing access to finance for individuals and MSMEs:** This is a core part of World Bank operations in countries where fintech plays a critical role. Examples include: use of API models and supporting adoption of innovative approaches by apex development banks (India); usage of DLT in agricultural value chains to bring more transparency and efficiency leading to better price realization for the end farmer (Haiti); usage of platform models for agricultural finance (e.g., Kenya, India, Myanmar, Rwanda, and Tanzania); and crowdfunding and other capital market approaches (e.g., Colombia, Mexico).
- e. **Institutional strengthening:** The World Bank supports capacity building for financial sector regulators and other authorities such as through supporting the establishment of dedicated fintech units and functions and the strengthening of internal systems and processes to support the adoption of regtech and supotech solutions. Examples include: capacity building and fostering dialogue through focused roundtables (e.g., Bangladesh, Colombia, Georgia, India, Peru, Saudi Arabia); modernization of core central bank and financial sector regulatory functions through extensive use of technology (e.g., Afghanistan, Burundi, Vietnam); and supporting greater adoption of technology by commercial banks, microfinance institutions and credit unions (e.g., Afghanistan, Mozambique, Sierra Leone).

13. **Against this background, the rest of the paper is organized as follows:** The next section documents fintech experiences in member countries, followed by an in-depth review of selected fintech topics. The analysis of the two sections are used to distill emerging trends and the policy issues facing member countries. The concluding section identifies the key priority areas for actions.

GLOBAL FINTECH LANDSCAPE

14. **This section provides a comprehensive review of fintech country responses in member countries,** based on the information available to IMF and World Bank staff from their engagements with member countries, organized regionally, and from country responses to the 2019 IMF-World Bank global fintech survey (GFS).

A. Regional Overview⁵

15. **The Africa sub-Saharan region has become a leader in mobile money resulting in a radical change in the delivery of financial services and significant gains in financial inclusion.** However, initial differences in regulatory approaches to new mobile money services offered by mobile network operators led to noticeable regional differences, which have narrowed over time. East Africa has maintained an overall lead including in attracting fintech investments. Southern and Central Africa have seen increases in delivery of financial services through digital channels, but there is significant room for further gains. Despite their varied starting points, priorities, and capabilities,

⁵ See Annex II for more detailed discussion. IMF area departments and the World Bank regional units have been engaged in the discussions and have contributed the analyses of region specific fintech developments.

countries in West Africa are ready to take advantage of digital technologies. Regulatory responses in many countries have been more reactive to the rapid pace of change in the sector and much work remains to be done with regards to adjusting their legislation, as needed, to facilitate orderly digital payments and to adjust to the new challenges coming with digital finance including for competition, AML/CFT, cybersecurity, consumer protection and data privacy issues.

16. **Asia has made significant advances in nearly every aspect of fintech, although there is heterogeneity within the region.** Fintech use has expanded beyond payments to include lending, insurance, and investment; adopting a wide range of technologies based on consumer needs, level of development, regulatory stance, and existing financial and technological infrastructure. Asian tech giants (e.g., in Bangladesh, China, Indonesia) have become important providers of financial services, putting competitive pressures on traditional financial institutions. Policymakers are trying to catch up with the rapid pace of fintech development, while ensuring that fintech risks are well understood and mitigated. Some fintech products have raised significant consumer and investment protection issues, as well as financial stability and integrity concerns (particularly in crypto-assets and P2P lending). Regulators are using mechanisms such as fintech units and regulatory sandboxes, and some regulators have been testing RegTech/SupTech applications (e.g., Malaysia and the Philippines). Some countries have issued regulations on digital lending (e.g., Indonesia, Malaysia, the Philippines, Singapore, and Thailand) and equity crowdfunding (e.g., Malaysia, Singapore, and Thailand). Similarly, the government of India via India Stack and the Jan Dhan-Aadhaar-Mobile Trinity, is supporting the digitization of payments, amending KYC requirements, and customers digital onboarding, and enabling automated access to data from various digitized government systems in the country.

17. **The fintech market in Europe is growing but is unevenly distributed, with non-EU countries trailing European Union peers in fintech adoption.** European authorities (such as France, Lithuania, Luxemburg, Malta, Switzerland, and the United Kingdom) have been proactively encouraging fintech innovation and exploring regulatory responses. The European Union has introduced two key regulations in the form of the General Data Privacy Regulation (GDPR) and the Payments Services Directive 2 (PSD2), both of which came into effect in 2018. The full implications of these significant policy developments will take some time to become clear. Nonetheless, Europe is already among the most financially-developed and inclusive regions in the world. Therefore, unlike some other regions, fintech would mainly affect the intensive margin of financial services provision. While lagging somewhat in investment in Fintech startups, existing financial institutions are actively adopting new financial technologies, as manifested, for example, in the fact that Europe is the leading region for digital payments.

18. **The MENAP and CCA regions had a slow start in adopting fintech and activities are concentrated in few countries and sectors, although the industry is now growing rapidly.** In MENAP, four countries (Egypt, Jordan, Lebanon, and UAE) account for 75 percent of fintech startups and, in the CCA, fintech activities are still concentrated in Kazakhstan. Innovations have mostly focused on payments and to some degree lending. Nonetheless, driven by broad recognition that fintech presents important opportunities to deepen financial institutions and promote financial

inclusion, the industry is now growing rapidly, and new growth centers have emerged in Bahrain, Iran, and Saudi Arabia. The growth of fintech in the two regions reflects government support and market dynamics but has been modest, including in addressing gender and income-based gaps. Policy priorities include addressing the gaps in digital infrastructures, prudential regulations (mobile money, cryptocurrencies, outsourcing), consumer protection, cybersecurity, supervision including cross-sector and cross-border collaboration as well as AML/CFT.

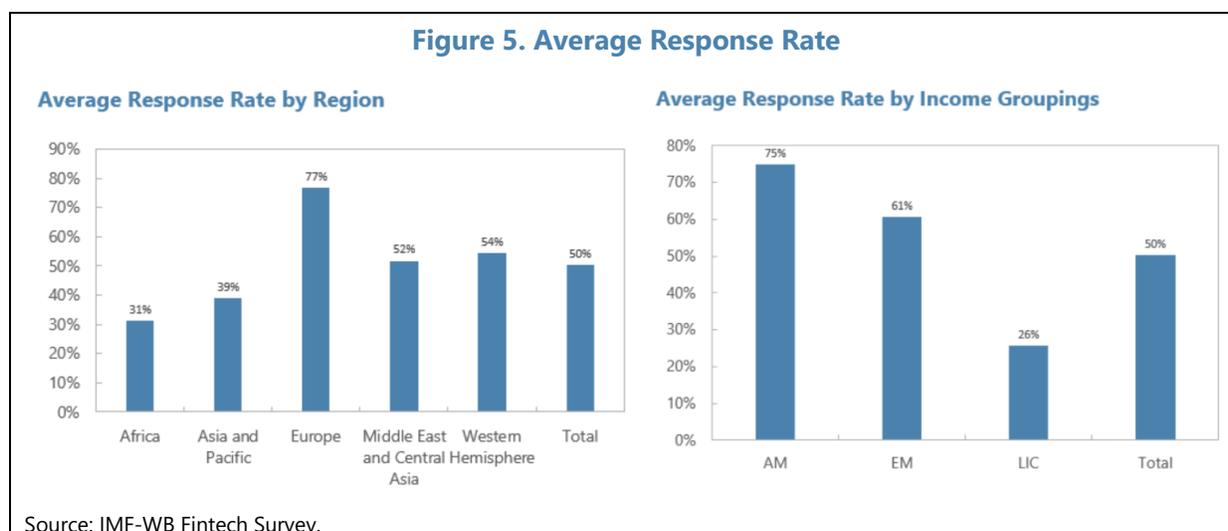
19. **In LAC region, fintech startups are growing, albeit from a low base and still behind Canada and the United States.** Adoption of mobile money services in LAC countries remains low, despite relatively high mobile and internet penetration rates. In terms of alternative financing, the United States accounts for 97 percent of the Western Hemisphere market. Most of the alternative financing in LAC is done through lending activities, rather than crowdfunding, and benefits equally consumers and businesses. To foster financial development and reduce transaction costs of cash, several central banks (e.g., Bahamas, the ECCU, and Uruguay) are exploring the possibility of issuing Central Bank Digital Currency (CBDC). The regulatory response varies widely across the region, depending on the size and structure of their respective financial and fintech markets, and the flexibility of the existing regulatory and legal frameworks. For example, while Mexico introduced new and comprehensive fintech-specific legislation, Brazil integrated fintech issues into the existing regulatory and legal framework. In Canada, the new oversight framework will seek to introduce measures associated with end-user funds safeguarding in the event of insolvency, operational standards, disclosures, dispute resolution, liability, registration, and personal information protection.

B. IMF-World Bank Global Fintech Survey⁶

20. **This paper is informed by the results of the GFS conducted with the membership.** This survey is structured along the 12 elements of the BFA. All IMF and World Bank member countries were invited to participate.⁷ The results are based on the 96 responses received. The response rate varies both regionally and by the income level, with fewer responses from less developed economies. The more advanced economies are better equipped to document a broader range of experiences and emerging practices. Consistent with this observation, the highest response rates come from European authorities. Elements relative to national fintech developments and strategies (I), the modalities of surveillance of fintech advances (V), the adaptation of regulatory frameworks and supervisory practices (VI), as well as the modernization of legal frameworks (VIII) received higher rates of response.

⁶ See Annex III for detailed responses. The Survey covers available information as of the end of 2018.

⁷ Relevant agencies were invited to participate, including Central Banks, Ministries of Finance, Financial Supervisory Authorities, Capital Markets Authorities, and Financial Intelligence Units.



21. **Countries are broadly embracing fintech and working on building up an enabling environment.** Two-thirds of all surveyed jurisdictions recognize the potential of fintech and either are working on or have a national strategy in place, which often focuses on improving consumer awareness and education, reviewing and amending the policy framework and improving institutional capacity to enable fintech investment, innovation, and adoption. Most jurisdictions, irrespective of income level, aim at achieving universal coverage with open and affordable access to core digital infrastructure services. Compared to other jurisdictions, lower- and middle-income countries (LICs and MIs) are significantly behind in terms of the usage of digital payments to governments, the ability to access information from government sources, and the adoption of faster and innovative payment services.

22. **Jurisdictions broadly expect fintech to increase competition in the financial sector.** Nearly all jurisdictions are expecting fintech to increase competition most in the area of payments, clearing, and settlement services, and to a lesser degree in credit and deposit taking services. Most jurisdictions already require fair, transparent and risk-based access criteria to key infrastructures relevant to fintech or are expected to within the next two years (e.g., payment systems, credit reporting, collateral registry, depositories, securities market clearing houses, central counterparties and KYC utilities).

23. **There are high expectations of the potential of fintech to expand financial inclusion for households (84 percent), MSMEs (73 percent) and reduce the urban-rural gap.** However, there is only a modest expectation on the potential of fintech to address the gender gap. Over 60 percent of jurisdictions reported having incorporated fintech in a National Financial Inclusion Strategy (NFIS), mostly in middle income countries. The focus of NFIS, centered around fostering adoption of fintech (41 percent), encouraging digitization of government processes (41 percent) and establishing a forum for public-private dialogue (33 percent). In addition, a majority of jurisdictions (80 percent) reported differentiated compliance requirements for fintech products and services targeted at the unbanked and underserved populations, the top five of which are: entry of nonbank

providers to offer payment services, creating a new category of basic bank accounts, simplified requirements for specific products targeted at the unbanked and underserved segments, eKYC, and agent-based models.

24. **Systematic monitoring of fintech developments is largely confined to the regulated perimeter.** Most jurisdictions (65 percent) conduct some form of fintech surveillance, although most (60 percent) have focused on their regulatory perimeter. The scope of surveillance covers a wide range of sectors and activities led by payment systems (51 percent), money transfer systems (42 percent), and lending activities (36 percent). The predominant focus on regulated entities suggests that the collected information might not be granular enough to capture the risks associated with new fintech developments. Furthermore, the survey suggests significant room for improving information sharing, as only about half of the responding countries have set up a consultation group with private stakeholders and less than a quarter of jurisdictions have established protocols for information sharing with foreign authorities.

25. **A majority of respondents (76 percent) have made some modifications to their regulatory approach to facilitate the development of fintech and supervisory capacity.** These were made mostly in response to a perception in most countries of rising risks, but also to achieve objectives other than financial stability (e.g., financial inclusion), and covered mostly mobile money/payment services and crypto-assets, and to a lesser extent P2P lending. Forty-five percent of respondents indicate that they are actively promoting the use of technology for regulatory compliance (regtech) purposes, and about half of the respondents have frameworks in place for registration and/or licensing of fintech service providers. Most respondents (87 percent) indicated that they have undertaken measures to increase their capacity to keep up with fintech developments.

26. **Most countries (63 percent) have observed increased fintech-related money laundering and terrorist financing (ML/TF) risks and have adapted their AML/CFT frameworks; although fewer countries have put in place risk assessment mechanisms.** Most countries appear to have taken or be taking legislative measures to mitigate fintech-related financial integrity risks. However, fewer countries have taken AML/CFT regulatory action with respect to crypto-assets. In addition, less than half of respondents (43 percent) have formal mechanisms to assess ML/TF risks associated with fintech (mostly in advanced economies), notwithstanding the stronger perception of risk. This variance could reflect some reputational bias against fintech products and services. It may also indicate that authorities' appreciation of risks is informed by sources other than formal risk assessment mechanisms.

27. **Nearly two-thirds of the countries responding to the survey identified gaps in which fintech issues are not adequately addressed by their existing legal frameworks.** This is particularly the case with the legal framework for financial sector related to crypto-assets, peer-to-peer lending, mobile money, robo-advisory services, algorithmic/automated trading, and lending activities using AI and ML. In the field of private law, most respondent countries recognize the need to amend their legal frameworks to address technological innovation in the financial sector but comparatively few have done so at this stage. Almost half of all respondents believe their existing

legal frameworks to be broadly adequate to address innovation in the areas of payments, electronic signatures, dematerialized securities and crypto-assets.

28. **The survey reveals wide-ranging views of members countries on CBDC.** About 20 percent of respondents indicated that they are exploring the possibility of issuing retail CBDC. Even then, work is in early stages; only four pilots were reported. The main reasons to consider CBDC are lowering costs, increasing efficiency of monetary policy implementation, countering competition from cryptocurrencies, ensuring contestability of the payment market, and offering a risk-free payment instrument to the public.

29. **About one-third of the respondents stated that they are experimenting with, or researching, DLT for use in financial market infrastructures (FMIs).** Potential benefits include heightened efficiency by improving end-to-end processing speed and enhancing network resilience through distributed data management. However, few respondents consider DLT as a viable alternative to replace outdated payment and settlement systems technology. Nevertheless, a few countries have carried out pilot projects, though they are still assessing results.

30. **There is considerable awareness of the need to establish modern data frameworks that support a robust financial system.** A majority of responding jurisdictions report having a robust data framework (73 percent) to protect the resilience of the financial system. This includes about two-thirds of jurisdictions outside Europe—where the GDPR has been in effect since 2018. However, half the survey respondents cite long-standing bank secrecy and personal privacy laws may only partially address the full breadth of implications from modern financial applications with respect to data ownership, privacy, integrity, protection, and ethical use. In those cases, modernization of data frameworks is becoming an increasingly salient policy challenge.

31. **While awareness of cybersecurity risks is high across the membership and most jurisdictions have frameworks in place to protect the resilience of the financial system, gaps in mapping cyber risks are common, particularly among emerging markets and developing economies (EMDE).** Cyber risks in fintech have been publicly identified and acknowledged as an emerging risk to the financial sector in a majority of jurisdictions, particularly among high income economies (79 percent). Evidence from the survey suggests that only a third of jurisdictions have analyzed IT interdependencies within the financial sector, or of concentration risks among big technology providers that could threaten infrastructure. While a high proportion (83 percent) of high-income respondents report some monitoring of cyber risks related to third-party service providers, only half of lower-income jurisdictions have specified minimum requirements.

32. **International cooperation efforts are already underway.** About half the respondents note that they have shared information about specific policy responses to fintech developments. Country authorities' have shared such information mostly with international financial institutions (IMF, WB, the Bank for International Settlements (BIS), etc.) or with other country authorities through international training and peer-learning programs. In terms of sharing with other country authorities, much of the cooperation within the African, Middle Eastern, and Western Hemisphere regions is intra-regional (83 percent intra-regional) whereas countries in Asia-Pacific and European

regions have noted more collaborations with countries outside the region (72 percent inter-regional).

33. The survey identifies key areas for greater international cooperation on fintech.

Respondents listed cybersecurity (84 percent), AML/CFT (68 percent), legal and regulatory frameworks (63 percent), payments and securities settlement systems (41 percent), cross-border payments (40 percent) and supervisory frameworks (39 percent) as the top priorities for greater international cooperation. Significantly, they also listed these as well as technological know-how areas in which they would seek the help of the IMF and World Bank in policy advice and capacity building.

34. The survey responses also suggest that there is a need to revise or develop international standards by SSBs.

Sixty-eight percent of responses indicated that there is a need for international standards for crypto-assets, especially among high income countries. Authorities also highlighted that the largest data gaps in cross-border activities relate to crypto-assets (38 percent), which also suggests the need for enhanced international coordination. The responses also suggested a need for international standards in mobile money payment services (34 percent) and P2P lending (29 percent).

35. Views on implications of fintech for the International Monetary System (IMS), including capital flows and asset holdings, are split.

Roughly half the members responding viewed the implications as significant while the others did not. Fintech is expected to matter most for international payments for goods and services, followed by remittances. Fewer authorities at this stage see significant implications for the organization of the Global Financial Safety Net (GFSN).

REVIEW OF SELECTED FINTECH TOPICS

36. Staff conducted an in-depth review of selected fintech topics. The selection of topics was based on a survey of country desks and staff judgment on the relative importance of specific fintech challenges confronting the membership. The review covered seven areas, including with input from external experts: sandboxes, aspects of crypto-assets, payments and settlement systems (large value and retail), data frameworks, selected legal issues, institutional arrangements, and CBDC. Given the breadth of fintech issues, including in the above selected areas, it is important to note that the review is not exhaustive; rather, the review focuses on the most important and cross-cutting issues at present while acknowledging that other aspects of fintech are also important. The results of the review are used to augment the findings from the previous section review of country experiences.

A. Regulatory Sandboxes

37. **A number of authorities have created regulatory sandboxes to enhance consumer protection, market integrity and stability while advancing responsible innovation.**⁸ Sandboxes are used in advanced economies (AEs) and EMDEs alike to allow testing of innovations. Strikingly, half of the sandboxes are located in high-income countries suggesting that market conditions and supervisory resources may be important considerations for their establishment. Some countries, like Indonesia and Poland, have created multiple sandboxes reflecting the different mandates of jurisdictional authorities. Multi-jurisdictional sandboxes are used to promote cross-border regulatory harmonization, foster exchange of information, and enable innovators to safely scale on a regional or global basis.⁹

38. **The objectives of a sandbox vary.** Most sandboxes adopt functional or activity-based regulatory approach rather than an institution-based approach. Commonly stated objectives are: to stimulate competition and innovation (e.g., the United Kingdom), to ensure the regulatory framework is fit-for-purpose (e.g., Singapore), to identify gaps in the availability of necessary market products (e.g., Malaysia),¹⁰ to promote financial inclusion (e.g., Bahrain and Indonesia), and to explore a particular theme. However, several sandboxes have a more general objective of supporting innovation in financial technologies.

39. **Sandboxes are providing valuable insights to policymakers but cannot be relied upon to be a comprehensive solution for harnessing innovation and regulating fintech.** There is a growing consensus that it is too early to determine their success. Sandboxes have not yet proven to automatically unlock financial innovation, and they are not substituted for a well-defined regulatory framework. In particular, sandboxes require careful consideration of and compatibility with the existing legal and regulatory framework and underlying market conditions. Early common experiences have raised the following aspects:

- a. **Clear results and impacts of regulatory sandboxes are yet to be distilled.** Sandboxes have only been in operation since 2016 and the benefits are still being extracted. More broadly, supervisory capacity and institutional constraints may make sandboxes challenging to operate and may potentially divert scarce resources from core supervisory activities, particularly in EMDEs. This raises the question of whether the benefits of a sandbox outweigh the cost and complexity of setting up and running a sandbox.

⁸ Generally, a sandbox is a framework set up by a financial sector regulator to allow small scale, live testing of innovations by private firms, both regulated and unregulated, in a controlled environment under the regulator's supervision. According to the GFS, there are about 33 sandboxes in the sample.

⁹ One such initiative is the Global Financial Innovation Network (GFIN) which includes 35 organizations and is spearheaded by the U.K.'s Financial Conduct Authority (FCA).

