

FinTech Data Gaps Policy Report

Fintech Data Gaps Working Group
(Data Gaps WG)

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CEMLA FINTECH FORUM

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1. Introduction

This document aims to provide an overview of the main issues related to data gaps to facilitate monitoring of FinTech and overcome the significant challenges towards incorporating FinTech activities in regular statistics. Moreover, the document explains the implications of data gaps on some of the central banks' main areas, in particular, monetary policy, financial stability, payment systems, and economic activity. Additionally, other implications related to the activity of BigTech companies, the impact of COVID-19 and Cybersecurity issues are explained, which represent an important challenge for data gathering at Central Banks. Also, it describes the main findings of the Irving Fisher Committee (IFC) survey "Central Banks and FinTech data" based on the answers provided by Latin American and Caribbean (LAC) countries, which identify their different positions regarding this topic and the current initiatives that each one is launching. Finally, a number of next steps are proposed based on a policy discussion and how LAC countries could overcome data gaps and improve data collection based on their current experience.

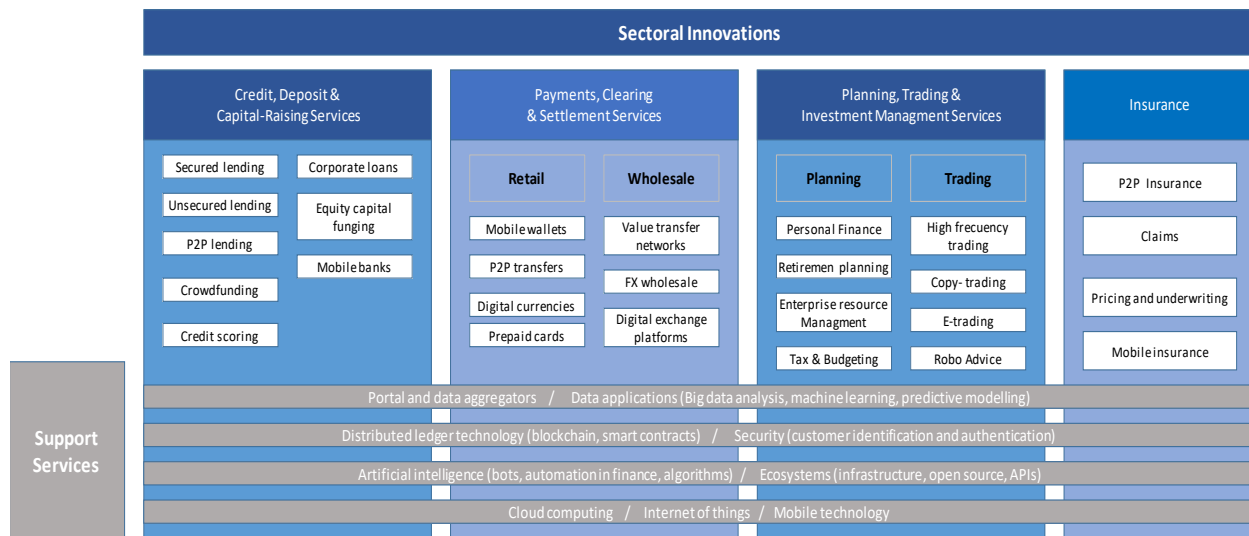
After the Global Financial Crisis (GFC), which started in 2007 and fully developed after the default of Lehman Brothers in 2008, the report "The Financial Crisis and Information Gaps" was produced by the Financial Stability Board (FSB) and the International Monetary Fund (IMF). This report had its origin in a request by the G20 ministers to study information gaps and ways to close them, resulting in two phases of work (DGI-1 and DGI-2), under this broader initiative which aims to be finished by 2021. The FSB has stressed on its reports a very important aspect which is of relevance for this report as well: "Data gaps limit the ability of policymakers and market participants to assess financial stability risks and economic developments in a timely and accurate manner".¹

The GFC revealed how important it is to be aware of interconnections and to be up to date on the consequences of financial innovation. The financial landscape could be considered less stable (or more dynamic) after the crisis, but this should not be an excuse to avoid closely monitoring recent developments, such as the FinTech activity. For this reason, regulators and policy makers have started to work on data gaps for the FinTech industry. Moreover, regulators and policy makers are aware of the tremendous speed at which the FinTech industry is growing. This is why many members of the CEMLA's FinTech Forum, endorsed the creation of the working group on FinTech Data Gaps.