¹⁰ Bank Negara Sandbox allowed the piloting of an eKYC solution, which has resulted in proposed legal amendment to allow eKYC use for remittance transactions.

- b. **Coordination is essential since fintech innovations often fall within the scope of several authorities.** In some jurisdictions, various regulators have set up their own separate regulatory sandboxes,¹¹ which make effective coordination, information sharing, and the application of consistent overall approach more challenging.
 - c. **One of the most important roles of a sandbox has been the continuous dialogue between the market and the regulators.**¹² This provides more regulatory clarity for fintech investment and innovation. However, the close interaction between regulators and sandbox companies could generate perceptions of regulatory capture.
 - d. **Country experiences suggest that it is essential that the objectives and design be appropriately considered** such as eligibility and exit criteria and measurement of outcomes. Moreover, sandboxes often provide exemptions or waivers to reduce initial compliance costs and lower barriers to market entry. As such, safeguards are required to ensure that the effects of failure do not jeopardize regulatory objectives.
40. **Other types of “innovation facilitators,” such as fintech accelerators and innovation hubs, may exist as a “light-touch” alternative or complement to sandboxes.** Like sandboxes, they require a careful cost-benefit analysis.
- a. **Accelerators** (e.g., Singapore and the United Kingdom) enable partnership between innovators/fintech firms and authorities or established companies to “accelerate” growth, innovate on shared technologies, or develop use cases. They can also include funding support.
 - b. **Innovation hubs** (e.g., Australia) provide support, advice, guidance and—in some cases—physical space, to either regulated or unregulated firms to help them innovate; identify opportunities for growth; and navigate the regulatory, supervisory, policy or legal environment. Support can be direct or aimed at multiple recipients and does not have to include testing of products or services.

B. Crypto-Assets¹³

41. **Most jurisdictions agree that crypto-assets present risks to investors but are not yet a threat to financial stability.** While AML/CFT legislation has been applicable to certain crypto-asset

¹¹ See the 2017 report of the Consultative Group to Assist the Poor on Regulatory Sandboxes and Financial Inclusion.

¹² See for example the FCA Regulatory Sandbox Lessons Learned report: <https://www.fca.org.uk/publication/research/the-impact-and-effectiveness-of-innovate.pdf>

¹³ This section benefits from a review that was completed by Mr. Daniel Heller (MCM external expert) and covered the regulatory and supervisory approaches to crypto-assets in a sample of jurisdictions (Abu Dhabi Global Market, the Bahamas, Dubai, France, Hong Kong SAR (China), Japan, Malta, South Africa, Switzerland, Thailand, the United Kingdom, and the United States).

activities for some time, financial sector regulators have more recently started discussing other potential risks. In particular, there seems to be a broad view that crypto-assets may pose risks to investors and many regulators have issued public warnings about their potential risks. Securities regulators have increasingly become involved given the similarities of some types of crypto-assets with securities.

42. **A growing number of jurisdictions are classifying crypto-assets according to their characteristics, although these classifications vary across jurisdictions.**¹⁴ Some jurisdictions classify crypto-assets as securities, utility and payment tokens. Others simply distinguish between assets that qualify as securities according to their national legislation and other assets. Many recognize that the categories are not mutually exclusive, leaving room for hybrid assets. For these categories, some jurisdictions are developing special guidance, and others have opted to leave these assets outside the scope of regulation, at least temporarily. Only AML/CFT regulation seems to be applicable to entities and persons dealing in financial activities related to most types of crypto-assets.

43. **Many securities regulators have issued public guidelines identifying those types of assets that would be regulated as securities.** For those assets, regulators have warned that persons or entities dealing in, providing trading services and offering the assets publicly should comply with securities regulation and would need to consider whether they may require a license.

44. **Some regulators have created special regulatory frameworks for crypto-assets while most are taking a case-by-case approach.** Only a few jurisdictions have provided specific guidance as to the types of licenses that are required, and the parts of the regulatory framework that are triggered by different types of activities with crypto-assets. For most jurisdictions that have stated that securities legislation would apply to securities-like assets, the practicalities remain unclear and many questions unanswered (i.e., how and to what extent securities regulation will be applied to each of the aspects of crypto-assets issuance, offer, trading and intermediation is generally not discussed).

45. **Most jurisdictions are aware of the features of crypto-assets that make them potentially attractive to criminals and terrorists and have taken varied approaches in response.** Some jurisdictions have taken measures to regulate and supervise crypto-asset service providers while others are in the process of consulting with stakeholders or weighing their policy options. Among those jurisdictions that have recognized the importance of regulating and supervising crypto-asset activities, some apply their existing AML/CFT framework to crypto-asset service providers including crypto-exchanges and custodian wallet providers, requiring such providers to apply AML/CFT controls including customer due diligence (CDD) and suspicious transaction reporting. Other jurisdictions have chosen to prohibit certain activities that they consider to present higher risks. The varied approaches currently adopted should converge in the future, as

¹⁴ See the "Treatment of Crypto-assets in Macroeconomic Statistics" paper, <https://www.imf.org/external/bopage/bopindex.htm>

jurisdictions implement the recently introduced AML/CFT standard of the Financial Action Task Force (FATF) related to crypto-asset activities.

C. Payments and Settlement Systems

Large-Value Payments and Securities Settlement Systems¹⁵

46. **The potential of distributed computing technologies for large-value payments and securities settlement systems have been explored in several countries.** Many have included prototypes that use distributed ledger technology (DLT). Others involved projects that examined the potential benefits and risks. Based on an in-depth analysis of 14 projects—including 4 large-value payments systems, 6 securities settlement systems, and 4 cross-border payment arrangements—this section summarizes the main issues and experiences so far.

47. **Recent developments suggest a move towards real-time settlement, flatter structures, continuous operations, and global reach.** DLT experimentations in large-value payments and securities settlement systems have partly demonstrated their technical feasibility for this new environment. The projects examined issues associated with operational capacity, resiliency, liquidity savings, settlement finality, and privacy. DLT also holds the potential to facilitate the delivery-versus-payment of securities, payment-versus-payment of foreign exchange transactions, and cross-border payments.

48. **The analysis points to key issues that could require further attention.** Most experimentations have been completed under controlled and technology-focused environments. All projects concluded that DLT is, at least to some extent, feasible as the basis for a large value-payments system (LVPS) infrastructure, but there were some views warning against the immaturity of this technology. Very few projects have explicitly assessed risks against well-established international standards for large-value payments and securities settlement systems. Almost none of the projects involved a cost-benefit analysis and no conclusions can be made on whether DLT-based or improved legacy systems would be the more efficient alternative in future. Key issues of a practical and forward-looking nature include:

- a. **Market practices.** Major changes to the current payments, clearing, and settlements arrangements could have an impact on users, participants, and markets. The evolution towards new infrastructures would require stakeholder consultations and a review of

¹⁵ This section benefits from a review that was completed by Mr. Harry Leinonen (MCM external expert) and covered the following major DLT-based large-value interbank payment projects and experiments: Jasper I&II (Canada), Khokha (South Africa), Stella I (Euro-area and Japan), and Ubin I&II (Singapore). It covers also the following DLT-based undertakings in securities settlements: Deutsche Bunds-bank&Deutsche börse DLT-prototype Blockbaster (Germany), DDTC's DLT-research project (US), ASX replacement of CHES (Australia), Jasper III (Canada), Stella II (Euro-area and Japan), and Ubin III (Singapore). The following cross-border payment projects with DLT-focus are also analyzed: CLS netting ser-vice (US), SWIFT DLT-research (Belgium), research on cross-border payments and settlement (Canada, United Kingdom, and Singapore) and the Utility settlement coin (Switzerland and international).

rules, market conventions, transaction reconciliation for synchronized distributed ledgers, and impacts from continuous operations (based on 24/7/365).

- b. **Risk assessments.** Future experimentations or actual implementations would benefit from the explicit and rigorous analysis of potential risks against the CPSS/IOSCO Principles for Financial Market Infrastructures and the analytical framework for DLT in payment, clearing and settlement.
- c. **Cost-benefit analysis.** Investment and operational costs would need to be determined and recouped through a transparent pricing policy, which could be established through annual, monthly or transaction fees, or their combination.

Retail Payments

49. **Fintech innovations in retail payments now combine features of mobile money with APIs and Quick Response (QR) codes with underlying changes to payment systems.** This unbundles payment services from underlying accounts, makes them faster, more cost effective, available around the clock, and—as a result—more user friendly. Incumbents and new players alike are harnessing payments data to customize products and reach new customer segments.

50. **Mobile money has allowed for payment services that are delinked from a bank account** and can be offered by nonbanks, requiring new regulations regarding, inter alia, safeguarding customer funds and AML/CFT. APIs and the wide spread usage of mobile applications are now leading to different approaches by directly initiating payments using APIs from a third-party app against an existing bank and prepaid account held with a different provider. The regulatory implications of such third-party initiated payments differ from the case of mobile money, since the third-party does not handle customer funds and is merely initiating transactions. There is however need for new regulations that require banks to provide access to accounts and ensuring strong customer authentication (e.g., PSD2 in Europe, Mexico fintech law).

51. **Tokenization is a parallel trend to open APIs, championed by global payment card providers.** It allows for payment card credentials to be embedded in, for example, mobile phones to make payments. This enables third-party mobile applications to initiate payments against the underlying payment card account (e.g., Apple Pay, Samsung Pay).

52. **The trend of third-party apps getting access to bank accounts and payment card accounts has brought more attention to the issue of authenticating customers reliably.** This is leading to more direct application of digital ID services for payment services (e.g., Aadhar in India) and the creation of new digital ID services for payments (e.g., Bank ID in Sweden).

53. **“Faster Payments” enable real-time clearing and (guaranteed) settlement of payments across different payment service providers.** Several countries have implemented Faster Payments across both advanced economies and EMDEs (e.g., TIPS in Canada, the Euro Area, India, Malaysia, Mexico, Sweden, Thailand, United Kingdom). Such systems enable mobile money providers, banks

and third-party applications to provide real-time payment services to individuals, businesses and Governments on a 24 hours a day/7 days a week basis.

D. Data Frameworks¹⁶

54. **The continued proliferation of data as an input in commercial applications has underscored its value and implications for efficiency, stability, inclusion, and other public policy objectives.** Access to data affects the ability of new entrants to challenge incumbents and develop new products, with implications for innovation, competition and growth. Leveraging data allows for increased inclusion but could also lead to exclusion. Concentration of data and cyber risks raise potential challenges for financial stability. A wide range of issues also arise with regards privacy, control and appropriate usage of data.

55. **Data frameworks have often focused on consumer protection and are being modernized in many jurisdictions.** These frameworks usually recognize four key stakeholders: data subjects (who the data is about), the state (sovereigns which enact and enforce laws); controllers (who have an interest in using the data); and processors (who would collect, store, transfer, and analyze the data on behalf of the controllers). Frameworks typically include rules to protect data subjects related to the collection, access, and portability of their personal information as well as principles related to data quality and rectification, lawful processing, and purpose specification.

56. **Properly defining the rights and obligations of each stakeholder is crucial to building trust and meeting wider public interests** (e.g., in financial stability, avoiding financial exclusion, and preserving sovereignty). Broadly speaking, this would allow for a full consideration of policy trade-offs, adjusted for national considerations, raised by use of data, including with regard efficiency, stability, inclusion, and privacy among others. Many jurisdictions have or are in the process of preparing revisions to their data frameworks, with a view to ensuring that privacy and consumer protection are adequately addressed throughout the economy, including in finance. International implications of national frameworks would merit consideration and discussion.

57. **Recent data breaches have drawn renewed attention to cybersecurity risks facing the financial sector.** Cyber incidents at credit bureaus, commercial and central banks, companies as well as infrastructures, have caused large financial losses and compromised personal information for millions of data subjects. Enabling the robust growth of fintech applications will require building public trust in the ability of data controllers and processors to maintain adequate security standards when handling their personal information to prevent data loss, data corruption, unauthorized access,

¹⁶ This section benefits from a review that was completed by Messrs. Vijay Chugh and Douglas Elliott (MCM external experts) and covered practices in a sample of countries (Brazil, China, European Union, India, Russia, Singapore, South Africa, United Kingdom, and USA) in establishing policies, laws, and regulatory frameworks governing the collection, storage, transmission and use of data in the financial industry. The review covered, in particular (a) policy frameworks for data governance in finance, (b) supervision and oversight, (c) data security and protection, and (d) data localization.

and misuse. This has implications for the oversight of these entities including their IT systems, risk management practices, and cybersecurity policies.

58. **There is substantial interest across the membership in analyzing the need for modernization of national data frameworks with several taking steps.** In the European Union, the 2018 General Data Protection Regulation (GDPR) sets up a framework specifying the rights of individuals who are the subject of data—including rights on erasure, informed consent and portability among others—and the obligations of the companies that collect, store, process and analyze it. The GDPR allows for sizable penalties on companies for non-compliance and has significant extra-territorial reach. In the United States, California is considering legislation that would require data controllers to pay data subjects for the use of their data while the Congress is discussing the adoption of a privacy law at Federal level. India issued a Personal Data Protection Bill in 2018 that clarified some rights and obligations of data subjects and fiduciaries. In Brazil, new legislation was approved granting data subjects a series of rights, including to data access and portability. The Asia-Pacific Economic Cooperation (APEC) is working towards the adoption of a cross-border privacy rules mechanism that provides for harmonization within the APEC economies while also compatible with the EU binding corporate rules and finally the European Union and the United States are working towards the refining of the Privacy Shield for its adequacy to GDPR.

59. **Some countries have required storage of sensitive data within their borders, on national security and sovereignty grounds, with data localization an increasing issue.** China, India, Russia, and Switzerland have imposed relatively strict provisions limiting the cross-border transfer of sensitive information. In a few jurisdictions, localization requirements are narrowly limited to particular sectors (such as health or financial records). Some recent trade agreements, such as the United States-Mexico-Canada Trade Agreement, specifically prevent (subject to certain exceptions) their signatories from adopting data localization measures.

E. Legal Issues

60. **Recent initiatives by authorities reflect the need for the law to grow with and adapt to market developments.** A legal framework that is consistent, comprehensive, and predictable is key to fintech innovation and adoption. As such, there are important aspects to be considered regarding the legal framework for financial regulation related to, for example, crypto-assets, P2P lending, mobile money, access to payment infrastructures for nonbanks, robo-advisory services, algorithmic/automated trading, and lending activities using AI and ML. Amendments to existing financial sector law may thus be called for. Indeed, there are many areas where gaps remain (e.g., digital signatures and digital records of ownership) in the legal framework and where further progress will be needed. Key questions have arisen as to the private law recognition and treatment of certain aspects of fintech activities:

- a. **The legal status of novel concepts introduced by technological change** (e.g., crypto-asset, stablecoins or other balances recorded on DLT, automated processes such as “smart contracts,” and claims on nonbank entities such as telecom companies used for mobile-initiated value-transfer services).

- b. **The legal basis for activities relating to technological change** (e.g., the holding and disposition of crypto-assets or balances recorded on DLT, the treatment of crypto-asset balances in a custody service provider's bankruptcy, transactions relying on escrow-like arrangements).
- c. **The allocation of risk of loss under applicable law** (e.g., treatment of operational vulnerabilities in the underlying technology, fraud, theft, erroneous transfers, and the law of mistake).

61. **Against this background, national authorities are taking different approaches to address these challenges.** Three types of responses are generally taking shape:

- a. Many jurisdictions are taking early active steps to consider whether financial sector private law is sufficiently certain and flexible to apply in the modern digital context. Some may not legislate if they conclude that existing legal frameworks provide sufficient clarity and certainty.
- b. Some national authorities (e.g., France, Luxembourg, and Switzerland), have undertaken law reform initiatives, in consultation with private sector stakeholders and experts, to enact or announce amendments to ensure legal principles attract and nurture fintech industries in their countries. These initiatives aim to, among other things, legally recognize the use of DLT in the recording and transfer of certain securities, although different legal approaches are used to adapt existing law.
- c. Other authorities (e.g., Japan, Hong Kong SAR (China), and South Africa), have also actively engaged with the private sector, including launching proofs of concept (PoC), to rigorously explore legal issues arising from fintech developments. In contrast to enacting legislation, they have published reports and papers seeking to educate the market as to common legal issues and legal risks that need to be managed.

62. **These developments underscore a fundamentally new phenomenon in today's fintech innovation.** They illustrate a deepening interest in law reform approaches that keep up with the rapid development of new technology. Financial sector private law, in particular payment and securities transfer law requires a high degree of legal certainty to be effective. However, in contrast to past private law modernization efforts (e.g., in response to greater computing power and high-speed telecommunications), a challenge in today's initiatives is the on-going need to better understand a still-evolving future in real time. These initiatives illustrate that key to crafting legal rules that provide legal clarity—without inadvertently introducing legal rigidity—is effective and on-going dialogue between national authorities and a diversity of stakeholders (e.g., legal professionals, technology companies, financial sector users of fintech, and other financial sector stakeholders impacted by such innovations and law reform under consideration).

F. Institutional Arrangements¹⁷

63. **The fintech institutional framework mostly mirrors the established responsibilities for financial sector policy, supervision, and development.** The setup of new fintech agencies is rare. Instead, responsibilities are allocated to existing agencies. The ministries of finance typically have a high-level policy coordination and formulation role, whereas other ministries may be less involved. Financial supervisory authorities have an active, multifaceted role in fintech. Law enforcement agencies engage with supervisory authorities for fintech-related financial crimes, including ML and TF.

64. **Countries differ in the emphasis placed on promoting the development of fintech as opposed to regulating it.** This tends to reflect the degree of emphasis put on development and competition. Some countries see fintech as a means of accelerating development and spurring financial inclusion. Others may support fintech innovation that can either challenge incumbents' business models or provide technology enabling financial institutions to digitalize their services. This difference in emphasis may impact institutional structures, including the allocation of staff resources.

65. **The allocation of supervisory responsibilities for fintech tends to follow the framework adopted for financial sector supervision.** Fintech supervision is organized differently depending on the country's institutional structure for supervision reflecting either separate prudential and conduct authorities; separate authorities for each part of the financial sector (e.g., banking, insurance, and capital markets); or one integrated authority. Some supervisory authorities are also responsible for supporting innovation. The conflicts of interest arising from the dual roles are managed in various manners, including through legally established prioritization of objectives or establishment of separate internal reporting lines for supervision and development.

66. **Supervisory authorities have normally organized their internal fintech functions in a new, dedicated core group and a network of experts drawn from elsewhere in the organization.** The core groups often have a formal mandate and their main functions include a combination of the following: (a) acting as point of contact for fintech firms; (b) running a sandbox; (c) coordinating internally and with other authorities; (d) coordinating internationally; (e) monitoring fintech developments; (f) providing internal training; (g) considering the internal use cases for SupTech; and (h) in few cases, supervising existing fintech firms. Some authorities hire professionals with expertise in fintech to strengthen their capacity.

67. **Domestic and international coordination takes various forms.** Domestic coordination typically relies on the existing senior level structures; when fintech issues arise, they are referred to a sub-committee or result in the creation of a taskforce to develop proposals. International coordination arrangements are emerging for fintech. These range from bilateral agreements and initiatives (e.g., fintech Memoranda of Understanding) to multilateral ones coordinated by the SSBs,

¹⁷ This section benefits from a review that was completed by Charles Taylor (MCM external expert) and covered fintech institutional arrangements in eight jurisdictions: France, Hong Kong SAR (China), Japan, Kenya, Malta, the United Arab Emirates, the United Kingdom, and the United States.

as well as by informal networks such as the Global Financial Innovation Network (GFIN), with varying degree of involvement by national authorities.

G. Central Bank Digital Currency¹⁸

68. **Several central banks, in both advanced economies and emerging and developing countries, are exploring CBDC.**¹⁹ Several central banks have published research on the potential implications of CBDC on financial stability, the structure of the banking sector, entry of nonbank financial institutions, and monetary policy transmission. Implications are shown to vary with the design of CBDC. A few central banks (e.g., Uruguay) have issued CBDC as limited-scale pilots and others are on the verge of doing so (the Bahamas, China, Eastern Caribbean Currency Union, Sweden and Ukraine).

69. **Central banks are considering the issuance of CBDC for a variety of reasons.** In some advanced economies, the falling use of cash is motivating the study of CBDC as an alternative, robust, and convenient payment method, as well as the potential to have negative interest rates. The CBDC could also facilitate contestability of the payment market and reduce the chances of a few large providers dominating the system. In developing countries, the focus is more on improving operational and cost efficiency. In some countries with underdeveloped financial systems and many unbanked citizens, the CBDC is seen as means to improve financial inclusion and support digitalization. Other reasons for considering CBDC include enhancing financial integrity. A non-anonymous CBDC could facilitate the monitoring of transactions.

70. **Most central banks are considering non-anonymous CBDC.** Almost all seem to be favoring a hybrid approach that allows the relevant authorities to trace transactions. Several are focusing research on a two-pronged approach with anonymous tokens for small holdings/transactions, and traceable currency for large ones.

71. **Some central banks are supporting private sector digital fiat currency (DFC) in regulatory sandboxes** (Barbados and Philippines). The DFC are digital tokens backed by sovereign currency held in trust at regulated financial institutions. These are like tradeable versions of stored value facilities, such as AliPay and MPesa, that provide private e-money against funds received and placed in custodian accounts. However, unlike DFC tokens, stored value facilities limit transactions to users in the same network.

72. **The overall case for CBDC adoption depends on country specific circumstances.** From the perspective of end user needs, alternative forms of money and payments may preclude the need for CBDC. From a central bank perspective, the case for CBDC is likely to differ from country to country and on the effectiveness of regulation. CBDC may reduce the costs associated with the use

¹⁸ This section draws on the findings of the 2018 Staff Discussion Note: "Casting Light on Central Bank Digital Currency."

¹⁹ CBDC is a digital form of existing fiat money, issued by the central bank and intended as legal tender. It would potentially be available for all types of payments and could be implemented with a variety of technologies.

of cash and may improve financial inclusion in cases of unsuccessful public or private sector solutions and policy efforts. It could also help central banks bolster the security of, and trust in, the payment system and protect consumers where regulation does not adequately contain private monopolies.

EMERGING TRENDS AND POLICY ISSUES

73. **Drawing on the review of experiences in the paper, staff have flagged select emerging issues for further consideration by the membership**, including on financial inclusion; regulatory, legal, and data frameworks; digital currencies; and the international dimension.

74. **Financial inclusion is one of the areas where fintech solutions have been identified as potentially transformative because they address several financial frictions.** These include: (a) cost barriers for delivering financial services—especially severe in remote rural locations and among marginalized groups such as women, the urban poor and migrants; (b) information asymmetries between service providers and consumers, especially among the unbanked who lack information needed to adequately assess risk; (c) lack of verifiable ID and difficulty in meeting CDD requirements; and (d) lack of suitable financial products for lower income segments. Fintech approaches can bring in more efficient and inclusive business models and expand the pool of suppliers of financial services (Box 2).

Box 2. Lending Platforms and Financial Inclusion

Mobile or online credit, P2P lending and crowdfunding are examples of inclusive fintech targeting individuals. These approaches seek to address the issue faced by excluded segments of lack of credit histories or collateral by using new data sources and decision tools (e.g., data gleaned from apps on users' mobile phones or from e-commerce transactions). Many of these platforms have developed outside the financial sector, including from technology companies and new investor groups.

Various types of fintech firms providing access to MSMEs are emerging, addressing the obstacles that traditionally hamper access including: a lack of credit histories and accounting data on (informal) MSMEs; financial or business capability; access to markets (e-commerce, supply chain, market data/pricing); and traditional collateral. Fintech companies can offer specialized cloud-based business services to MSMEs that reduces costs. Moreover, the collected data could serve as a basis for cross-selling financial products. Fintech platforms can also provide a gateway to markets and supply chains. Tapping into traditional capital markets to raise longer-term finance is usually not a realistic option for MSMEs, so development of alternative retail-based market-place lending (crowdfunding) platforms could provide viable alternatives. Moreover, there are platform-based models for reverse factoring which create a market place for receivables which expands access and improves efficiencies. For very small firms or newly established enterprises lacking a track record, donation and reward crowdfunding may be a valuable and unique source of early capital.^{1,2}

¹ <https://www.popsoci.com/women-crowdfunding-success-kickstarter-tech#page-2>

² <https://www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/publications/3rd-asia-pacific-region-alternative-finance-industry-report/#.XIAKuDM3k2w>

75. **The widespread uptake of mobile and smart phones and applications suggests that basic physical infrastructure exists for increasing financial access through fintech solutions, but risks need to be managed.** Mobile network coverage and internet access in developing economies have expanded rapidly in recent years, serving even remote geographical locations. However, there is a need for better awareness of the new risks to consumers posed by digital finance, particularly for the previously underserved populations (Box 3) and strengthen consumer protection measures. These risks arise from the high speed of transactions, remote interactions, automated decision-making, extensive use of data, limited written records of accounts and transactions, and the involvement of unregulated or nonfinancial entities and intermediaries.

Box 3. Fintech’s Opportunities Come with New Risks to Financial Inclusion

The opportunities created by fintech come with important risks to financial inclusion:

Exclusion—unequal access to technology limits the fintech potential and increases the digital divide. In particular, lack of basic infrastructure; access to smartphones, which permit more sophisticated analytics and improved customer experiences; affordable data-plans to access the Internet and emerging fintech services; and financial literacy, disproportionately disadvantages women and the poor.¹

Discrimination—while the promise of many “arms-length” analytical decision-making tools was to remove bias, experiences to date suggest that the record is at best mixed. These tools often reflect the biases in the underlying data, the people designing them, existing preferences (e.g., discrimination against minority borrowers).²

Consumer protection—include risks related to transparency and electronic disclosure; product suitability and over-indebtedness; agent liability; data privacy; effective recourse mechanisms; safety of funds; cybersecurity, and digital illiteracy.

Data-protection related risks. The potential for these risks (such as the compromise of privacy, identity theft and fraud) to cause harm is greater where consumers have low levels of financial and digital capability and lack of alternatives, as is the case in many EMDEs.

¹ Data from Gallup shows in countries such as Bangladesh, Ethiopia, and India, men are twice as likely as women to have access to mobile phones and the internet. See “Access to Mobile Phones and the Internet Around the World” https://globalfindex.worldbank.org/sites/globalfindex/files/chapters/2017%20Index%20full%20report_spotlight.pdf

² <http://newsroom.haas.berkeley.edu/minority-homebuyers-face-widespread-statistical-lending-discrimination-study-finds/>

76. **Financial technology has always been used extensively in capital markets, however its applications have expanded in the last five years and have given rise to several policy challenges.** There are three main areas in which fintech is bringing material changes that can impact capital markets development:

- a. **Alternative financing** applications (e.g., crowdfunding and ICOs) are increasingly used to expand financing options for MSMEs and start-ups. However, they have raised important policy questions with regards to disclosure requirements, the applicability of securities regulation, and investor protection.
- b. **Product distribution platforms**, in particular in connection with fund distribution, enable investors, financial advisers or wealth managers to select from a broader range of

third-party products potentially impacting capital market development. They can also reduce product costs and allow for better informed decision making. Most platforms for the distribution of funds have been developed in advanced economies but are making inroads in larger emerging markets (e.g., India, Korea, and Mexico).

- c. **Investment advice** (robo-advisers) offer automated portfolio construction and management services (mostly on low-cost index funds and exchange traded funds). This reduces costs and makes portfolio management services available to smaller investors. These applications mostly exist in many AEs (mainly the United States) and larger EMEs (e.g., Brazil, China, and India), but interest is rising in lower income countries (e.g., Kenya).

77. **The adoption of technology in the insurance sector has accelerated in recent years (Box 4).** It can fundamentally impact business processes along the value chain such as product development, marketing and distribution, underwriting, and policy and claims management. The availability of large datasets and AI/ML can facilitate more accurate risk classification and pricing, thus improving product development and underwriting, and improve customer satisfaction through speedy, accurate and personalized service.

Box 4. Insurtech—Disruptive Technologies in the Insurance Industry

Use of telematics data for motor insurance has increased, as well as health and life insurance utilizing data from wearable devices. Technical developments for connectivity in vehicles, increasing use of more sophisticated smartphones and low cost of networking have enabled the market to grow rapidly especially in Canada, Italy, Japan, the United Kingdom, and the United States. As for health and life insurance utilizing data from wearable devices, those products have been offered for some time in South Africa and United Kingdom and are now available in developing countries such as India.

Although insurtech has significant potential to benefit both insurance companies and policyholders, its transformative power also holds challenges. Emerging challenges include excessive personalisation and granularity of data which may erode the solidarity principle, and vulnerability to increased amount and types of personal data to breaches of privacy resulting from cyberattacks. There is also a risk of AI perpetuating existing biases. Regulators will need to carefully judge how much individualization of insurance and what kind of data use can be accepted in consideration of an inherent social role of insurance and policyholders' privacy.

78. **Fintech innovations offer significant opportunities for Islamic finance to contribute to financial development and inclusion:**

- a. The Global Findex Database shows that 40 out of the 56 member countries of Organization of Islamic Conference (OIC) have formal account penetration rates that were less than the world average of 50 percent. Expanding financial services that are

Islamic finance compliant through fintech could lessen this gap.²⁰ While about 6 percent of the unbanked adults around the world reported religious reasons for not having an account,²¹ these concerns weren't significant in many countries with majority Muslim population and well-developed Islamic financial sectors.²²

- b. **The modus operandi of some fintech models are highly congruent with Islamic finance principles, with the latter focusing on asset-backed transactions and risk sharing.** Fintech can make screening transactions quicker and easier, improve traceability and security, expand Islamic finance penetration and strengthen governance (Box 5). Recent industry reports indicate that about 70 percent of current Islamic fintech companies are focused on facilitating business and consumer financing through equity crowdfunding ECF and P2P lending.²³ The potential of DLT to reduce asymmetric information, fraud, and distrust between counterparties could enable better efficiencies and transparency in areas such as trade finance and Islamic social finance institutions.²⁴

Box 5. Fintech in Islamic Finance

Fintech applications for Islamic finance cover broad areas. Innovations include: P2P lending and investment platforms that provide Islamic financial services to retail investors and MSMEs. Islamic ECFs are offering opportunities for financiers and investors who are looking for products and services compliant with the Islamic principles. Advances in fintech have also created a conducive environment to scale up the offering of these products, and to deepen the social and ethical impacts of financial services.

The use of DLT holds promise in enabling secured trading of sukus and establishing a new class of assets that promotes and deepens Islamic capital markets. In 2018, blockchain was used in the resale and settlement of Islamic sukuk by a private Islamic bank in the United Arab Emirates that was worth US\$500 million and will mature in September 2023. Another initiative leveraged blockchain technology to enable retail investors to invest in the sukuk, which will then use the proceeds to provide Islamic microfinance under a new initiative in Indonesia.

79. **Many jurisdictions have set up a framework to monitor the emerging risks, but additional enhancements are desirable.** New fintech services and players have emerged and incumbents are adopting fintech applications quickly, while the entry of large technology companies could have a major impact on the financial landscape. These developments point to the need to

²⁰ Several OIC member states (e.g., Bahrain, Indonesia, Kazakhstan, Malaysia, Qatar, Saudi Arabia, and the UAE) have taken initiatives in supporting digital economy including fintech. In addition, the Islamic Development Bank (IsDB) has launched a fintech challenge to support Islamic fintech startups, and the United Kingdom regulators have been supportive of its domestic Islamic fintech and startup ecosystem.

²¹ Abayomi A. Alawode (2019), *Islamic Finance, Inclusion and Sustainability*

²² <https://www.reuters.com/article/idUSWAOAPHREBLWW18A3>

²³ <https://www.dinarstandard.com/wp-content/uploads/2018/12/Islamic-Fintech-Report-2018.pdf>

²⁴ Hazik Mohamed and Hassnian Ali (2019), *Blockchain, Fintech and Islamic Finance*, Boston Walter de Gruyter Inc., Boston/Berlin

strengthen monitoring beyond the present regulatory perimeter, and further enhance information sharing and coordination domestically and internationally.

80. **The initial regulatory response has largely been proportional, but countries face multiple challenges in implementing an effective and balanced approach.**²⁵ Key emerging issues include:

- a. **Continued limited experience in regulating fintech activities and products.** Newer areas of regulation with few country experiences include the regulation of crypto-assets and related services, P2P lending, and algorithmic trading. Experience with the regulation of insurtech, robo-advisory, and lending activities using artificial intelligence (AI) is even more limited.
- b. **Resource constraints are challenging the efforts to provide adequate regulatory response and build up capacity.** Lower-income countries are particularly vulnerable, as they might be forced to choose between risking financial stability or missing out on fintech opportunities.²⁶
- c. **There is broad concern about the potential for cross-border regulatory arbitrage.** Regulators have emphasized the need for international standards for the regulation and supervision of fintech activities and providers, but these remain at an early stage, including for more mature industries such as mobile money operators.²⁷
- d. **Increasing dependence on technology heightens the importance of addressing cyber risk.** Operational (including third-party risk) and cyber risk is identified as one of the most important risks types. However, the apparent large gap between high- and lower-income countries in terms of addressing cyber risk, may indicate the need for capacity building to support the development of stronger frameworks.

81. **Countries are taking different approaches in adapting their legal frameworks to business models using new technologies, and trends are emerging.** These include, in particular:

- a. **Countries are taking a cautious approach to the reform of private (i.e., civil or commercial) law.** A few countries have been more forward in their approach, but most will generally rely on the inherent flexibility in private law concepts. Modifications will be made only when the specific features of new technologies and products are not well-suited to existing law (e.g., when is a payment on a distributed ledger using consensus-based validation processes “final”?). This approach recognizes that placing undue

²⁵ For example, mobile money supervision has become in many countries stricter with the increase in its systemic importance.

²⁶ The low response rate of low-income countries to the fintech survey could be indicative of the difficulties facing these countries.

²⁷ Progress is being made to safeguard the integrity of financial sectors, with the development by FATF of new requirements on countries to monitor virtual asset service providers (such as crypto exchangers and others) for AML/CFT purposes.

emphasis on a specific technology may quickly become outdated or predict a future that will never be.

- b. **There are close linkages between public and private law.** The rapidly-emerging focus of policymakers on legal frameworks governing the control, use, and handling of personal data is a case in point. Developing these frameworks inevitably involves important public policy issues requiring a regulatory response, but these frameworks are fundamentally based on the delineation of the legal rights and obligations of private firms and their individual customers.
- c. **Legal solutions are also being driven by the private sector although there are limits on the clarity and certainty this approach can provide.** Lawyers representing private clients are addressing the specific features of new technologies every day and are employing contractual solutions to novel legal problems (e.g., the development of standardized documentation for smart derivatives contracts). Private-sector industry groups have developed common approaches to emerging legal challenges confronting market participants. Private-sector systems and operating rules may play an important role in the development of legal frameworks governing fintech. While such rules can help ensure that the legal foundations of fintech applications are sound, they are not a complete substitute for a regulatory response.

82. **How data shapes fintech’s implications for economic efficiency, equity, financial stability and privacy, will depend on the rights and obligations accorded to different agents.**

Effective data frameworks reflect a balancing of different policy goals including:

- a. **Developing a clear framework for the acquisition, processing, and storage of individual data, that also manages risks related to consumer protection, privacy, cybersecurity, and financial stability.** While the balance will vary according to national priorities, clarifying rights, obligations, and implicit benefits received by individuals, would help hence complete markets.
- b. **Facilitating individuals control over their own data has implications for contestability that could be significant.** Giving individuals greater control in sharing their own data with different services providers—including in the case of platform models—could increase contestability in these markets that tend to be concentrated with implications for efficiency and stability. However, other policy goals (e.g., consumer protection, privacy, cybersecurity, and financial integrity) should also be weighed alongside such considerations.

- c. **A global dialogue is needed to help support effective data frameworks.**²⁸ How jurisdictions treat data governance and protection is increasingly relevant for global financial services. Data localization has emerged as an early focal point of tensions, with some large technology incumbents and some jurisdictions arguing that such laws could potentially constitute non-tariff barriers, while others argue that national security interests and the ability to ensure adequate oversight require direct control over data within national borders. Incompatibility of data frameworks and the compliance costs may engender some market fragmentation
- d. **Need to ensure appropriate incentives to manage cyber risk.** Regulation and supervision must ensure that financial firms and their service providers adequately manage cybersecurity risks. Clarity is needed on responsibilities for losses to ensure adequate investment in security. Since data breaches can damage public trust in the broader financial system—with implications for growth and financial stability— incentives based on reputation effects are unlikely to lead to adequate investment in cybersecurity by individual institutions. Major challenges for supervisors are developing monitoring and surveillance systems, re-designing supervisory and enforcement tools, and building expertise, including for oversight of third-party technology service providers, which are increasingly involved in the handling of data on behalf of financial firms.

83. **As interest in issuing CBDC rises, a closer look is warranted at its impact on the stability of monetary and financial systems.** This includes, in particular, the impact of the CBDC on: the structure of the banking system; the effectiveness of the monetary transmission channels; and the potential risk of financial disintermediation, particularly in times of systemic financial stress. In addition, the cross-border implications of CBDC raise new questions that merit investigation (including for example the impact of CBDC issued in a reserve currency on currencies and market functioning in smaller jurisdictions). Finally, central banks should be aware of the potential ML/FT risks that could arise from issuing CBDC.

84. **Digital currencies currently pose little challenge to fiat currencies at present as they are too volatile, risky, and not yet scalable.** However, technological advancements may overcome such impediments and unlock potential benefits—including to cross-border payments—and, if their use grows substantially and their links to the core financial system increase they may pose a threat to global financial stability by raising exposure to cyber-security risks. Finally, if the usage of crypto-assets as money becomes more widespread, monetary policy effectiveness could be undermined.

85. **Fintech has made it possible for nonbanks to provide payment services,** often bypassing regulated financial institutions. Since ultimate settlement still take place in the traditional banking system, there have been only minor impacts on monetary policy transmission through the bank-lending channel. In some jurisdictions, these new services have become the dominant payment

²⁸ Initiatives such as the principles drafted by the World Economic Forum (“The Appropriate Use of Customer Data in Financial Services”) focus on aspects such as control, security, portability etc., and suggest how financial institutions and fintechs could approach the use of customer data keeping fairness, transparency and appropriateness in mind.

service providers, raising concerns about the contestability of the payment market, its costs, and the stability of the payments system. However, regulatory barriers in some jurisdictions inhibit nonbank entities from offering payment services (e.g., by not allowing them to offer services or impeding access to payment and settlement infrastructures). Moreover, in many jurisdictions, enhancements to national payments systems have enabled incumbents and nonbank entities alike to adopt new fintech models in payment services.

86. **The DLT that underlies crypto-assets facilitates the trading of crypto-assets on decentralized trading platforms, with potential implications for financial stability.** In such markets, liquidity is denominated in those crypto-assets, over which existing central banks and financial market infrastructures would not have any control or backstopping capacity. In the event of a liquidity crisis on the exchange, there may be no official institution to supply emergency liquidity, with important financial stability implications if such exchanges grow to become systemically important.

87. **Fintech could potentially lead to new forms of cross-border financial flows.** New instruments are arising for transactions in capital markets, including across borders, such as tokenized securities, and blockchain bonds, and it is possible that crowd-funding may take place cross-border. These developments could gradually impact the role of traditional centralized intermediaries with implications for the global financial systems:

- a. **Fintech solutions could change the nature of cross-border capital flows.** Fintech could reduce information asymmetries, enabled by more granular information on borrowers and better matching and pooling of savings and investment, leading to a more diversified and decentralized model of international finance.
- b. **Managing capital flows and enforcing macroprudential measures could become more challenging.** Peer-to-peer transactions may prove difficult to monitor or limit. An increase in channels for cross-border capital flows could raise regulatory arbitrage and amplify the impact of shocks such as those arising from liquidity, spillovers and contagion risks.
- c. **The issuance and use of digital currencies—if they become wide-spread in the future—may change the pattern of trade and financial network effects which are key factors that help support the reserve currency status.** Depending on their liquidity and credibility, these new currencies and more decentralized monetary transactions may affect the need for buffers of liquid assets—i.e., reserves—or support the emergence of new reserve currencies, with implications for reserve holdings, the choice of exchange rate regimes and the size and configuration of the global financial safety net (GFSN).
- d. **Close international cooperation is needed to balance the efficiency and risk effects of new forms of global financial flows** and avoid unnecessary frictions in international transactions. International collaboration can be used, for example, to improve

interactions between private fintech firms and domestic regulators, such as facilitating the entry of fintech firms into other jurisdictions' regulatory sandboxes and hence benefiting both private firms and regulatory authorities.

88. **The configuration and size of the GFSN will need to be regularly reviewed**, in light of the uncertainty as to how much fintech would change the volume or composition of capital flows and how volatility may evolve, depending on the degree of decentralization at which global finance settles, as well as the potential emergence of new reserve assets. The need for new mechanisms for data and information sharing and regulatory cooperation is likely to increase.