Central banks should care about these possible data gaps for two main reasons: first, as with many other economic activities, it is necessary to monitor and classify correctly this "new" type of economic activity in the national accounts, something that is not always easy to achieve, considering the global and cross-sectional nature of FinTech activities (see Figure 1). Second the speed of growth of the sector and the number of activities offered is remarkable and could have important implications for the development and stability of the financial system.

¹ See: FSB (2019). "G20 Data Gaps Initiative (DGI-2): The Fourth Progress Report — Countdown to 2021"

Figure 1. FinTech activities.



Source: Own elaboration with information from the BIS, IAIS and IOSCO.

Similar to many other novel concepts, there are numerous definitions of what FinTech is and for this reason we will enumerate only a few in order to lay the basis for the rest of the concepts discussed in this report. Although this report is about FinTech data gaps, a working definition is necessary in order to guide our discussion on why it is necessary to study such gaps.

In this document the FSB definition is adopted: “Technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services.”

Once the working definition for the FinTech industry has been specified, we will elaborate on the relationship of the FinTech industry with important aspects and relevant tasks of central banks. In doing so, we will describe some of the initiatives for data gathering in the region.

It is important to mention that some of the related FinTech activities are cross border in nature and some jurisdictions are still on the drawing board regarding FinTech regulation. These two aspects have important implications for regulators and policy makers, as there are many different definitions for some FinTech concepts and the lack of regulation difficult the data gathering process. Moreover, the cross-border nature of some activities, like payment services, could hamper authorities’ ability to detect money laundering and terrorism financing.

In many jurisdictions in the region, most of the activities performed by FinTech companies lie outside the regulatory perimeter, and hence they are not subject to reporting requirements. This makes it hard to study their implications for many areas such as monetary policy implementation or to detect emerging risks to the stability of the financial system. Moreover, monitoring the activity of FinTech companies could be also difficult since they are not classified adequately under the current statistical frameworks and authorities have no legal rights to access their data.

In this context, there are initiatives in some of the jurisdictions with the purpose of getting access to the FinTech sector data. For example, regulatory sandboxes² represent a good source of information just to get a feeling of the market, as well as to rely on FinTech associations and the use of administrative sources (such as mercantile registers), as focal points to compile information. In some jurisdictions the current size of the sector is still small and do not represent a threat to the financial system. However, there is no guarantee that this is going to be the case in the medium term and, in fact, the current growing trend points to a different direction.

The rest of the document is organized as follows: Section 2 explains the impact of FinTech on several aspects which are of relevance for central banks and present important challenges and opportunities in terms of data, namely, monetary policy, financial stability, payment systems, BigTech, COVID-19, and cybersecurity. Section 3 presents the main results of a survey conducted in close cooperation with the IFC. Section 4 discusses the main policy implications in terms of data gaps and the related initiatives in order to close those gaps. Finally, Section 5 concludes.

2. Implication on Central Banks

This section discusses the possible implications, in terms of data, that FinTech activities could have on crucial tasks performed at central banks. Among such tasks one can find monetary policy implementation and transmission, financial stability, financial markets infrastructures regulation and oversight, among some others.

2.1 Monetary policy and data gaps

Monetary policy consists of the decisions taken by the Central Bank in order to accomplish its main objectives: price stability and in some cases also economic growth. Within this context, one of the pillars of modern monetary policy is the understanding of monetary transmission. This transmission is the mechanism by which policy actions taken by the Central Bank are reflected on the economy's real sector, and therefore, guide the authorities towards their preferred direction (Gigineishvili, 2011).³

² A regulatory sandbox in the FinTech context refers to the framework in which financial innovators can operate in a live environment under the scrutiny of a regulator for a limited amount of time. First, it allows experiments to take place, even where it is not possible at the outset to anticipate every risk or meet every regulatory requirement. Second, it provides an environment where if an experiment fails, it fails safely and cheaply within controlled boundaries, without widespread adverse consequences for the financial system. In these schemes the applicant jointly with financial authorities define the boundaries within which the experiment will take place and then authorities can determine the specific legal and regulatory requirements which it is prepared to relax for the duration of the experiment within these boundaries.

³ Broadly speaking, economic literature has explained the monetary policy transmission through five main channels: credit (balance sheet and bank loans), interest rates, asset prices (wealth effect), inflation expectations and exchange rate. Some of these do not act independently but simultaneously or as complementary processes.

In general, theoretical models depart from a scenario where there is a complete transmission from changes in monetary policy interest rate towards interest rates of the financial system. But the empirical evidence has shown that this pass through is incomplete; it has a lagged effect because of the market's structural characteristics such as its industrial

Accordingly, for monetary authorities to control and lead the design and implementation of monetary policy it is necessary to have a profound knowledge on how and for how long, the transmission mechanism of their monetary policy instruments impact the economy; as stated by Mishkin (1996), there is a need for identification and understanding of the mechanisms under which the monetary policy affects the main economic variables.

Under this perspective, to have a better understanding of the FinTech industry seems crucial for monetary policy purposes. The services provided by FinTech firms may have an effect on the efficiency of the pass through between monetary policy decisions (changes in monetary policy, reserve requirements, among others) and other macroeconomic variables which may influence the attainment of price stability.

This can be explained given that they may prevent in a partial or complete manner financial intermediation. Central Banks and commercial banks are closely related, as money supply travels from lending activities of commercial banks. Term transformation and fractioned banking activity are the basis for the wide range of services commercial banks offer. Instead, FinTech allows direct financing from savers to borrowers enabled by technology and new business models.

As mentioned by Choy (2018), the way in which monetary policy is designed and conducted will have to adapt to changes and challenges brought by new technologies. Probably, policy transmission mechanisms will have changes, and more transmission channels would develop away from the banking system as we know it today. Also, a generational bias might take place given that new technologies tend to be more accessible to a specific collective, which could create some asymmetries on the monetary policy effects.

Within all FinTech services, the payment systems' business areas are recognized as those which overlap with Central Bank activities as they may affect the monetary policy transmission channels and therefore, as those which have created data gaps in statistics of its interest such as Monetary and Financial Institutions, Payment Systems and Financial Accounts.

In general, the source of these gaps has been that FinTech firms are not always obliged to provide information about their activity. Given that in some cases they are outside the regulatory perimeter, there is no reporting obligation. In other cases, it might be that the scope of information requirements is narrow and there is not enough data to monitor or analyze the effects of this industry on the effectiveness of monetary policy.

There is also a problem of information classification, which may result in a source of data gaps. For example, according to the service they provide they might be either new firms, existing IT companies which have developed a financial service or traditional financial intermediaries which are offering a new set of technological products, and not all of them are registered as suppliers. Therefore, it seems as if the natural order to improve data and statistics is to include in current statistics those of FinTech

organization, entry barriers, sunk costs, or regulations. Also, the way in which financial institutions perceive the changes in monetary policy may have different effects; for example, if they consider that the change is transitory, their incentive to modify their own interest rates on the same direction will be low.

service providers according to the activities they perform. But still, it can be hard to measure as FinTech might not be fully identified or they change between the services they might provide.

Further, there is another area in which FinTech services and monetary policy encounter: cryptocurrencies and stable coins. Within the era of digital money, these have been recognized as possible threats and as a big challenge to Central Banks, specifically, to the sovereignty of its currency.

Money has evolved, and nowadays has a fiat nature, which means that users have trust on its issuer and therefore, recognize money as medium of exchange for transactional purposes. Moreover, it means that its value will be determined by supply and demand and by the agents' perception of its worth.⁴

Digital currencies do not have a physical representation, are issued and put in circulation by private agents on a decentralized global platform, are a medium of exchange between digital tokens and goods and services, and have a specific unit of account, as stated by Alfaro and Muñoz (2019).

Global stable coins and cryptocurrencies are a part of them, the variation with the latter is that they rely on cryptographic technology for trading and recording on electronic-registry books, and with the former, is that they are pegged to an underlying asset.

The main differences between these assets and money issued by a Central Bank is that they do not represent a liability for its issuer and that their exchangeability depends on the agreement between both ends of the transaction, as none is obliged to pay or receive them as payment. This stands as one of the biggest challenges for digital currencies.

Therefore, on the one hand, these assets are recognized as a way to ensure a transparent global network for circulation, to be created by a credible algorithm, and to be a transaction mechanism that is relatively safe, fast, and inexpensive, but on the other, they (still) have no wide credibility or stability. In addition, the functioning of this transaction mechanism depends on private operators that can decide to stop working depending on the value of the digital currency and/or the cost of electricity. Thus, the problem of the system stability should be remarked.