CONCLUSIONS

89. **Fintech is making inroads globally and changing the way in which financial transactions are conducted.** Many advances have taken place in mobile payments with major positive impact on financial inclusion. Technology companies are increasingly offering or considering providing financial services alongside commercial products and services and challenging incumbents, albeit with significant variation across countries. Traditional financial institutions are also adapting and increasing their digital footprint, often in partnership with smaller technology companies, or setting up consortia among incumbents. Adapting legal and regulatory frameworks to fintech is progressing; although novel questions are emerging in the field of private law. Supervisory agencies are themselves increasingly exploring fintech applications. Finally, the fintech impact on monetary systems and financial stability is limited at present.

90. **Notwithstanding the progress there remains significant uncertainty and several key issues that need to be addressed.** While fintech applications and companies are having an impact on incumbent financial institutions (e.g., reduced revenues from payments services), they do not seem to have reached disruptive critical mass and incumbents are adapting their business models and are absorbing fintech advances. It is not yet clear also how competition (or lack of it) is shaping the development of the fintech sector, though large technology firms are expected to play an increasingly greater role in the provision of financial services. Furthermore, rapidly evolving new technologies could quickly and unexpectedly reshape the digital and fintech. Notwithstanding these longer-term concerns, there are urgent issues needing attention, including:

- a. **Balancing competing policy priorities.** The regulators and public authorities are broadly convinced of the need to harness the potential of fintech to address many long-standing barriers to financial sector deepening, inclusion and development. There is broad desire to sustain and strengthen financial stability and integrity, while avoiding arbitrage opportunities (e.g. differing regulatory requirements or tax treatment for same activity based on type of institution providing the service) and promoting competition, entrepreneurship and developing the digital economy ecosystem. These policy priorities could at times be seemingly at odds and balancing them is an issue with which several countries are grappling, requiring broader national dialogue.

- b. **Addressing foundational infrastructure constraints.** Public authorities, particularly in EMDEs recognize the need to address these constraints to fully harness the potential of fintech. These include gaps in the legal framework restricting payment services only for banking institutions; physical infrastructure gaps like limited penetration of broadband and mobile telephony; financial infrastructure gaps like gaps in credit reporting and payment systems; and gaps in overall levels of digitization of government systems like identity, tax records and land records.
- c. **Developing legal and regulatory approaches to the products, processes and services.** The development of international standards or good practices by SSBs will help many countries adapt their legal and regulatory frameworks to the new entrants that are increasingly becoming part of the intermediation and financial service delivery chain, and to ensuring their entry and exit from the financial system in a manner that would not disrupt the availability of services or broader financial stability.
- d. **Impact on monetary systems and financial stability is limited at present but could change quickly.** Many central banks are actively examining the possibility of issuing CBDCs. However, several policy and technical hurdles need to be addressed, and a clear case for issuing CBDC has not yet emerged. Digital-currencies remain volatile and unlikely to be considered, at least at present, as stable monies. Implications for IMS may arise over the longer term and need further study.
- e. **Data frameworks are emerging as a priority issue,** with diverse international approaches that are shaping fintech developments and their efficiency, equity, stability and individual rights impacts. While the approach will vary according to national priorities, it seems important for orderly digital developments that the rights and obligations of various stakeholders are clarified. A global dialogue is important to support effective data frameworks and the cross-border fintech benefits.
- f. **Cybersecurity is widely considered as a key risk facing financial systems and fintech applications.** The rising capabilities of cyber-attacks is creating a sense of urgency amongst public authorities to institute effective measures for cybersecurity risk management and operational resiliency.

ISSUES FOR DISCUSSION

- a. Do Directors agree with staff analysis of the emerging policy issues identified in the paper?
- b. Do Directors agree with the areas identified as urgent issues needing attention by national authorities and international bodies (paras. 89 and 90)?
- c. How do Directors view staff's approach on fintech so far, and where do they see a need for staff to do further analytical work on fintech?

Annex I. Disruptive Technologies in the Financial Sector

1. This Annex provides an overview of selected fintech technologies and their potential applications and impact.

Application Programming Interfaces

2. **An Application Programming Interface (API) allows software programs to interact by exchanging data which can prompt certain actions such as making a transaction.** As such, APIs enable businesses to leverage data and services developed by others which helps entities focus on their specific value added which breaks open data silos and can promote innovation, competition, and financial inclusion. However, more evidence is needed to fully assess the impact of APIs.

3. **There are four main categories of APIs.** Payment APIs, which help third parties make and receive payments; data APIs, which share individual (with proper customer consent) and aggregate data with third parties, enabling them, for example, to better understand the risk profiles of individuals; “ecosystem expansion” APIs, which enable loan origination or account creation; and “consent and identity” APIs that facilitate KYC, enable sharing of data and/or movement of money by third parties.

4. **There are a range of open API initiatives with different drivers, objectives, and approaches.** In Europe, the United Kingdom, and Mexico for example, legislation requires financial institutions to share data and payment APIs with licensed third parties. In other markets, providers choose to adopt open APIs for commercial reasons. MTN Uganda, for example, recently opened a set of payment APIs to drive customer growth and activity. Other examples include Finserve (a subsidiary of Equity Bank), and Paystack.

5. **There are also centrally provided APIs.** India Stack is arguably the best example of this: “a set of APIs [including identity, payment and consent APIs] that allows governments, businesses, startups and developers to utilize a unique digital Infrastructure to solve India’s hard problems....”¹ Others take the form of API marketplaces. For example, the Asean Financial Innovation Network (AFIN) in Singapore aims to “facilitate innovation and collaboration between financial institutions and fintechs,” with a focus on financial inclusion.

Platform-based Distribution Models for Financial Products

6. **Financial services are highly susceptible to being delivered using platform-based models.** Most banking services can be completely digitized and therefore can be broken into component processes and outsourced or farmed out and reassembled. At the same time, there are basic ledger and transfer (LAT) processes, such as maintaining an account and verifying its balances, that are common to many products and services. A platform can facilitate a wide range of financial

¹ Source: <https://indiastack.org/about/> accessed on 7 March 2019.

services simply by linking to the account-holding institution and issuing the digitized instructions to perform LAT operations as needed.

7. **Two main types of platforms are emerging, Bank-centric and Tech-centric:**
 - a. **Tech-centric platforms** include tech companies aggregating banking services to enable others to build financial products, and tech companies embedding financial services in nonfinancial activities (Techfin), such as e-commerce platforms lending to merchants that sell on the platform. Open banking and APIs facilitate these business models by enabling the tech platforms to access LAT functions at banks.
 - b. **Bank-centric platforms** include traditional banks providing a marketplace for third parties to distribute financial products, and purpose-built platform banks, which have been established de novo as technology platforms with an open architecture on which other services could be built. Open banking is spurring adoption of these strategies, although traditional banks may struggle with the transition, particularly in jurisdictions where their ability to earn nonfinancial revenues is restricted.

8. **Several policy issues arise from the global trend towards platform-based distribution models for financial products and services**, in addition to issues such as consumer protection and cyber risks:
 - a. **Regulatory perimeter.** As financial activities become embedded in nonfinancial businesses, and third-party providers become critical links in a financial services value chain, regulatory perimeters will need to adjust and coordination across financial and nonfinancial regulators and supervisors heightened.
 - b. **International coordination.** International coordination and cooperation are necessary, given the cross-border and global accessibility nature of platforms, to avoid a “race to the bottom.”
 - c. **Competition.** There is potential for market concentration and monopolistic behavior. However, at the same time, platform distribution models also make financial services more contestable.
 - d. **Financial stability risk** may rise in the transition to new business models as market learns about new risks. The impact of nonbank tech platforms as financial services providers remains unclear due to revenue diversification or contagion from nonfinancial parts of the business.

Digital ID

9. **Digital ID is having a transformative impact on the financial sector** in three main areas. Digital IDs should be universal (i.e., all residents in a jurisdiction have access), unique (i.e., reliable

one-to-one association between an ID and a resident); and legal (i.e., usage is allowed in the financial sector).

- a. **Simplification of account opening procedures.** Digital IDs coupled with norms for simplified account opening have supported efficient onboarding of individuals. This has had significant impact on financial inclusion particularly for women and marginalized groups (India, Pakistan and Peru). Coupled with the development of Unique Business Identifiers, digital IDs support simplifying account opening procedures for businesses by linking the senior management, Directors and owners of businesses reliably to a business (India, Nigeria, Serbia, and Singapore). Further there is a trend towards centralized CDD or KYC registries that provide a shared repository of all requisite documentation obviating the need for submitting same information to multiple institutions (India, Mexico, Nigeria, Singapore, and Sweden).
- b. **Streamline transaction monitoring.** In addition to KYC registries there is also a trend towards development of centralized transaction repositories linking transactions to unique digital IDs. These enable enforcement of transaction limits for customers across all providers, thereby giving greater confidence in AML/CFT risk mitigation measures (JoMoPay—Jordan and Modelo Peru—Peru). Mexico is in the process of developing one such system as a key measure to mitigate AML/CFT risks of cross-border transactions.
- c. **Enabling efficient means to authenticate customers and secure customer consent.** Authentication services based on Digital ID are emerging as an alternative for dedicated passwords and security credentials. These digital ID services could be directly based on public sector centralized IDs (Aadhaar eSign in India and SingPass in Singapore) or build on build digital layers on top of public sector IDs (BankID—Sweden) or use a federated architecture with participating institutions holding some elements of a person's/business identity (Gov.Verify in United Kingdom and Secure Key concierge in Canada).

Annex II. Fintech Developments—Regional Perspective

Sub-Saharan Africa

1. **Sub-Saharan Africa (SSA) has become the global leader in mobile money innovation, adoption, and usage.** Across Africa, the adoption and use of technology in the provision of financial services is changing the way in which financial service providers operate and deliver products and services to their customers. The region leads the world in mobile money accounts per capita (both registered and active accounts), mobile money outlets, and volume of mobile money transactions. Mobile money account penetration in SSA countries recorded a remarkable increase. Based on Findex 2018 report—as of year ending 2017, since 2014 the share of adults in sub-Saharan Africa with a mobile money account has nearly doubled to 21 percent. In addition, close to 10 percent of GDP in transactions are occurring through mobile money, compared with just 7 percent of GDP in Asia and less than 2 percent of GDP in other regions.
2. **Mobile money has underpinned a radical change in the delivery of financial services in the region with significant gains in financial inclusion.** Mobile money accounts surpassed traditional deposits by 2015.¹ Most mobile transactions are used to send and receive domestic remittances. Increasingly, transactions are also being used for domestic transfers such as paying utility bills, receiving wages, and payments for goods and service. Users can engage in cross-border payment transactions and take up small loans. Whereas overall financial depth remains below other regions, fintech is emerging as an engine of growth and technological enabler that fosters financial inclusion and economic development. For example, evidence suggests that access to mobile-money services increased daily per capita consumption levels for Kenyan households lifting them out of extreme poverty, particularly for those headed by women.²
3. **In East Africa, mobile money has become access point for broader range of financial services,** including digital credit, savings, insurance, and investment. Furthermore, some mobile money providers are adopting open APIs to facilitate the integration with third parties and drive adoption of payments with mobile money.
4. **Countries in Southern Africa have seen notable increases in delivery of financial services through digital channels, but there is still room for significant improvement.** Based on Findex 2018, the percent of adults who made or received a digital payment in the last 12 months in South Africa, Namibia, Botswana, and Zambia stood at 48 percent, 33 percent, 36 percent, and 19 percent respectively. While these numbers are higher compared to Sub Saharan Africa median average of 13 percent, the levels are significantly lower compared to countries such as Kenya at 63 percent. Governments in Southern Africa are aware of the need to expand the reach of financial services to unbanked and underserved segments through digital channels. Several countries

¹ IMF Financial Access Survey data for 17 economies including some of the largest in sub-Saharan Africa, such as South Africa, Kenya, and Tanzania

² Jack and Suri (2008), <https://science.sciencemag.org/content/354/6317/1288.abstract>.

including South Africa, Zambia, Zimbabwe and Lesotho have included digital financial services as a key priority area in their national financial inclusion strategies. In addition, the 2018 survey show that most countries expect fintech to contribute to increase in overall financial inclusion, reduce the gender and rural/urban gap in access to financial services.

5. Despite their varied starting points, priorities, and capabilities, countries across West Africa are getting primed to take advantage of digital technologies.

Mobile finance penetration has improved by about 30 percent across the region. In Senegal, Mali, and Burkina Faso, mobile money penetration rose from single digits to reach 27 percent and more in less than 3 years. Ministries of Finance in Burkina Faso, Cote d' Ivoire, Guinea, and Niger have begun the process of digitizing their payments via mobile. Niger is working on the creation of algorithmic scoring based on mobile money transactions, call records, google map and social media feeds to expand credit to rural populations. The region's financial institutions have become more open to partnering with mobile operators. Even the smallest banks and microfinance institutions are creating mutualized platforms to allow supply of financial services via mobile.

6. Likewise, delivery of financial services through digital channels, including mobile money, is expanding in Central Africa but more remains to be done.

Mobile Money operators in Cameroon have partnered with large co-operations, including the main Electricity utility (ENEO) to accept Mobile Money payments and a few online services such as JUMIA also accept mobile money payments. According to mobile telephone operating companies in Cameroon, at least 3.1 million electronic money accounts have been opened (i.e., covering 15 percent of the population) but remain infrequently used (less than 7 percent record at least one transaction per month). This compares to 16 percent penetration among adults in sub-Saharan Africa overall and as high as 68 percent in Kenya. Technology-driven retail payment services have clearly demonstrated their contribution to furthering financial inclusion, and thereby contributing to poverty reduction by extending the availability and affordability of financial services. Considering that the rate of penetration of mobile telephones in Cameroon is 60 percent, the potential for development is huge. Mobile banking is also slowly being introduced in Angola and there are currently three mobile money providers in the market. However, the lack of interoperability (a single mobile switch) among the different mobile money providers as well as an inadequate legal framework currently inhibit further market development.

7. Legislators and regulators are slowly trying to catch up with the digital trend.

To address shortcomings in the legal and regulatory frameworks. Although the snapshot of the region reveals a growing scene of fintech companies, current regulations remain rigid in that area, slowing considerably the digital momentum in the region. Many countries, also, have not adjusted their legislations to fully allow digital payments, or taken the measures to adjust to the new challenges coming with digital finance. Nonetheless, ongoing reforms in several countries are expected to give impulses for the development of digital financial services (Box 1).

Annex II. Box 1. Fintech Policy Actions in sub-Saharan Africa

Following the issuance of the Payment Service Banks regulation in Nigeria, subsidiaries of mobile network operators (MNO) are now allowed to engage in provision of financial services. Similarly, with issuance of recent regulations in the Central African Economic and Monetary Community region,¹ MNO's mobile money activities can now be licensed by the Central Bank as financial services providers. The regional central bank of West African countries (BCEAO) has put in place a set of regulations for mobile finance. In Angola, the central bank is strengthening the legal framework for payment systems and mobile money to encourage more participants. Kenya and Rwanda have adopted plans to implement mobile money systems interoperability. The Bank of Zambia continues to use a "test and learn" approach to allow innovative payment solutions in the financial services sector. As the market continues to grow and evolve, the Bank of Zambia is aiming to adopt a more formal approach through updates to policy framework and National Payment Systems Act.

¹ Instruction no. 001 / GR / 2018.

8. **Several emerging challenges and risks from fintech have been identified, including AML/CFT, cybersecurity, consumer protection and data privacy issues.** With the rise in mobile finance, issues related to the supervision and monitoring of AML/CTF issues, cybersecurity, and other related operational risks are especially relevant. Changes in regulation to mitigate such risks are taking the form of AML/CFT obligations and monitoring for service providers. There is also an effort in the region to enhance data collection frameworks for fintech activity and regulation. Other new challenges arising from fintech include consumer protection issues, in particular related to provision of credit through digital channels, and data privacy-related issues with data being sold to third parties for credit scoring.

Asia and Pacific

9. **Asia is ahead of other regions in nearly every aspect of fintech, but there is heterogeneity within the region** that reflects the diverse levels of development of their financial systems and digital divide. The region's economies have the highest dispersion in terms of the adoption of digital technologies—not surprising, given that Asia covers a broad range of the income spectrum (IMF, 2018a).³

10. **Asian economies have made significant progress, in many cases leapfrogging into fintech services.** For example, in China, the massive scale of its markets and a regulatory "light touch" in the early years supported fintech development, with China emerging as a global leader. In India and Bangladesh, large-scale adoption of mobile payments and increase in money transfers have driven growth in the mobile payments. In ASEAN, there are e-money issuers in all countries (World Bank and ASEAN, 2019).⁴ But the region's use of fintech has been uneven for different segments of the population. Fintech use exhibits large gaps between the rich and poor, men and

³ ["The Digital Revolution in Asia: Disruptor or New Growth Engine \(or Both\)?" Background Paper No. 4.](#)

⁴ <http://documents.worldbank.org/curated/en/856241551375164922/Advancing-Digital-Financial-Inclusion-in-ASEAN-Policy-and-Regulatory-Enablers>

women, and rural and urban areas. For example, in Bangladesh while 20 percent of the population report having a mobile money account, this masks a large disparity between men (30 percent) and women (10 percent).

11. **Asian economies have adopted a wide range of technologies based on consumer needs, level of development, regulatory stance, and existing financial and technological infrastructure.** For example, while mobile payments have grown rapidly in China, and are emerging in Sri Lanka with the development of the national retail payment infrastructure, Australia has instead experienced the growth of contactless card payments, building on existing infrastructure and experience with the use of cards for secure payments. In the same way, with geographical dispersion preventing traditional banking infrastructure from reaching all inhabited islands, the leading bank in Maldives opened a digital wallet for fishermen to conveniently make transactions through a unique card and reducing the requirements for cash.

12. **Fintech use in Asian countries has also expanded beyond payments to include lending, insurance, and investment.** For example, leveraging existing social-media platforms, China's fintech services include several other key areas: P2P lending, internet credit, including microlending, internet-based banking and insurance, digital wealth management, and credit-ratings (IMF, 2019a).⁵ In addition, in South Asia, alternative lending models backed by technology and big-data have developed. In India, a fintech portal PSBloansin59minutes.com (PSB59) launched in November 2018 by a consortium of banks has emerged as the largest on-line lending platform. In the Pacific Island countries (PICs), where access to financial services through traditional channels is impeded by infrastructure deficiencies and geographical dispersion, greater access to mobile phones has provided for greater access to basic financial services.

13. **Asian tech giants—such as Alibaba, Tencent, and Baidu in China, bKash in Bangladesh and GO-JEK in Indonesia—have become important providers of financial services, putting competitive pressures on traditional financial institutions.** Many fintech products have been developed to facilitate other digital activities such as e-commerce (e.g., Alipay in China and PhonePe in India), as fintech innovations are often pre-conditions for other digital innovations.

14. **Asia has also been a leader in crypto-assets, including initial coin offerings (ICOs).** Before China tightened regulations, more than 90 percent of Bitcoin trading volumes were against the renminbi, and in Korea, prices of Bitcoin and other crypto-assets have been substantially more volatile than in other economies, reflecting speculative demand. Some small states in the region have even been approached by private investors to adopt crypto-assets as the legal tender (e.g., the Marshall Islands which recently passed a law), raising serious legal and regulatory concerns.

15. **Some fintech products have raised significant consumer and investment protection issues.** Like other regions, Asia has seen a considerable number of frauds in crypto-assets space. For instance, crypto-assets related frauds/scams include Mt. Gox in Japan, "Puyin Coin" in China, and

⁵ <https://www.imf.org/en/Publications/WP/Issues/2019/01/17/Chinas-Digital-Economy-Opportunities-and-Risks-46459>

Komid and UPbit in Korea. Similarly, China's P2P industry—the largest in the world—has seen a wave of illegal activity. Nearly 250 Chinese P2P lenders defaulted in June and July 2018 alone, and their number shrunk from almost 3,400 in 2016 to just 1,645 in August 2018.

16. **Asian policymakers are facing a balancing act.** First, they are trying to catch up with the rapid pace of fintech development in the region and its opportunities, and second, they are trying to ensure that fintech-related risks are well understood and mitigated for the sake of consumer and investor protection and financial stability and integrity.

17. **Governments' push to catalyze the development of the fintech ecosystem is notable.** In ASEAN there are important public and private sector coordination initiatives to support fintech development among its member states. For example, the ASEAN Financial Innovation Network (AFIN) "aims to facilitate broader adoption of fintech innovation and development" in the region. In many ASEAN countries, regulators and supervisors have been establishing specialized departments dedicated to fintech developments. Nepal has recently embarked in the Digital 2020 initiative to accelerate digital financial inclusion and access to finance. The Digital Bangladesh government initiative has helped build the underlying infrastructure required for digital innovation by the government and by private players (such as mobile financial services providers and banks). Similarly, the Government of India via India Stack and the JAM (short for Jan Dhan-Aadhaar-Mobile) Trinity is supporting the digitization of payments, amending KYC requirements, and customers digital onboarding, and enabling automated access to data from various digitized government systems in the country.