As mentioned by Dabrowski and Janikowski (2018), despite their technological advances and global reach, digital currencies are far from being able to challenge the dominant position of sovereign currencies and the monetary policies of central banks, however, in extreme cases (hyperinflation, political turmoil, etc.), they can become a means of currency substitution. Therefore, for now, these assets represent a challenge to financial regulators, particularly because of their anonymity and cross-border character.

FinTech data gaps may impact the effectiveness of monetary policy due to FinTech engaging in activities such as peer to peer lending, crowdfunding, digital currency solutions to facilitate online

⁴ Overall, there are four general characteristics of money: unit of account, medium of exchange, store of value and standard of deferred payment, but also, money is issued and backed by a central authority (European Central Bank, 2012), and has other characteristics associated with being a medium of exchange. According to He et al. (2006), money is of legal tender, transferable, accepted for its nominal value, has no transaction costs, no expiration date and does not pay interests.

payments. As such, there is a need to close these data gaps in order to determine the (possible) impact that this industry may have on its transmission effectiveness.

The new monetary policy design and follow up will require, necessarily, to know in a detailed manner the operations and transactions of FinTech firms (e.g. loan level data, financial statements, volume of transactions with digital currencies...), and eventually, some kind of regulation that provides the Central Bank with an influence degree on the new transmission channels or on their creation. In terms of data requirements, one way of obtaining this information could be to incorporate FinTech activities on the regulatory perimeter – keeping some proportionality with their size. It is suggested, then, that the statistics and regulation turn to be activity-based. Moreover, data sharing among different authorities is particularly relevant in order to organize efficient statistics while keeping the reporting burden to a minimum, and many central banks are taking steps in this direction (IFC, 2020).

2.2 Financial Stability

Since the global financial crisis, financial stability has been a priority for central banks and financial authorities. Financial stability can be understood as a condition in which financial institutions, markets and their infrastructures facilitate the exchange of funds among deficit and surplus agents, with adequate risk management, thus contributing to the proper functioning of the economy and the achievement of sustainable economic growth. Financial stability also implies that the financial system is able to withstand shocks, while it also contributes to maintain an environment of macroeconomic stability and growth. An adequate functioning of the financial system also contributes to ensure price stability, since it promotes a more efficient operation of monetary policy's transmission channels. Financial stability is a necessary condition to reach sustainable and balanced growth given that, as international experience has showed, periods of financial instability have translated into high costs to societies. In this regard, by its effects over the economy, financial stability could be considered a public good.

When analyzing financial stability, one of the relevant factors is the degree of interconnectedness in the financial system, as shocks could spread more easily as interconnectedness increases. In this sense, while interconnectedness is not bad by itself, it is important to measure and analyze it in order to understand potential risks and how they could be propagated or amplified across the system. In relation to this aspect, the recognition of potential risks to financial stability due to the increase in FinTech activity would allow central banks to identify new data gaps and, to the extent of their possibilities, gather new information to close these gaps. The aim of this section is to identify the main risks that FinTech activity could pose to financial stability and whether any potential data gaps could constitute an obstacle to their identification and measurement.

The section is structured as follows: the first part identifies the main risks for financial stability resulting from the participation of FinTech in the financial system; the second part points out the main data gaps that would limit the monitoring of such risks.

FinTech Risks for Financial Stability

A first step in analyzing the risks that FinTech could imply for financial stability is the identification of the magnitude of its potential effect on financial stability, as well as the probability associated to the materialization of such event. That said, the magnitude would depend, mainly, on the size of the FinTech sector and on its interconnectedness to the rest of the financial system. A small FinTech sector could have limited impact on financial stability, even if its degree of connectivity with other intermediaries were high. Similarly, a larger FinTech sector could also have limited impact on the rest of the financial system if its interconnectedness with them were low and if it did not have a high impact on the banks' business. Although this last case implies that there is little effect, or contagion, from the shock arising in the FinTech sector to other intermediaries, its effect on financial stability would depend on the relative size of the FinTech sector, as well as on additional aspects, such as confidence in the financial system. Additionally, it is worth mentioning that FinTech could increase the complexity of the financial system by increasing the level of interconnectedness or by changing the structural properties of the financial ecosystem (as a consequence, small shocks may spread and expand). In this regard, it is essential that market participants have enough information available to adequately assess the risks inherent to the business models of FinTech.

The identification of potential risks for financial stability associated to FinTech can be addressed in two directions:

- 1) Through the identification of current vulnerabilities in the financial system that could be increased by FinTech interrelation with other financial system participants, or new vulnerabilities generated by FinTech; and
- 2) Understanding how shocks coming from FinTech can be amplified and propagated throughout the financial system and to the real economy.

Given that some of the activities carried out by FinTech could be similar to those conducted by other financial intermediaries, their associated risks would be comparable: credit risk, market risk, liquidity risk, maturity mismatches, among others. Additionally, exposures of financial intermediaries to FinTech could trigger risks for financial stability if this sector were to face financial turmoil. As mentioned before, the extent of the impact on the rest of the financial system would depend on the level of interrelationship between FinTech and other financial intermediaries.

Credit risk

Loan origination by FinTech considers that it can be directly provided by FinTech firms or indirectly, using innovative technology, as Peer-to-Peer lending (P2P), which allows users of FinTech platforms to directly provide credit among them. FinTech credit activity could have benefits for financial stability,⁵ such as access to alternative funding sources, the potential opportunity to foster financial inclusion and the incentives to incumbent banks to improve the efficiency of the financial services

⁵ For further discussion of FinTech benefits and risks for financial stability, see Financial Stability Implications from FinTech Supervisory and Regulatory Issues that Merit Authorities' Attention. FSB, June 2017.

they offer. On the other side, the possibility for end users to become direct lenders exposes them to similar risks than those faced by regulated financial institutions, but without the same level of experience or risk management capabilities. Additionally, the heavy reliance on algorithms and extensive usage of large volumes of data (big data), as result of the innovative nature of their business models, could pose a risk if models were flawed or ill-calibrated. This aspect is more relevant for FinTech, as their technological platform allows a faster completion of transactions. As mentioned, FinTech credit includes not only the service of linking investors to creditors using a technological platform, but also the credit offered directly by FinTech firms with their own resources or with those borrowed from other intermediaries, which increases disintermediation. If data on FinTech credit activity is not reported, it would not be possible to have an accurate picture of total indebtedness in the economy, or a good assessment of credit risk or the extent of interconnections with other financial intermediaries.

Market and Liquidity risks

The maturity transformation assumed by FinTech firms is considered a low source of risks as in this case, FinTech activity consist on being a channel of contact between debtors (persons, firms or entrepreneurs) and investors, which accept to lend the money requested by debtors for a predefined purpose (personal consumption, buy supplies, repay other credits, funding or participating in the returns of an investment, etc.) and, in return, receive interest payments. As far as the maturity of investments and loans is matched, their maturity risk is limited. Nevertheless, as the maturity of the loan could constrain the liquidity of the investor, it would be important to have detailed data on the maturity structure of assets and liabilities.

The use of new technologies by FinTech to facilitate investment services, such as wealth management or investing in mutual funds, have eased the construction of platforms that aggregate personal financial information, creating opportunities for customers to automatically move their resources between different savings accounts, mutual funds or other investing options to obtain better returns. These flows could have effects over the liquidity of certain intermediaries in the financial system. While changes across accounts facilitated by these FinTech services could increase the efficiency of wealth management, improving the possibility for investors of having better returns, it could also reduce customer loyalty as changing the service provider would be faster and at lower costs, increasing the volatility of deposits, and therefore, leading to higher liquidity risk.

Other case where liquidity risks can be increased is through the use of robo-advisors that use artificial intelligence (AI) algorithms fed with online information, including sentiment analysis that follows the investment decisions of lead investors. In this case wrong AI algorithms, simplistic (or complex) algorithms, static information provided to algorithms, incorrect reading of market sentiment, or sentiment analysis unduly influenced, could generate inappropriate investment decisions and possibly herding patterns that could affect asset prices and liquidity.

Additionally, the use of new types of financial assets (such as crypto assets) might also be subject to liquidity risk, as these assets could be affected by speculative price bubbles (generated by the

relatively good performance registered since its inception due to the innovative concept, the feasibility of channels to trade with them, etc.). In this regard, it is worth mentioning that the size of the impact on financial stability would depend on the extent of deepness in the use of this kind of assets in the economy.