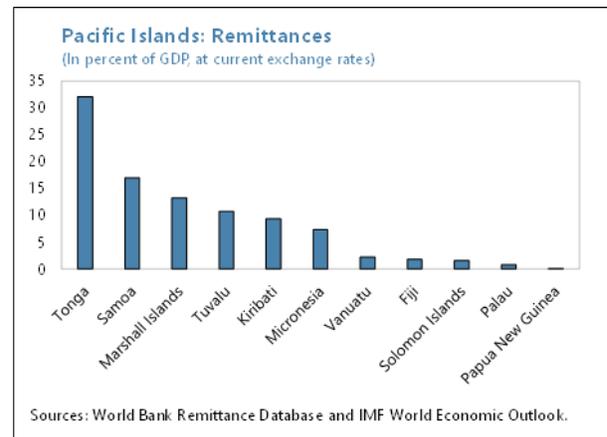
18. **Several countries are focusing on development of digital financial services as part of their National Financial Inclusion Strategies.** For example, Indonesia, Malaysia, Myanmar, the Philippines, and Thailand, have implemented such frameworks, with data-gathering mandates, and, in some cases, monitoring and evaluation mechanisms.

19. **Asian economies are showing strong interest and are at different stages in establishing regulatory sandboxes.** One objective is to encourage and enable fintech initiatives that promote efficiency and increase access to financial products and services. In 6 out of 10 ASEAN countries, regulators and supervisors are actively engaging with industry participants and consumers through mechanisms such as fintech units and regulatory sandboxes to facilitate the development of fintech. Some regulators have also been testing RegTech/SupTech applications, including for example the Philippines' Bangko Sentral. Some countries have issued regulations on digital lending (Indonesia, Malaysia, the Philippines, Thailand, and Singapore) and equity crowdfunding (Malaysia, Singapore, and Thailand).

20. **The PICs financial inclusion efforts can be complemented by fintech solutions.** The PICs are facing structural impediments that affect economic growth, including lack of scale, limited infrastructure, geographic remoteness, and weakening correspondent banking relationships (CBR). Fintech solutions can complement existing efforts to promote financial inclusion, enhance financial sector development, and increase inclusive growth potential, thus reducing poverty. However, the lack of a reliable mobile network or internet coverage, the frequency of natural disasters, and a frail

regulatory environment might make the adoption of new technologies more challenging than in other economies. To overcome these challenges, the PICs would benefit from regional approaches to deploying new technologies to foster financial inclusion and development. Digital platforms have the potential to accelerate adoption of a regional KYC facility and regionally-linked payment and settlement arrangements as outlined under the Samoa Commitment (RBA, 2018).⁶

21. **Technology-enabled identity validation can support the PICs efforts to improve financial inclusion and identification requirements.** With a high number of unregistered citizens in the PICs, financial service providers face costly and complex administrative processes to prove their customer's identity. New technological solutions for electronic identification can streamline those processes rendering them more cost-effective for both banks or money transfer operators (MTOs) and their clients. These solutions could improve banks' AML/CFT compliance, which would help them maintain their CBRs (Alwazir et al; 2017).⁷ Maintaining CBRs is particularly important for the PICs, as their economies are highly dependent on remittances. Electronic identity solutions would also enable governments to build a national digital identity system, which digital financial service providers could build into their financial products and services ensuring seamless compliance with identification requirements. The development of a regional KYC facility in the Pacific could benefit from the digital identity design principles (Box 2).



⁶ The Samoa Commitment intends to leverage information technology to support economic development and financial inclusion in the region. Reserve Bank of Australia (RBA), 2018, Media Release, Samoa Commitment for the Pacific Islands, <https://www.rba.gov.au/media-releases/2018/mr-18-30.html>

⁷ http://www-intranet.imf.org/departments/MCM/sites/Derisking_WG/Derisking%20Document%20Library/wp1790.pdf

Annex II. Box 2. Potential Fintech Solutions for Identification Requirements in the Pacific¹

Identification and authentication systems based on biometrics can support countries' efforts in maintaining their correspondent banking relationships (CBRs). Samoa's Office of the Electoral Commission (OEC) maintains a registered voter's database that includes biometric information. The Asian Development Bank (ADB) has engaged the Central Bank of Samoa (CBS) to migrate the OEC data to a decentralized platform that incorporates a native biometric identity system and payment solution with a multi-currency wallet. Partner institutions in the remittances business such as money transfer operators (MTOs) and financial institutions will be able to validate their customers identity electronically through mobile and web-based applications and carry out transactions with them. The platform is expected to strengthen KYC compliance, enhance customer due diligence, and improve financial institutions' capacity to monitor and detect suspicious financial transactions. The identity data can be leveraged to build out a national digital identity system and the collected financial transaction history could be used to support the establishment of a credit bureau function.

Papua New Guinea (PNG) has relied on blockchain technology and cell phones to develop a low-cost biometric system. In PNG, less than 5 percent of births are registered and only 20 percent of the population has access to electricity. As a result, large segments of total population are excluded from the formal financial system. The Bank of Papua New Guinea (BPNG) has experimented with leveraging the high penetration of SMS-capable phones to improve identification using the blockchain technology-enabled ID Box. The ID Box is a low-cost solar-powered device that works in off-grid remote areas. The Box is used to record and encrypt personal identification based on fingerprints and mobile phone numbers. The disintermediated nature of the blockchain is used to verify and store identity information. Based on the established digital identity, individuals can participate in digital transactions, trade excess solar-power, vote or access government services (ID Box, 2017).

¹ This box draws on the upcoming IMF Departmental Paper by Davidovic, Loukoianova, Sullivan, and Tourpe (2019), "Fintech Solutions for the Pacific Island Countries."

Europe

22. **The fintech market in Europe is growing rapidly but is unevenly distributed.** Fintech can lead to a greater variety of better targeted products, lower costing financial services through technology and increased competition, and increased access to finance for consumers and firms. The greater degree of financial development, banking penetration, and competition in Europe lessens the demand for some fintech solutions while regulatory fragmentation hinders the expansion of fintech firms across borders.

23. **Non-EU countries trail EU peers in fintech adoption.** Given high mobile phone and internet access⁸, the potential for fintech take-up improving outcomes in Europe is high. However, there are important regional differences in the uptake of digital finance, the prevalence of cash-based payments, account ownership and usage, and savings and credit in the region.⁹ There is also a considerable gap between the United Kingdom and the rest of Europe—the United Kingdom being

⁸ Gallup Poll, 2017.

⁹ Findex, 2017.

significantly ahead of the rest of Europe both in terms of fintech innovation and investment. Going forward it is still unclear the full impact of Brexit on these developments.

24. Europe also attracted its second largest amount of fintech venture capital investment ever in 2018.¹⁰ In 2018, total investment into European fintech companies (including private equity and venture capital) totaled US\$34.2 billion, across 536 deals, as per KPMG's biannual Pulse of fintech report. The median fintech M&A size in Europe increased from US\$23.7 million in 2017 to US\$62.5 million in 2018.¹¹ The United Kingdom led the European countries with over US\$16 billion in total fintech investment.¹² In the United Kingdom alone, venture capital invested in 2018 totaled US\$1.73 billion across 261 deals, making it the third largest globally in terms of fintech investments, after the United States and China.¹³ While the United Kingdom led the way in fintech investments, Switzerland also witnessed a substantial growth in its fintech market over the past year with growth of about 62 percent in 2018.¹⁴ Finally, almost half of the funding from initial coin offerings (ICOs) were raised by startups in Europe.¹⁵

25. European authorities have been proactive encouraging fintech innovation and exploring regulatory responses. This has been particularly the case regarding crypto-assets, initial coin offering and digital currencies. Poland and Russia have plans to set up regulatory sandboxes, while Denmark and Lithuania already set up sandboxes, with two firms operating in it in Denmark's case. Malta became the first jurisdiction to legally recognize cryptocurrencies and also passed laws that govern crypto-assets. Belarus also launched its own crypto-framework. The Swiss authorities have been proactive in ascertaining the legal status of various crypto-assets and in clarifying rules applicable to initial coin offerings.¹⁶ More recently, the FINMA issued new fintech licensing guidelines. The Swedish central bank is considering issuing digital currency, the e-krona, bringing the country closer to being completely cashless.

26. Generally, Europe has been leading the way in enacting fintech regulations and regulatory innovations. The U.K.'s Financial Conduct Authority (FCA) has set up one of the first regulatory sandbox in 2016. Last year the European Commission unveiled a fintech action plan and proposed new rules to help crowdfunding platforms to expand across the EU's single market. It also published a draft ethics guideline for the development and use of artificial intelligence. The European Banking Authority (EBA) launched its own fintech knowledge hub, to support the EBA's

¹⁰ Based on KPMG's Pulse of Fintech Report—H2:2018 <https://home.kpmg/content/dam/kpmg/us/pdf/2019/02/the-pulse-of-fintech-2h2018.pdf>

¹¹ Based on KPMG's Pulse of Fintech Report—H2:2018 <https://home.kpmg/content/dam/kpmg/us/pdf/2019/02/the-pulse-of-fintech-2h2018.pdf>

¹² Based on KPMG's Pulse of Fintech Report—H1:2018 <https://assets.kpmg/content/dam/kpmg/xx/pdf/2018/07/h1-2018-pulse-of-fintech.pdf>

¹³ Innovate Finance: 2018 Fintech VC Investment Landscape, <https://cdn2.hubspot.net/hubfs/5169784/Innovate-Finance-2018-FinTech-VC-Investment-Landscape.pdf>

¹⁴ <https://cointelegraph.com/news/report-swiss-fintech-market-grew-by-62-percent-in-2018>

¹⁵ <https://www.coindesk.com/report-european-startups-take-in-half-of-all-ico-funding>

¹⁶ Source: FINMA Guidelines for Enquiries Regarding the Regulatory Framework for Initial Coin Offerings.

initiatives on fintech. Finally, the European Parliament adopted a resolution on distributed ledger technologies and blockchains.

27. **Regarding other regulatory developments, the EU has introduced two key regulations** in the form of the General Data Privacy Regulation (GDPR) and the Payments Services Directive 2 (PSD2), both of which came into force in 2018.

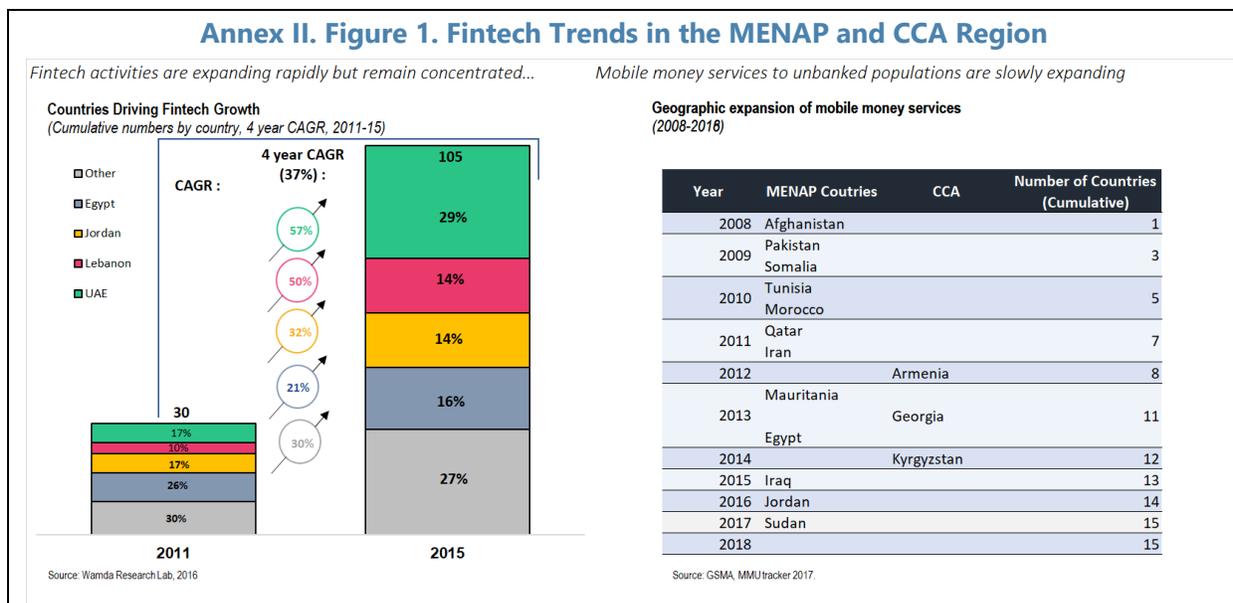
- a. The GDPR aims to protect individual privacy by regulating the processing and transfer of personal data. For efficiency reasons GDPR may set the global standard for many firms with operations in the EU. GDPR provides clarity and protections on use of data, but also imposes significant compliance costs, particularly for smaller firms.
- b. The PSD2 obliges banks to give third-party providers access to customers' bank accounts, if requested by the customer increasing competition and innovation in financial services. PSD2 is also likely to help integrate financial services across the EU.

28. **The full implications of these developments will take some time to become clear**, as legal questions regarding compliance are settled and as markets respond to the new environment. The GDPR could either be helpful or harmful to competition depending on the impact it has on incumbent tech firms and the burden of compliance costs, particularly on new and smaller entrants. And the success of PSD2 will depend on the extent to which banks seek legal means to meet the letter of the directive without effectively opening up access to fintech firms.

Middle East and Central Asia

29. **The MENAP and CCA regions were slow in adopting fintech, however, the industry is now growing rapidly.** Investments in the two sub-regions account for less than 2 percent of total global fintech investments between 2013–2018. Nevertheless, the industry has gained momentum in the last five years in selected countries, characterized by a rapid expansion in the number of fintech startups, digitization of operations by certain incumbent financial institutions, and expansion of mobile money services. Governments in several jurisdictions have adopted mobile payments for salaries, social transfers and revenue collection and mobile account users are steadily growing.

30. **Fintech is still concentrated in selected countries and sectors, but new growth centers are emerging.** In the MENAP, four countries (Egypt, Jordan, Lebanon, and the UAE) account for 75 percent of total startups and the UAE alone accounts for a third of all activities, but there are new growth centers in Bahrain, Iran, and Saudi Arabia. In the CCA, fintech activities are concentrated in Kazakhstan, but more countries (Armenia, Georgia, and Kyrgyzstan) are embracing mobile payment innovations, and Georgia has emerged as a hub for the mining of cryptocurrencies. In both regions, fintech players are mostly payments-led although mature credit solutions are emerging (Figure 1).



31. **The growth of fintech in the two regions reflects both pro-fintech policies and market dynamics.** Several countries (Egypt, Jordan, Morocco, and Tunisia) have updated mobile payment regulations to provide legal clarity for nonbank payment service providers. Institutional support programs (accelerators, incubators, free zones, and sandboxes) in some countries (Bahrain, Kuwait, Jordan, Saudi Arabia, Tunisia, and UAE) have strengthened the capacity of fintech startups. Investments in high speed voice and data communication networks has facilitated mobile and internet penetration. The availability of private capital, including early stage risk capital, has underpinned the comparatively strong performance of fintech in countries like the United Arab Emirates. Egypt’s giant consumer base is making it an attractive market for fintech. For some countries (e.g., Somalia), idiosyncratic factors related to the weak banking infrastructure encouraged the growth of mobile payments.

32. **Fintech in MENAP and the CCA, however, remains below potential.** Surveys of fintech companies identify regulations, lack of talent and appropriate funding as the top constraints impeding the growth potential of fintech. There is also still a prevalence of low-speed networks that limit adoption of some of the fintech solutions such as cloud computing. Limited data availability constrains adoption and effective use of big data analytics, AI and ML. On the demand side there continues to be a strong preference for cash payments in the Middle East, despite the growth of e-commerce transactions. Mobile payments have to compete with the entrenched and effective “Hawala” system for remittances. Limited interoperability of mobile networks fragments the market and agency networks are still limited.

33. **Fintech presents important opportunities to deepen financial institutions and promote financial inclusion in the MENAP and CCA regions.** Both regions feature large unbanked populations, sizeable gender disparities in access to financial service, large rural populations and SMEs whose growth is constrained by limited access to finance, and large remittance markets and informal transfers (Hawala). There are also many other untapped opportunities to promote fintech

through digitizing cash-based transfers from the government, employers and the agriculture sector.¹⁷ Government policies mapping and digitizing recurrent bulk payments emergency cash transfer programs are emerging, although relatively slow compared to other regions.

34. Policies already taken are encouraging but more is needed to enhance fintech adoption while ensuring financial stability. Legal and regulatory frameworks need to be reviewed to identify gaps and restrictions that may impede the growth of fintech, particularly given that the MENAP and CCA region's financial systems remain bank centric with limited regulatory space for nonbank payment and financial service providers. Other critical reforms needed include upgrading the fintech-relevant infrastructure and encouraging interoperability; putting in place enabling regulations to encourage the development of seed, venture and growth capita; strengthening the region's cybersecurity financial integrity frameworks and education reforms to align skills with the digital economy. These reforms should be underpinned by sustained structural reforms to improve the business environment and a competitive environment that enables nonbanks to contribute to financial inclusion.

Western Hemisphere

35. In Latin America and the Caribbean (LAC), fintech startups are growing, albeit from a low base. Most startups in the region focus on digital payments and transfer services, followed by alternative financing platforms (IDB and Finnovista, 2018). In terms of payment services, adoption of mobile money services in LAC countries remains low, despite relatively decent mobile and internet penetration rates. In addition, despite sizeable remittances received by the region (particularly Caribbean and Central American countries), fintech activity in cross-border payment technologies remains limited. In terms of alternative financing, the United States accounts for 97 percent of the Americas market, with consumer lending as the key driver (Cambridge Center for Alternative Finance, 2018). While Canada experienced considerable growth in 2017, 42 percent of surveyed firms were primarily headquartered in the United States, thus reflecting the strong cross-border relationship. Most of the alternative financing in LAC is done through lending activities and benefits equally consumers and businesses. While most firms rely on P2P lending, 24 percent of fintech firms in LAC also mobilize their own-balance sheets. Lending to businesses is largely focused on small business financing, where MSMEs face limited access to credit.

36. Improvements in financial technology can further financial inclusion including to serve the unbanked population in the region. Only 21 percent of LAC have access to credit from formal institutions or used a credit card. In fact, under 50 percent of adults in Argentina, Colombia Mexico, and Peru have an account in a formal financial institution (Findex, 2017). Electronic invoicing and factoring, digital banking, and digital authentication processes are all driving efforts toward more efficient and inclusive financial institutions in the region. The governments of Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Peru, and Uruguay introduced a policy that

¹⁷ In MENA, 7 million banked adults and nearly 20 million unbanked adults receive private wages in cash, yet nearly 90 percent of these adults have mobile phones.

established a mandatory electronic invoicing. The digitalization of invoices leads to increasing efficiency of factoring and reverse factoring using platform approaches, as well as enhancing transaction information for MSMEs, enabling lenders to better assess creditworthiness. In addition, a growing penetration of smartphones provides for an important fintech platform and access channel. Smartphone penetration is expected to grow to 71 percent by 2022 (from 55 percent in 2016).¹⁸

37. **Several central banks in LAC are exploring the possibility of issuing CBDC**, such as Uruguay (pilot program implemented in 2018), the Bahamas, and the ECCU. Underlying reasons for exploring digital currencies appear to be the desire to foster financial development and reduce transaction costs of cash.

38. **Many LAC authorities have already begun to review their regulatory frameworks for fintech**. However, the speed of regulatory response varies widely across economies, depending on the size and structure of their respective financial and fintech markets as well as the flexibility of the existing regulatory and legal frameworks. For example, while Mexico introduced new and comprehensive fintech-specific legislation, Brazil integrated fintech issues into the existing regulatory and legal framework. Uruguay passed a regulation on P2P lending in late 2018, and several other countries have also either passed or are considering regulatory changes, such as Argentina, Chile, Colombia, and Peru. In Canada, the new oversight framework will seek to introduce measures associated with (i) end-user funds safeguarding in the event of insolvency, (ii) operational standards, (iii) disclosures, (iv) dispute resolution, (v) liability, (vi) registration, and (vii) protection of personal information.

39. **In addition, many authorities have warned publicly about the potential risks from crypto-assets like Bitcoin**. Such warnings are largely aimed at educating the general public about the difference between legal tender and digital currencies issued by private sector firms; the high volatility associated with certain digital currencies; and the opportunities that cryptocurrencies create for illegal activities, such as ML and TF transactions.¹⁹ While there is, to date, no legislation in LAC countries that specifically applies to digital currencies, some countries have taken concrete measures: Bolivia imposed direct restrictions on investments in cryptocurrencies, and Colombia bars financial institutions within their borders from facilitating transactions involving cryptocurrencies. Mexico created the concept of virtual assets under the fintech law and extended anti-money laundering laws to cryptocurrencies.