In October 2018 the Financial Stability Board released a report on the Crypto asset market.⁶ The report assessed the implications of crypto assets for financial stability and found that “crypto assets do not pose a material risk to global financial stability presently, but vigilant monitoring is needed in light of the speed of market developments.” The report considered that at the time, risks were limited because of the relatively small size of the crypto-asset market, when compared to other financial markets, and because of the limited interconnectedness that existed between crypto-asset markets and the regulated financial system. However, the report stated that this could change in the future if crypto assets were to become more widely used and integrated into the financial system. The main risks identified included market liquidity risk, volatility risks, technology, and operational risks.

Other risks

Other vulnerabilities to financial stability could be generated by FinTech and affect other participants in the financial system. Among those are the risks generated by FinTech that could be spread to the financial system if financial intermediaries have direct exposures to FinTech entities or indirect exposures if they have clients in common. In the first case, financial intermediaries could be exposed to FinTech financing directly to FinTech firms (in the form of credit or debt), or participating as FinTech’s shareholders. The second contagion channel could be when FinTech firms and financial intermediaries share the same clients or a big share of them. In this case, the interconnectedness between FinTech platforms, banks and capital markets could be larger and, as FinTech credit expands, it could generate larger transmission channels whereby risks generated by the FinTech credit industry could be spread to the wider financial system, and vice versa.

Non-financial risks (for example, operational or cyber risk), of the FinTech sector could also affect financial stability. These risks could be amplified if different firms rely on the same technology-provider or due to broader reliance on technology.

As part of their business advantages, FinTech promises to offer bank client’s better conditions for financial operations (higher interest rates for their investments and lower interest rates for credits) and FinTech startups design their digital services in a “customized” base from ground up, giving agility and benefits for customers. These can represent a major challenge for traditional business models of incumbent financial institutions, but additionally, banks are often constrained by legacy IT systems and operating models, and have to deal with increasing layers of compliance, consumer protection and their own bureaucratic structures, all this could threaten or weaken the traditional banking business model. Deterioration of incumbent banks profitability due to a lack of anticipation and agility, and the loss of profitable direct customer relationships or margin compression might weaken the

⁶ Financial Stability Board (2018). “Crypto-asset markets. Potential channels for future stability implications”. Available at <https://www.fsb.org/wp-content/uploads/P101018.pdf>

ability of incumbent institutions to weather future business cycles, for example, if banks react to falling profits by engaging in riskier activities, such as moving down the credit spectrum.

FinTech Data Gaps

The identification and monitoring of potential risks associated to FinTech is necessary to assess their impact on financial stability. To have a thorough understanding, information is required to perform, among others, contagion studies, systemic risk analysis, and stress testing. The relative new emergence of FinTech, their potential increasing participation in the financial system, and their innovative business model, represents a challenge to central banks to design information requirements and to compile data of these financial participants, without inhibiting innovation. At the same time, information requirements should be proportional to the relevance of the firm in order to avoid reporting overload and unduly regulatory costs. To assess the risks mentioned above, once a definition of FinTech firms —operative enough to draw a clear perimeter— is adopted, data (microdata or aggregated) required would include:

- i. The size of the different types of FinTech activity. Traditionally this information is reflected in financial statements which allows to have a clear knowledge about the different FinTech activities and its size. This data could also be reported following innovative procedures and be estimated using micro data of FinTech transactions.
- ii. The characteristics of the financial services provided by FinTech to other financial entities and to other economic sectors. Information like type of operation, counterparties, interest rates, terms, or the currency of the operation (including crypto assets) also is needed.
- iii. The size of interrelationship to other financial entities (funding). Since FinTech could receive funds from banks or other financial intermediaries, data on its interrelationship is needed to assess a potential source of contagion to the financial system.
- iv. The size of credit exposures of FinTech to the main economic sectors (by activity). One of the main activities of FinTech is credit, which also represents the link between the real sector and the financial system, data about credit exposures of FinTech to economic sectors is needed to the assessment of potential credit risk.
- v. Common users of FinTech and other financial entities. To measure potential structural changes for the financial system.

It is worth mentioning that, in addition to these gaps, detailed information on the characteristics of their business model would be useful to have a better understanding of their specific risks.

Getting this data could raise the opportunity to implement new schemes to gather information, by combining innovative technologies (SupTech and RegTech)⁷ and it could also give the chance to improve the efficiency of the current data collection process.

⁷ SupTech is the application of new technologies to help authorities to improve their supervisory capabilities. RegTech is the application of new technologies by institutions to meet their regulatory requirements. (FSB, 2020).