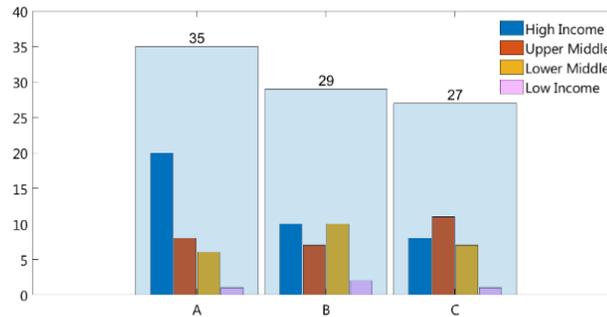
¹⁸ The Mobile Economy Report (2016) by GSMA.

¹⁹ For example, Aruba, Belize, Curacao, and Sint Maarten, the ECCB, Jamaica, Peru, Trinidad and Tobago.

Annex III. Global Fintech Survey Results

Annex III. Figure I. Embrace the Promise of Fintech

Question 3



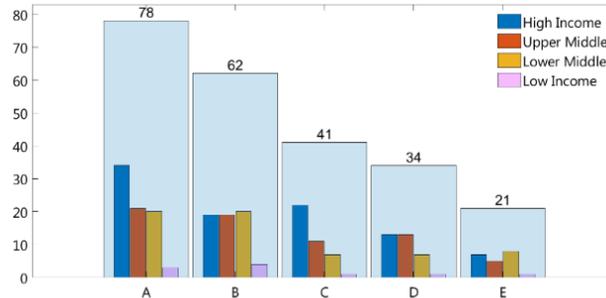
Does your jurisdiction have a national strategy in place to promote responsible innovation and adoption of fintech or expect to have one?

A: Yes, a strategy has been developed.

B: No, but a strategy is under development and will be in place in the next two years.

C: No.

Question 4



What does your jurisdiction see as the top three benefits of fintech for the financial sector? (select up to three)

A: Increase innovation (e.g., new business models, products, and services).

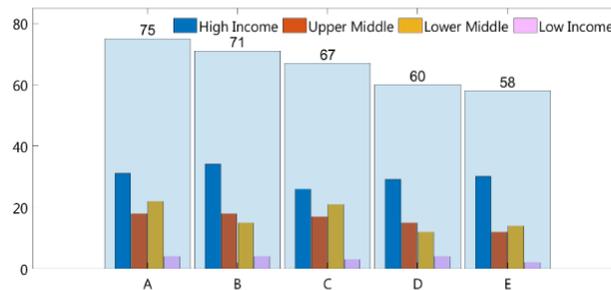
B: Increase access to financial services for consumers.

C: Increase competition and lower barriers to entry.

D: Increasing operational and cost efficiencies of financial institutions.

E: Increase access to financial services for micro, small, and medium-sized

Question 5



To maximize fintech's benefits, does your jurisdiction actively undertake the following activities or expect to do so in the next two years (please check all that apply)?

A: Improving consumer awareness and education.

B: Reviewing and amending the policy framework to enable fintech investment, innovation, and adoption (e.g., similar treatment of similar activities and risks, proportionality).

C: Strengthening of institutional capacity.

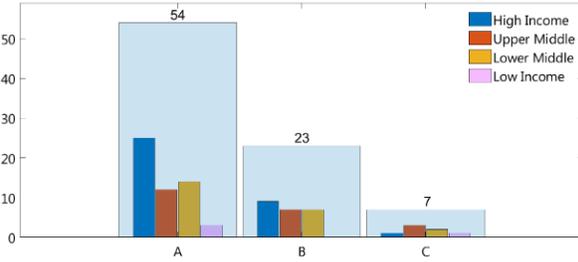
D: Expanding outreach to stakeholders (e.g., financial incumbents, fintech companies).

E: Adopting a cross-agency approach involving relevant ministries and agencies.

Source: IMF-World Bank Global Fintech Survey.

Annex III. Figure II. Enable New Technologies to Enhance Financial Service Provision

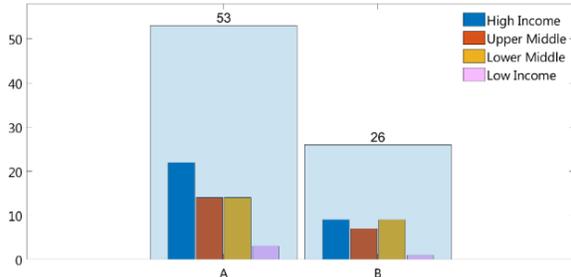
Question 6



Does your jurisdiction have policies in place that actively foster the development (e.g., coverage, capacity, safety) of key digital infrastructures that enable fintech (e.g., telecommunications, broadband, and mobile data services) or expect to have them

- A: Yes, to achieve near-universal coverage everywhere within five years. [Please provide brief description below]
- B: No.
- C: Yes, to achieve near-universal coverage in urban areas only within five years. [Please provide brief description below]

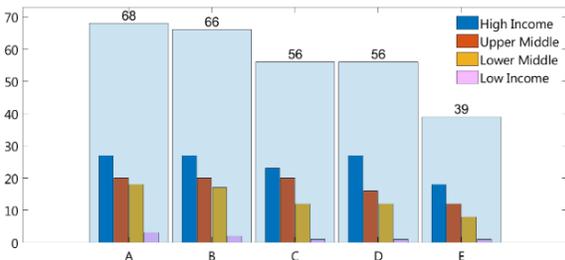
Question 7



Does your jurisdiction have policies in place that actively foster open and affordable access to key digital infrastructures (e.g., telecommunications, broadband, and mobile data services) or expect to have them in the next two years?

- A: Yes
- B: No

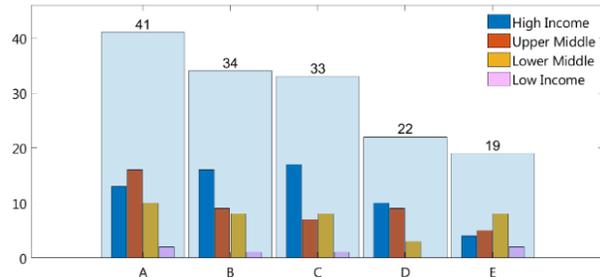
Question 8



Which of the following government services to collect revenues can be conducted online or are expected to be in the next two years (please check all that apply)?

- A: Corporate income taxes.
- B: Personal income taxes.
- C: Fines (e.g., traffic violations).
- D: Business registration and other fees.
- E: Driver license fees.

Question 9

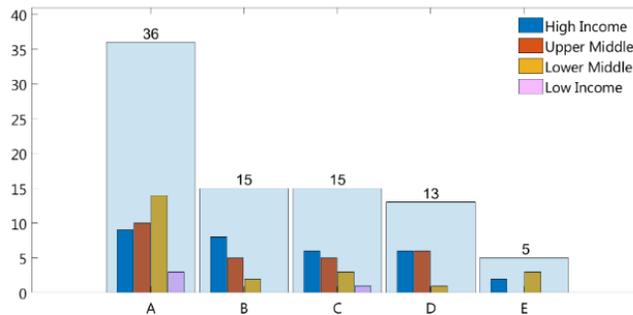


Which of the following data collected and maintained by the government can currently be accessed online by a qualified third party (e.g., a financial institution, licensed fintech company) or are expected to be in the next two years (please check all that)

- A: Details pertaining to any form of governmental identification documents (ID) (including national ID and driver license).
- B: Vehicle registration details.
- C: Land and other real estate records.
- D: Other. [Please provide brief description]
- E: None.

Annex III. Figure II. Enable New Technologies to Enhance Financial Service Provision (concluded)

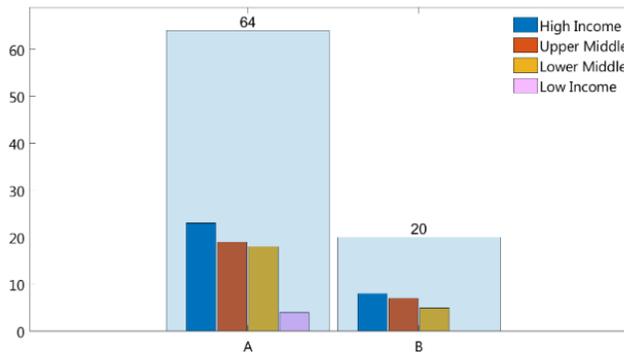
Question 10



How is customer consent for third parties to access client information provided and validated?

- A: Written consent.
- B: Online, using strong authentication (e.g., a digital signature).
- C: Not Applicable.
- D: Other means. [Please provide brief description]
- E: Online, using a pre-registered email ID or mobile phone.

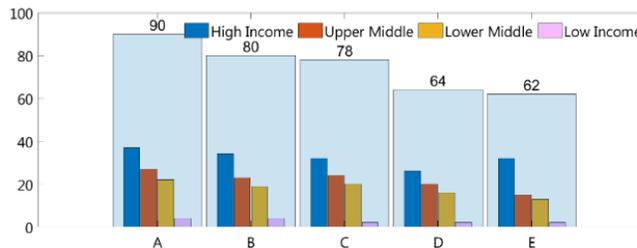
Question 11



Are government-issued IDs in your jurisdiction guaranteed to be uniquely tied to a single person such as through using biometric information?

- A: Yes
- B: No

Question 12



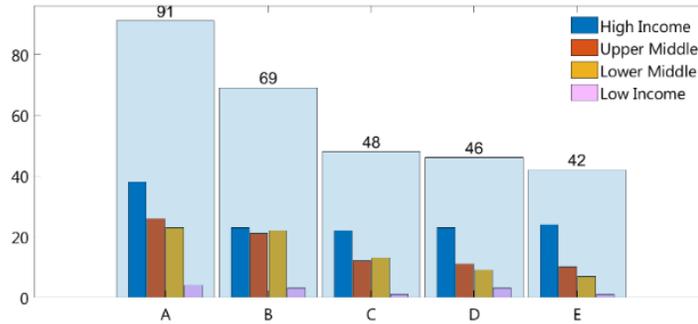
Which of the following financial infrastructures are operating in your jurisdiction (please check all that apply)?

- A: Retail payment system connecting providers of payment services like cards, credit transfer and mobile money.
- B: Securities settlement systems.
- C: Central securities depositories.
- D: Credit reporting systems with near universal coverage of credit products which offer services like credit scoring.
- E: Innovative payment mechanisms (e.g., QR code payments using an alias (like email ID) and services similar to Apple Pay, Ali Pay and Android Pay).

Source: IMF-World Bank Global Fintech Survey.

Annex III. Figure III. Reinforce Competition and Commitment to Open, Free, and Contestable Markets

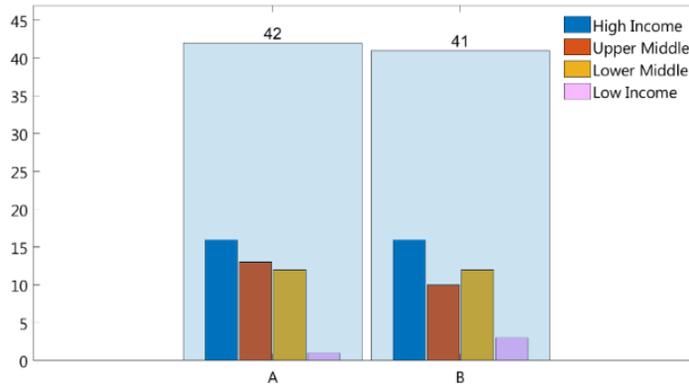
Question 13



For which type of financial services does fintech present the most promising use cases to improve competition and contestability in the financial sector of your jurisdiction in the next five years (please check all that apply)?

- A: Payment, clearing, and settlement services.
- B: Credit and deposit related services.
- C: Insurance.
- D: Capital raising services.
- E: Investment management services.

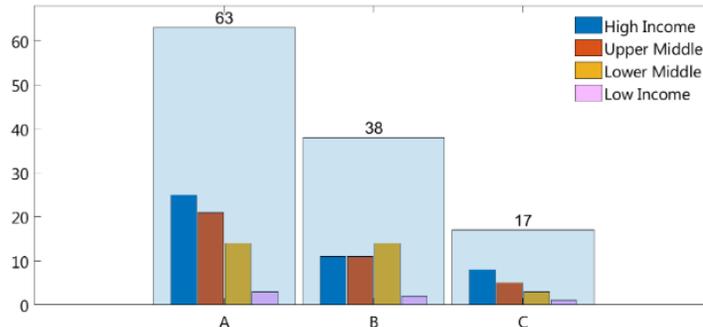
Question 14



In light of fintech developments in your jurisdiction, do you foresee a need to adjust the competition policy framework within the next five years?

- A: Yes
- B: No

Question 15



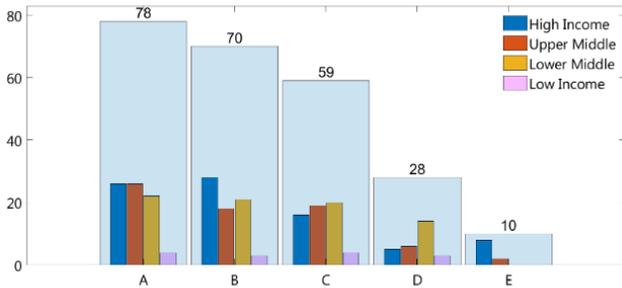
Which is true for all financial infrastructures that are relevant for fintech development and adoption in your jurisdiction (e.g., payment systems, credit reporting, collateral registry, depositories, securities market clearing houses, central counterpart)

- A: These infrastructures are required to have fair, transparent and risk-based access criteria or are expected to within the next two years. [Please provide brief description below]
- B: These infrastructures provide a sufficient level of interoperability (including for smaller players in the industry) to support fintech development and adoption. [Please provide brief description below]
- C: None of the above.

Source: IMF-World Bank Global Fintech Survey.

Annex III. Figure IV. Foster Fintech to Promote Financial Inclusion and Develop Financial Markets

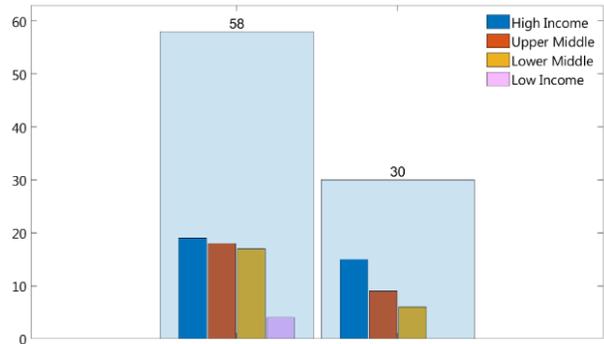
Question 16



Do you expect fintech to significantly expand access and usage of financial services in your jurisdiction within the next five years (please check all that apply)?

- A: Increases overall financial inclusion for households.
- B: Helps close the Micro, small, and medium-sized enterprise gap.
- C: Helps close the Rural and remote areas gap.
- D: Helps close the Gender gap.
- E: Other. [Please provide brief description]

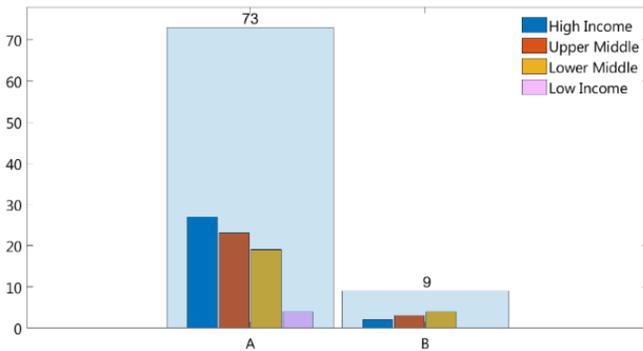
Question 17



Does your jurisdiction have a national financial inclusion policy, strategy, or roadmap?

- A: Yes
- B: No

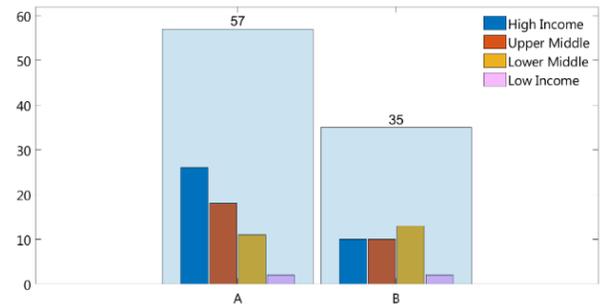
Question 18



Does your jurisdiction have specific policies and work programs in place to actively promote digitization across government services (as payee and payer) or expect to have them in the next two years?

- A: Yes
- B: No

Question 19



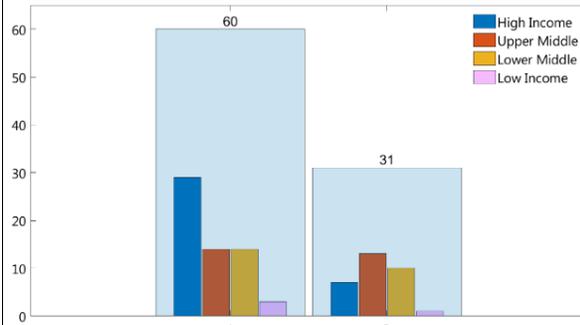
Does the regulatory and supervisory framework in your jurisdiction allow for differentiated compliance-related processes for fintech products and services targeted at the vulnerable, underbanked and population segments that are more costly to service?

- A: No
- B: Yes

Source: IMF-World Bank Global Fintech Survey.

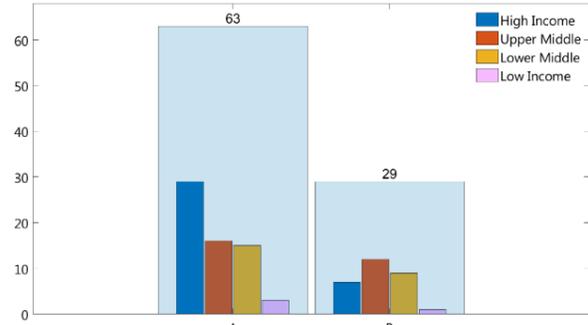
Annex III. Figure V. Monitor Developments Closely to Deepen Understanding of Evolving Financial Systems

Question 20



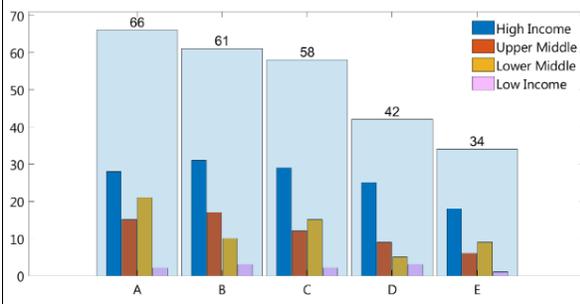
Does your institution carry out fintech surveillance by activity type (both official data requests and informal market surveillance)?
 A: Yes
 B: No

Question 21



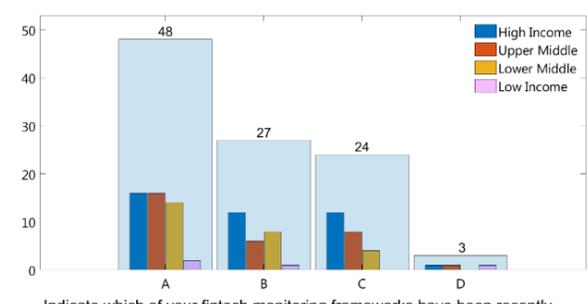
Does your institution carry out fintech surveillance by entity type (both official data requests and informal market surveillance)?
 A: Yes
 B: No

Question 22



What is the scope of the authorities' fintech surveillance by sources (please check all that apply): Official data requests.
 A: Official data requests.
 B: Informal contacts with industry and other players.
 C: Press and news reports.
 D: Formal forums with industry and other players.
 E: Social Media.

Question 23

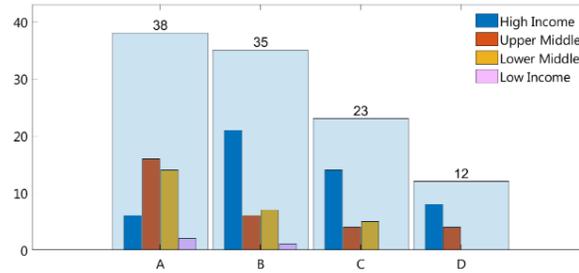


Indicate which of your fintech monitoring frameworks have been recently updated. (please check all that apply)
 A: There have been no recent updates
 B: The update covers regulated entities under your jurisdictions.
 C: The update extended the monitoring to capture relevant fintech activities outside the regulated entities.
 D: The update covers cross border activities.

Source: IMF-World Bank Global Fintech Survey.

Annex III. Figure V. Monitor Developments Closely to Deepen Understanding of Evolving Financial Systems (concluded)

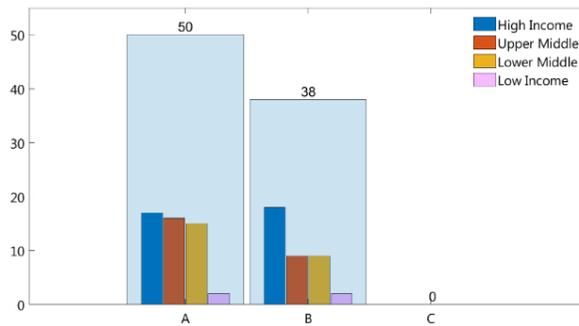
Question 24



Have you set up in your jurisdiction an active information sharing and coordination mechanism on fintech developments among the regulatory community (please check all that apply)?

A: There is no established information sharing mechanism.
 B: There is an interagency mechanism for sharing information on fintech developments.
 C: There is a mechanism for sharing information on fintech with foreign authorities.
 D: Other. [please provide brief description]

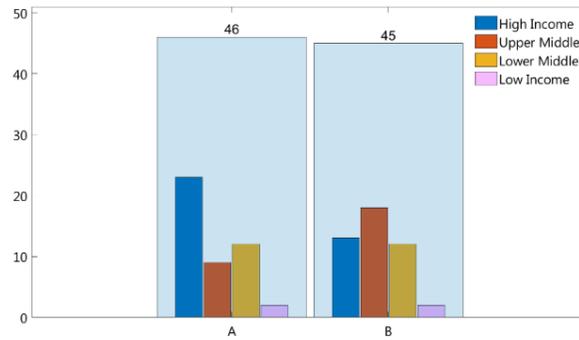
Question 25



Is the collection and analysis of data automated (such as using artificial intelligence)?

A: Not automated.
 B: Somewhat automated.
 C: Highly automated, using artificial intelligence and other innovative tools.

Question 26



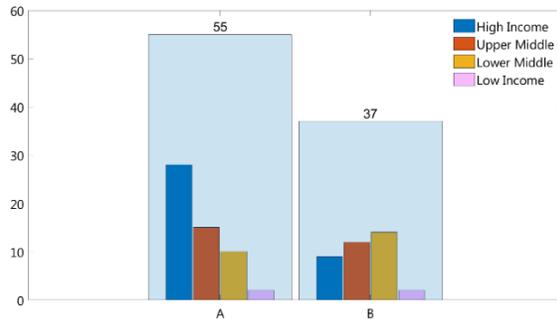
Have you set up a consultation group with private stakeholders (e.g., fintech companies, industry associations, etc.) to monitor policy developments?

A: Yes
 B: No

Source: IMF-World Bank Global Fintech Survey.

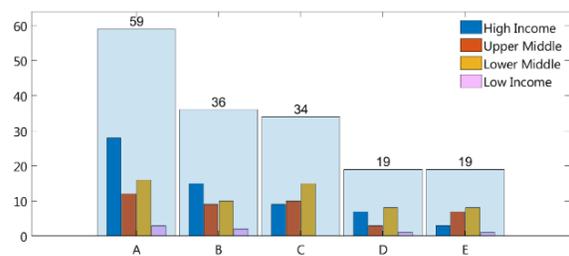
Annex III. Figure VI. Adapt Regulatory Framework and Supervisory Practices for Orderly Development and Stability of the Financial System

Question 27



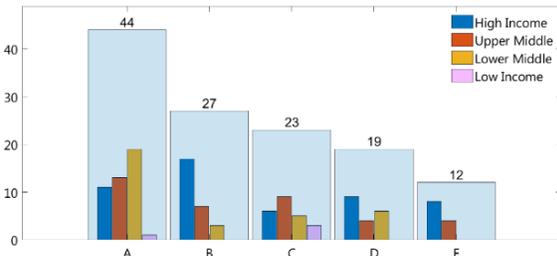
Have financial regulators in your jurisdictions identified fintech as an emerging risk (e.g., in public statements or financial stability report) (excluding cyber risk)?
 A: Yes
 B: No

Question 28



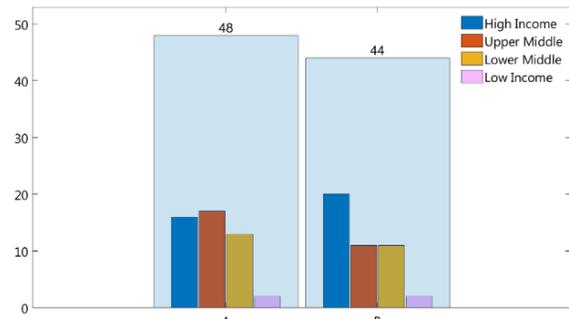
In which areas have authorities identified gaps in the existing regulatory framework, resulting from fintech developments, that need to be addressed (please check all that apply)?
 A: Crypto-Assets: Issuance, Exchange and Custody
 B: Peer to peer lending
 C: Mobile Money / payments services
 D: Investment Products with Robo-Advisors
 E: Lending Activities with artificial intelligence and machine learning on credit scoring

Question 29



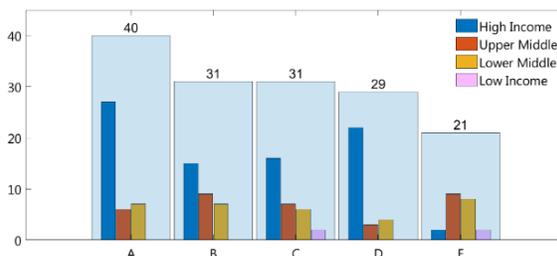
In which areas have authorities modified their regulatory framework (e.g. expanding the perimeter or introducing a new regulation) to address emerging risks from fintech activities (please check all that apply)?
 A: Mobile money / payment services.
 B: Crypto-assets: Issuance, Exchange and Custody.
 C: None
 D: Peer to peer lending.
 E: Others: [Please provide brief description]

Question 30



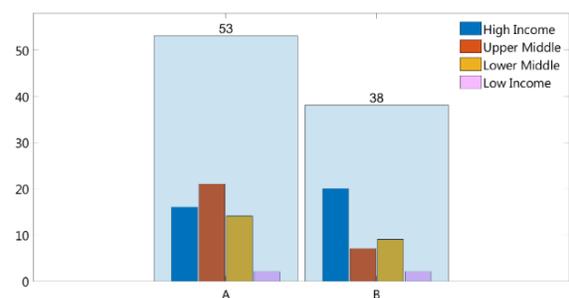
Is there a framework for registering and/or licensing new fintech driven service providers?
 A: No
 B: Yes

Question 31



Have authorities modified their regulatory and supervisory approach to facilitate the development of fintech and/or develop supervisory capacity (please check all that apply).
 A: Set up special contact point for fintech questions.
 B: Allowed sandboxes.
 C: Other. [Please provide brief description]
 D: Established Innovation hubs.
 E: None.

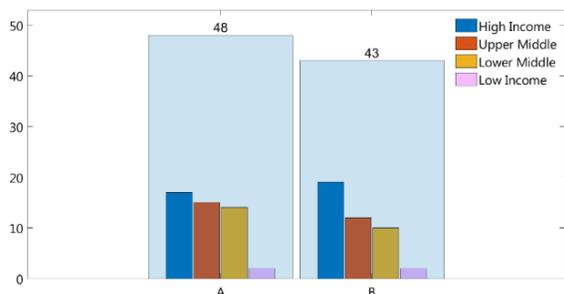
Question 32



Have consumer and/or investor associations or the relevant regulatory authorities publicly raised the need for enhancing consumer and/or investor protection as a result of material misconduct (e.g. market manipulation, fraud related to ICOs, predatory len)
 A: No
 B: Yes

Annex III. Figure VI. Adapt Regulatory Framework and Supervisory Practices for Orderly Development and Stability of the Financial System (concluded)

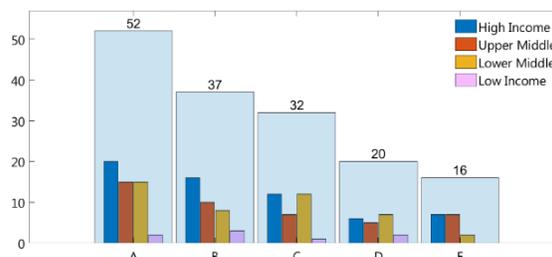
Question 33



Do financial regulators actively promote the use of enhanced technology to support regulatory compliance (Regtech) (e.g. for transaction monitoring, determining and monitoring investor/customer profiles, streamlining compliance workflows)?

A: No
B: Yes

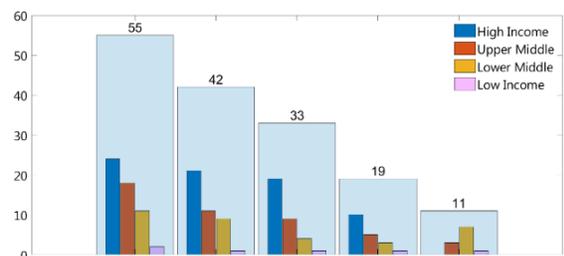
Question 34



For which purpose do financial regulators actively use or consider using enhanced technology to support supervisory activities (Suptech) (please check all that apply).

A: For regulatory reporting.
B: For market surveillance.
C: Suptech is not considered at present.
D: For credit risk analysis.
E: Other. [Please provide brief description]

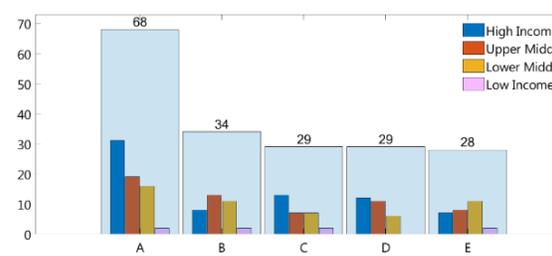
Question 35



Have financial sector regulators undertaken actions to increase their capacity to keep up with fintech developments (please check all that apply)?

A: Provided specialized training to staff.
B: Concentrated knowledge in a specialized unit.
C: Hired specialized staff.
D: Other. [Please provide brief description]
E: None.

Question 36



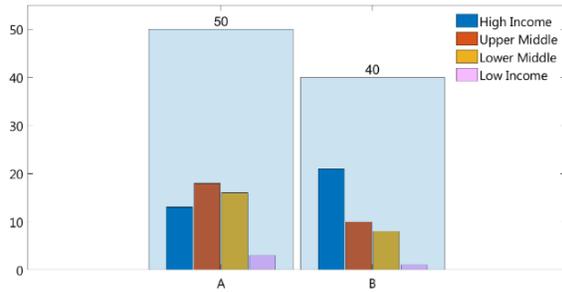
Which are the top three areas where there is a need to revise existing international standards or develop new standards related to fintech developments?

A: Crypto-assets: Issuance, Exchange and Custody.
B: Mobile money / payment services.
C: Peer to peer lending.
D: Algorithmic/Automated trading and/or smart contracts.
E: Lending activities with artificial intelligence and machine learning on credit scoring.

Source: IMF-World Bank Global Fintech Survey.

Annex III. Figure VII. Safeguard Financial Integrity

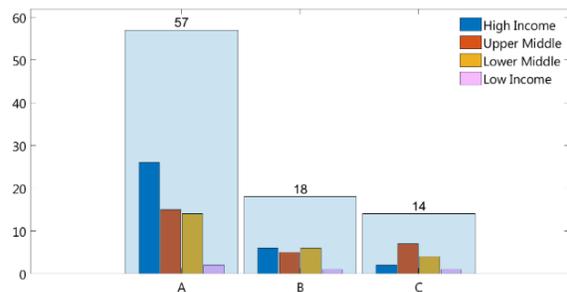
Question 37



Do authorities have a mechanism, at the national or supervisory level, for identifying, understanding and assessing risks of criminal misuse emanating from fintech products and services?

- A: No, we do not have such a mechanism as this is left to financial institutions and consumers to assess the risks for themselves.
- B: Yes

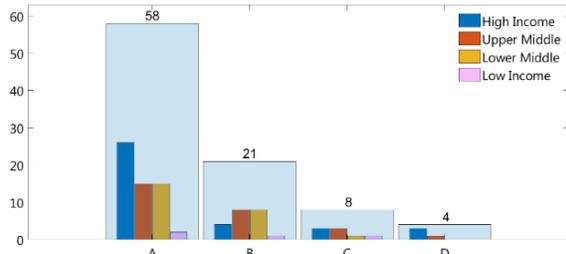
Question 38



Do authorities observe any trend of increased money laundering risks through the anonymity that some fintech products provide such as electronic wallets and mixing services that hide their owners' identity?

- A: Yes, we are concerned about increased money laundering risks.
- B: No, we do not observe any trend of increased money laundering risks.
- C: We do not monitor fintech developments closely.

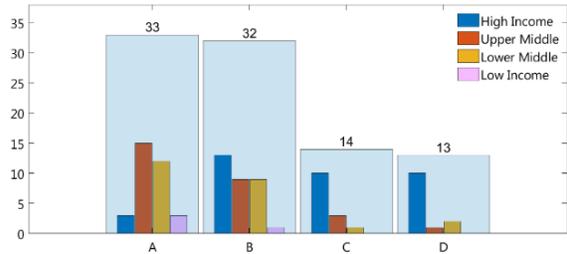
Question 39



What approach have the authorities adopted to respond to the challenges associated with fintech-related financial integrity risks?

- A: Adapted the country's existing AML/CFT framework to address the risks.
- B: No action has been taken.
- C: Refrained from taking action while monitoring developments and potential ML/TF risks.
- D: Banned all or part of specific activities deemed more at risk, such as "initial coin offerings."

Question 40

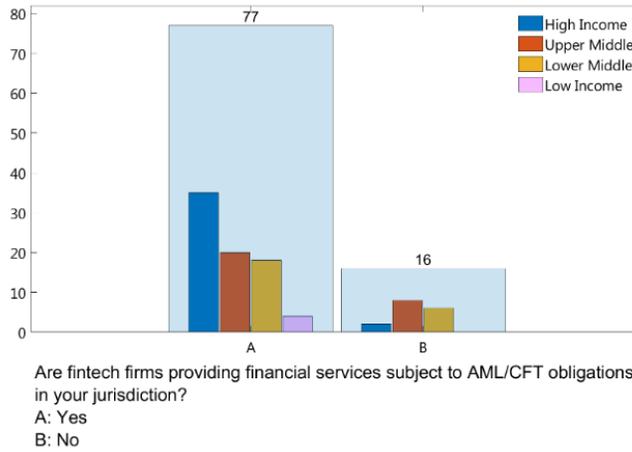


Has your jurisdiction taken legislative or regulation actions on crypto assets from the AML/CFT perspective?

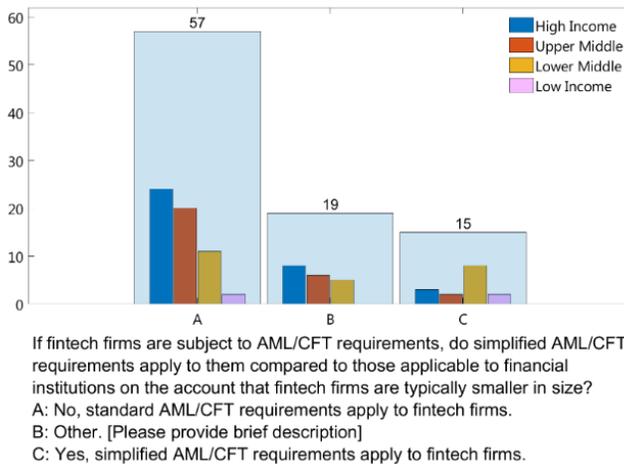
- A: No action has been taken.
- B: Other. [Please provide brief description]
- C: Yes, we have subjected crypto assets to the AML/CFT framework by amending existing AML/CFT provisions.
- D: Yes, we have subjected crypto assets to the AML/CFT framework by encapsulating crypto assets under existing AML/CFT framework.

Annex III. Figure VII. Safeguard Financial Integrity (concluded)

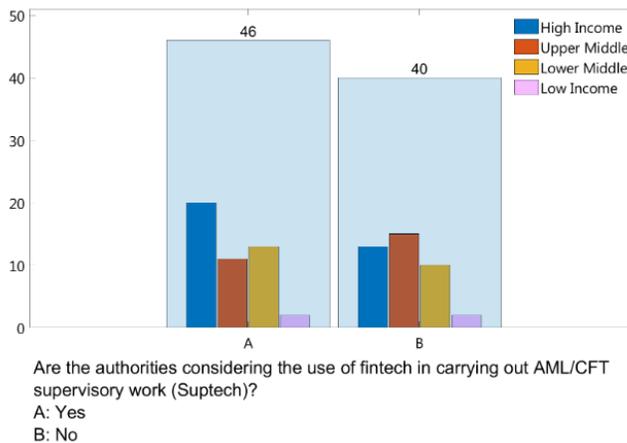
Question 41



Question 42



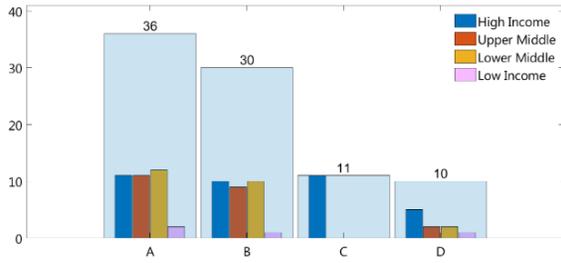
Question 43



Source: IMF-World Bank Global Fintech Survey.

Annex III. Figure VIII. Modernize Legal Frameworks

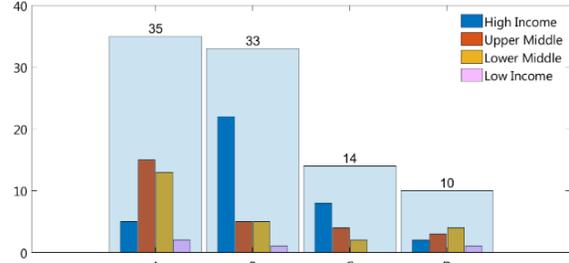
Question 44



Do you consider your jurisdiction's existing securities law sufficiently broad to encompass and provide certainty and clarity with regard to fintech developments, such as the treatment of crypto assets, distributed ledgers, and automated processes such as

A: No and we are not considering any changes at present.
 B: No but we are considering changes at present.
 C: Yes, but we are considering further changes at this moment.
 D: Yes, and we are not considering any further changes at present.

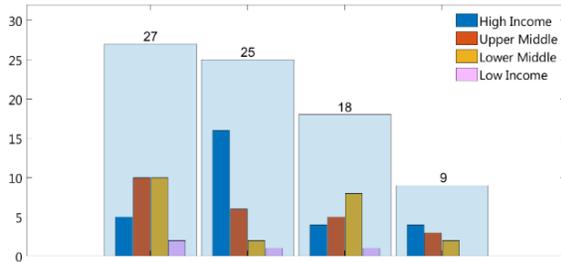
Question 45



Do you consider your jurisdiction's existing payments law sufficiently broad to encompass and provide sufficient certainty and clarity with regard to fintech developments?

A: No but we are considering changes at present.
 B: Yes, and we are not considering any further changes at present.
 C: Yes, but we are considering further changes at this moment.
 D: No and we are not considering any changes at present.

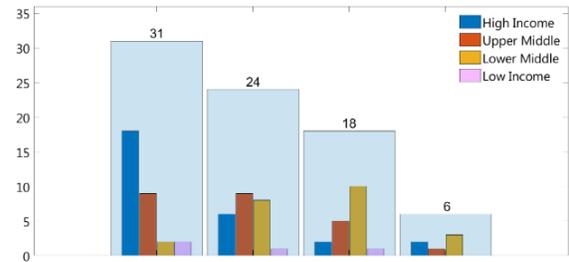
Question 46



Do you consider your jurisdiction's existing contract law sufficiently broad to encompass and provide sufficient certainty and clarity with regard to fintech developments?

A: No and we are not considering any changes at present.
 B: Yes, and we are not considering any further changes at present.
 C: No but we are considering changes at present.
 D: Yes, but we are considering further changes at this moment.

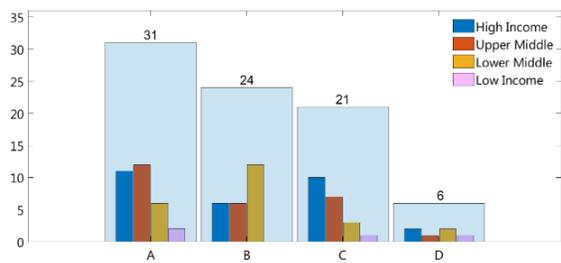
Question 47



Do you consider your jurisdiction's existing insolvency regime and bankruptcy framework sufficiently broad to encompass and provide sufficient certainty and clarity with regard to fintech developments?

A: Yes, and we are not considering any further changes at present.
 B: No and we are not considering any changes at present.
 C: No but we are considering changes at present.
 D: Yes, but we are considering further changes at this moment.

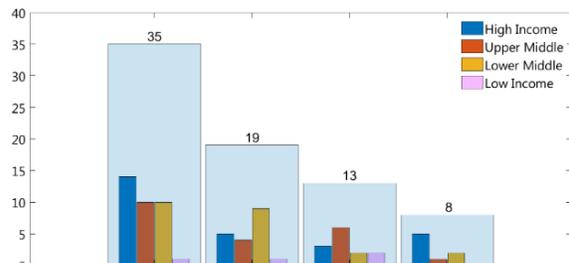
Question 48



Do your jurisdiction's legal frameworks (namely, in each of the areas of securities, payments, contract, insolvency, and bankruptcy) recognize or otherwise support digital features and functionalities such as electronic signatures, dematerialized security

A: Yes, and we are not considering any further changes at present.
 B: No but we are considering changes at present.
 C: Yes, but we are considering further changes at this moment.
 D: No and we are not considering any changes at present.

Question 49



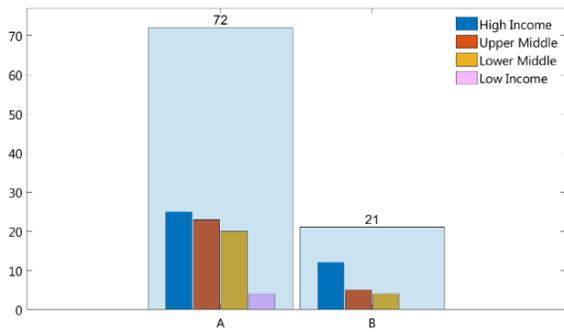
Do your jurisdiction's intellectual property law and other relevant legal frameworks provide sufficient clarity with regard to the ownership of data and limitations around how data may be used?

A: Yes, and we are not considering any further changes at present.
 B: No but we are considering changes at present.
 C: No and we are not considering any changes at present.
 D: Yes, but we are considering further changes at this moment.

Source: IMF-World Bank Global Fintech Survey.

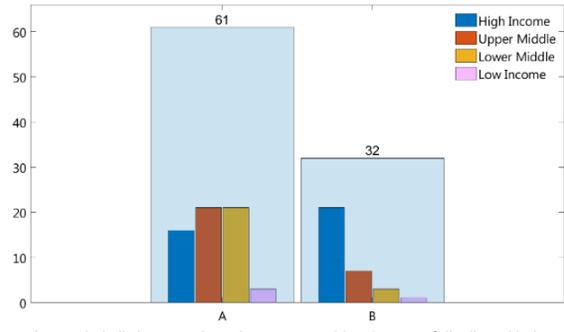
Annex III. Figure IX. Ensure the Stability of Domestic Monetary and Financial Systems

Question 50



Is your jurisdiction's central bank looking into issuing retail digital currencies (CBDCs)?
 A: No
 B: Yes

Question 51

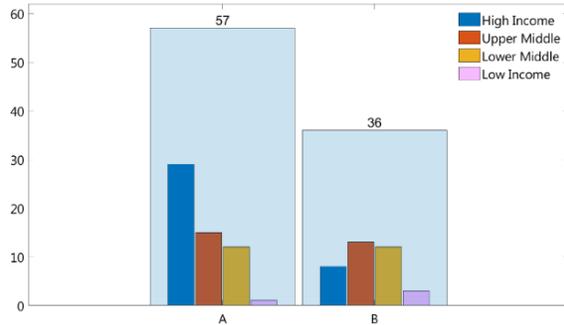


Is your jurisdiction experimenting or researching the use of distributed ledger technology in its payment and settlement systems, where applicable?
 A: No
 B: Yes

Source: IMF-World Bank Global Fintech Survey.

Annex III. Figure X. Develop Robust Financial and Data Infrastructure to Sustain Fintech Benefits

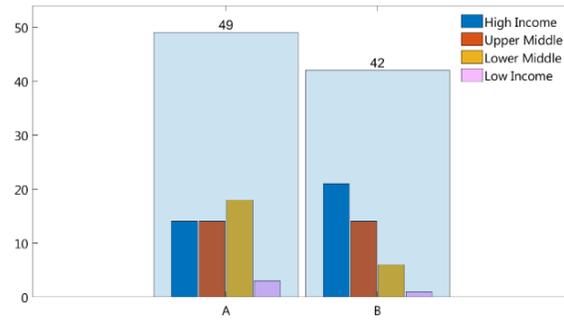
Question 52



Have financial regulators identified cyber risk in fintech as an emerging risk; e.g., in public statements or financial stability reports?

A: Yes
B: No

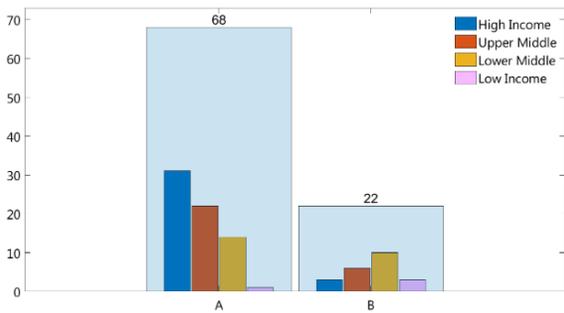
Question 53



Are there established industry standards in place to encourage cyber resilience applicable to fintech?

A: No
B: Yes

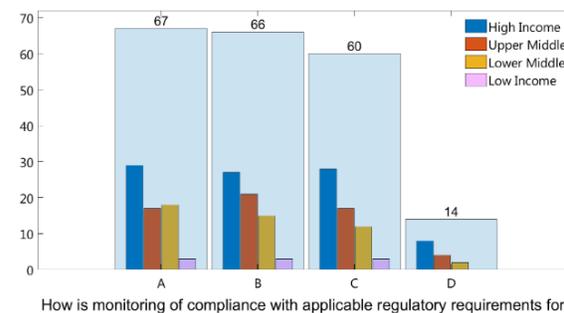
Question 54



Has the supervisor implemented minimum standards for cyber risk management and governance applicable to financial sector participants, including fintech?

A: Yes
B: No

Question 55

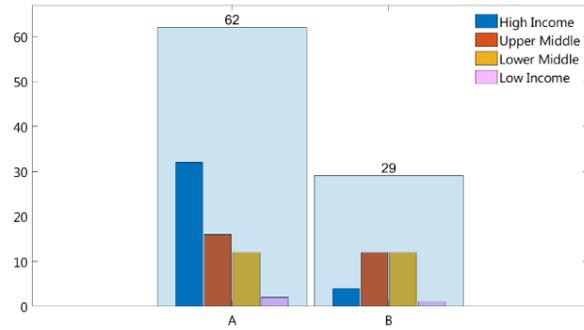


How is monitoring of compliance with applicable regulatory requirements for cyber security conducted (please check all that apply)?

A: Onsite inspection.
B: Reporting requirements.
C: Offsite activities.
D: Other. [Please provide brief description]

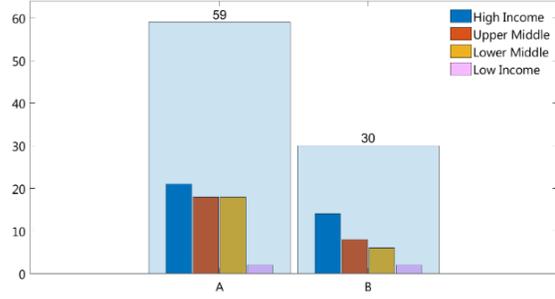
Annex III. Figure X. Develop Robust Financial and Data Infrastructure to Sustain Fintech Benefits (concluded)

Question 56



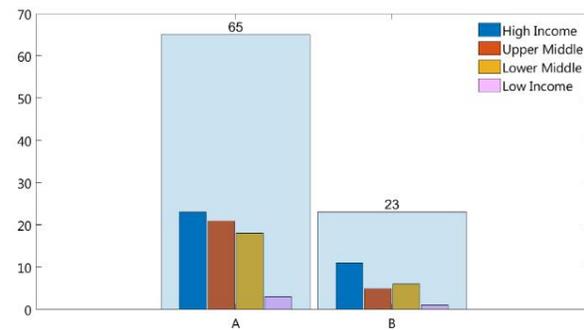
Have authorities implemented minimum requirements regarding third party service providers that would apply to fintech?
 A: Yes
 B: No

Question 57



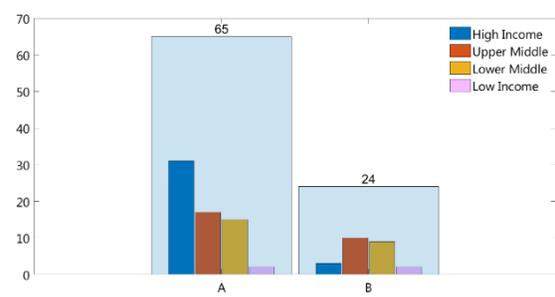
Have authorities conducted analysis of the IT interdependencies between market players (banks, fintech and others) and market infrastructures, which could cause threats to operational resilience?
 A: No
 B: Yes

Question 58



Has the supervisor addressed potential concentration risks of technology suppliers or outsourced services (for instance, concentration in so-called bigtech)?
 A: No
 B: Yes

Question 59

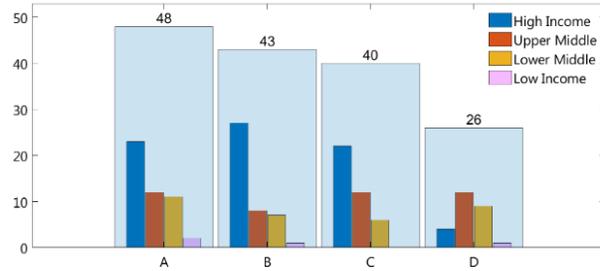


Have authorities issued guidance or regulations for the financial sector to ensure that robust data governance frameworks are in place to address issues of data ownership, privacy, integrity, protection, and the ethical use of data?
 A: Yes
 B: No

Source: IMF-World Bank Global Fintech Survey.

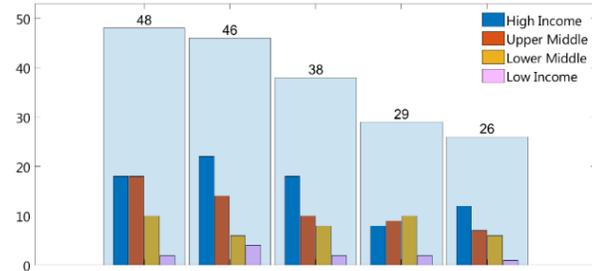
Annex III. Figure XI. Encourage International Cooperation and Information-Sharing

Question 60



Have you shared information about specific policy responses to the evolution of the financial system to fintech developments (please check all that apply)?
 A: Yes, with international financial institutions (e.g., IMF, WB, BIS, FSB, etc.).
 B: Yes, we shared information with other countries' authorities.
 C: Yes, with international standard setting bodies (e.g. FSB, BCBS, CPMI, IOSCO, IAIS, FATF).
 D: No, we have not shared any information with other countries or international organizations.

Question 61

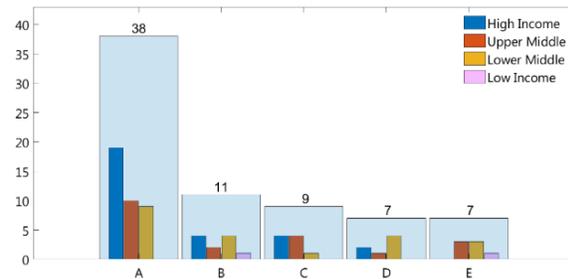


In which areas do you think lessons from your own experience with fintech could best benefit other countries (please check all that apply)?
 A: Payments and security settlement systems.
 B: Legal, regulatory frameworks.
 C: Supervisory frameworks.
 D: Financial development and inclusion for both households and firms.
 E: AML/CFT.

Source: IMF-World Bank Global Fintech Survey.

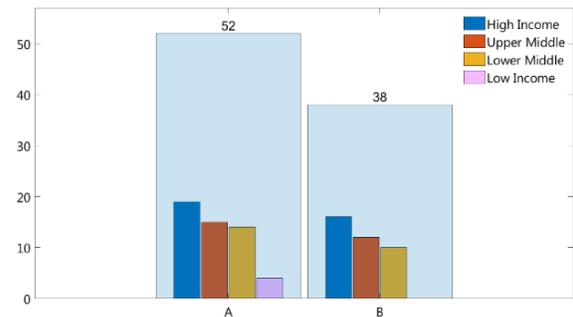
Annex III. Figure XII. Enhance Collective Surveillance of the International Monetary and Financial System

Question 62



Where do you see the largest data gaps with regards to monitoring fintech activities across borders?
 A: Crypto assets.
 B: Payments systems (including mobile and DLT-based).
 C: Other. [Please provide brief description]
 D: IT outsourcing including cloud computing/storage.
 E: KYC applications.

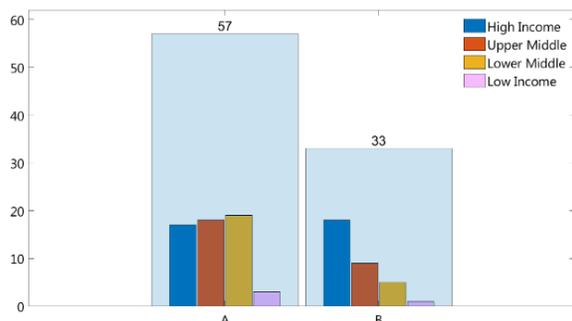
Question 63



Do you see fintech developments having a major impact on cross-border capital flows and spillovers?
 A: Yes
 B: No

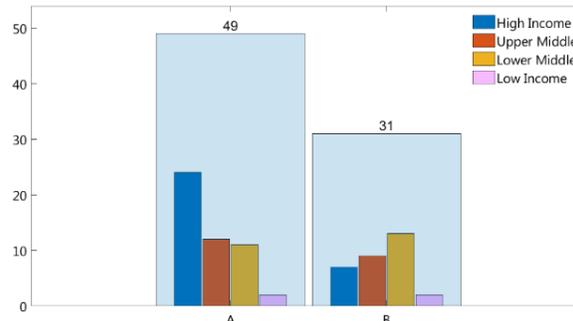
Annex III. Figure XII. Enhance Collective Surveillance of the International Monetary and Financial System (continued)

Question 64



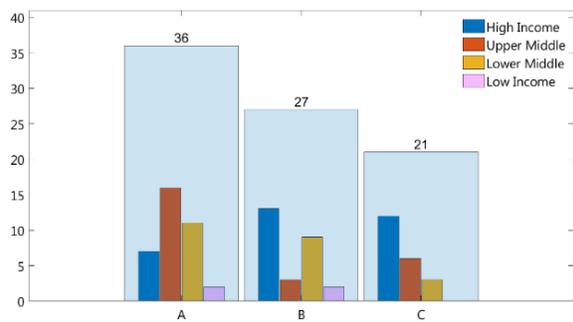
Do you see fintech developments having a major impact on the operation of the International Monetary System?
 A: Yes
 B: No

Question 65



Do you see fintech developments having a major impact on the way the Global Financial Safety Net (GFSN) is organized?
 A: No
 B: Yes

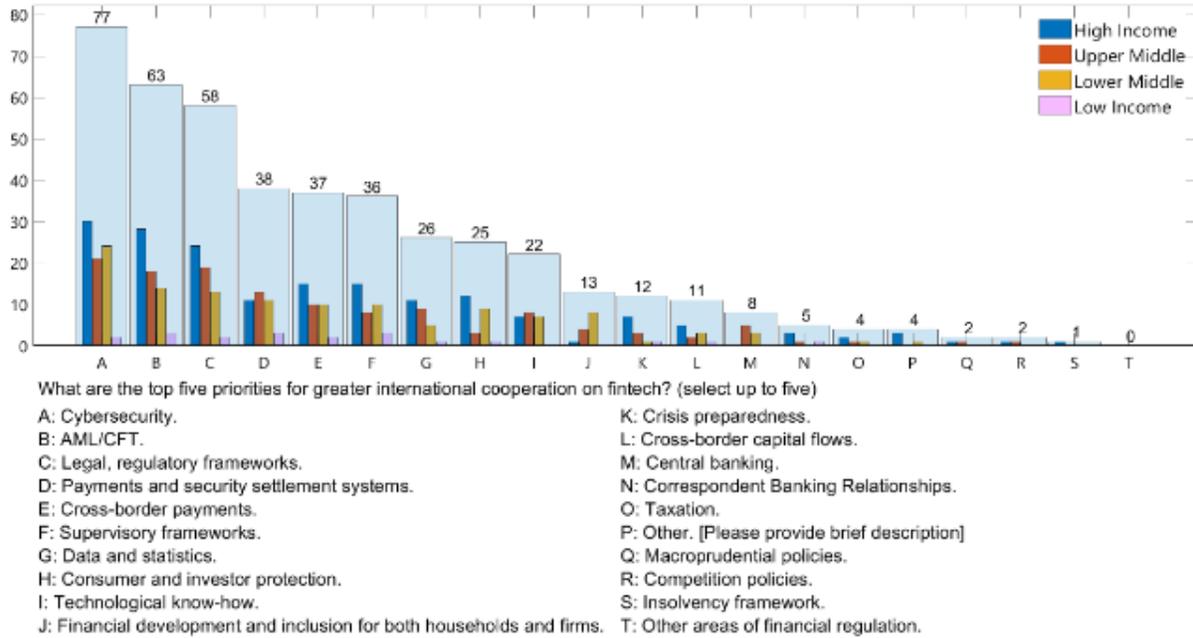
Question 68



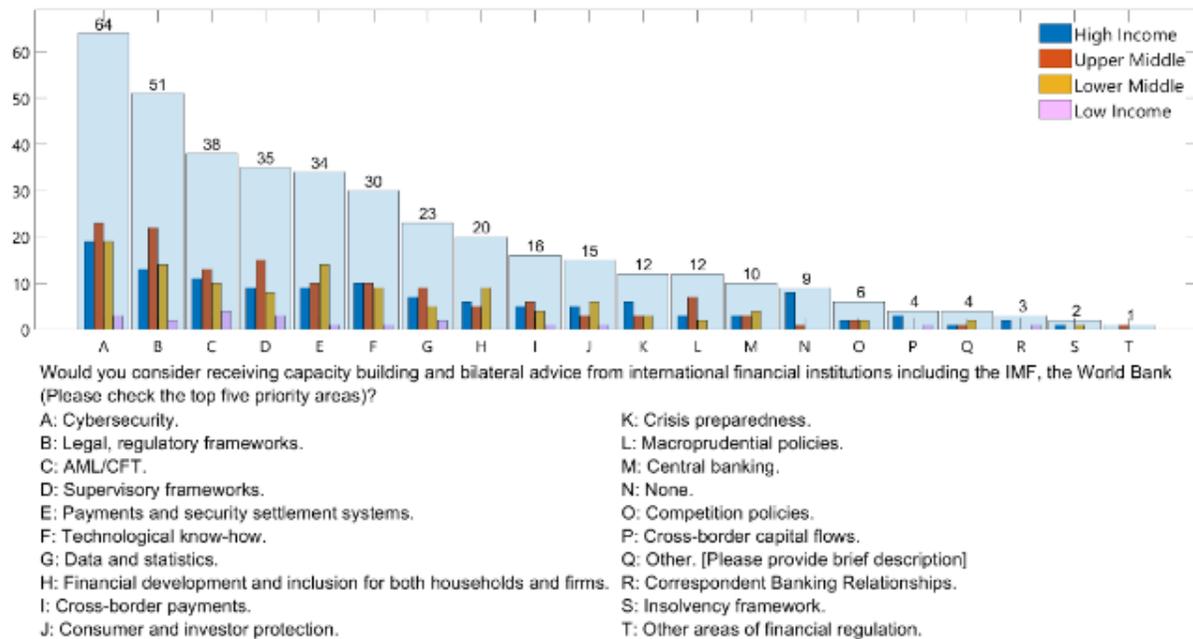
Do you intend to or would you consider contributing, as a donor country, to strengthening capacity development activities related to fintech innovations?
 A: No
 B: Maybe
 C: Yes

Annex III. Figure XII. Enhance Collective Surveillance of the International Monetary and Financial System (concluded)

Question 66



Question 67



Source: IMF-World Bank Global Fintech Survey.