In sum, it is necessary to identify FinTech risks for financial stability and the existing data gaps for this sector, in order to design strategies oriented to closing those gaps. Among the main challenges ahead for central banks regarding data collection are:

- i. The design of efficient information requirements for FinTech sector. These would consider an equilibrium between information needs of regulators and not disincentive the innovation, avoiding the reporting burden. In this regard, the use of sandbox schemes that allow the operation of new business models under controlled conditions, could be a useful tool, allowing authorities to design information requirements adequate to the risks identified when the innovative FinTech model is developed in the sandbox.
- ii. Implementing non-traditional channels to collect data. The collection of data in an efficient way would include the adoption of homogenous interchange data standards that would allow the collection by using new developments, such as Application Programming Interfaces (API's). This could also allow the development of new models to collect information, such as data hubs.
- iii. Increasing the international coordination for sharing information on FinTech activities, especially for those firms that offer services in different jurisdictions.
- iv. Sharing experiences regarding regulation of financial activities of BigTechs.
- v. Since some risks identified could have more impact than others, it is important to evaluate which data gaps should be addressed first and which ones could be deferred.

2.3 Payment systems

Innovation has changed the current payments landscape internationally; in most cases a complex ecosystem has resulted given the rise of new entrants and an unbundling of roles in the payments' value chain. This scenario requires, consequently, that authorities devote efforts to avoid and minimize data gaps, since information in the payments and market infrastructures is critical to monitor, regulate and oversee.

Against this backdrop, banks, FinTech and regulators are working together in order to build the appropriate level playing field in which this collaboration can be enclosed in a regulatory and reporting framework.

The Committee on Payments and Market Infrastructures (CPMI), as the global authority setting statistical requirements in payment systems, has a payments statistical reporting framework that is called the Red Book Statistics. This framework provide guidance on minimum data and statistics central banks must gather within the domestic payments and financial market infrastructures' ecosystem. This guiding framework is useful as it could provide grounds for regulating and overseeing new developments in this financial sector spectrum. Of course, domestic reporting frameworks relies as the primary source of verifiable information stemming from payments and market infrastructures. Likewise, data reporting may differ from one central bank to other.

The CPMI updated the Red Book Statistics in 2017, acknowledging the emergence of cashless payments and other important developments in financial market infrastructures, including FinTech. The new statistics reflect the substantial changes related to FinTech developments that have arisen in the payments and market infrastructures landscape over the past decade. The statistics include more information on the role of non-banks, on online and contactless payments and on fast payments.

Within this framework, CEMLA⁸ established in 2001 a regional payment statistics framework using a similar methodological approach for Latin American and Caribbean Central Banks. This set of country and comparative statistics are compiled annually and continuously updated. They present annual data on the use of payment instruments and activity on payment systems and market infrastructures for WGPS-LAC member countries.

More specifically, this statistical framework is useful to review several details of the payments and market infrastructures, including participation and activities in the wholesale payment systems, central securities depositories, and other supporting infrastructures. They are also useful to have an overview of the overall functioning of retail payments, including details of payment services providers, payment instruments available for individuals, businesses and government, the availability physical terminals (access points), and the usage of such instruments and access points.

Each Latin American and Caribbean Central Bank has its own reporting framework according to its domestic regulation and oversight duties. Nevertheless, the Red Book and the Yellow Book⁹ provide meaningful guidance for national authorities to identify data needs relative to payments' and market infrastructures' businesses.

There are significant trade-offs for existing payments data requirements domestically and internationally, as FinTech has proved to be a continuum of change, especially in the payments' domain. Given new entrants and other nonbank payment service providers (PSP) will fall outside the existing regulatory reporting requirements, it must be relevant to identify whether these new players will require their own data reporting framework ahead. And it will be also of significant importance to determine how flexible the "requirements" must be in order to embrace a changing payments landscape. Finally, it is important to remark that closing data gaps will bring valuable information to financial authorities and is a necessary condition to allow authorities the analysis of the risks faced by the FinTech sector. However, this is not sufficient to preclude potential disruptions in the sector by itself, and the availability of data should be combined with a thorough and frequent supervision of the sector. In this sense, the Wirecard case is a remarkable recent example that closing data gaps is a

⁸ This statistical framework is periodically used by CEMLA to assist national central banks to develop an oversight and data reporting framework.

⁹ The Yellow Book Statistics is an annual publication about payments and financial market infrastructures in Latin American and Caribbean Countries. The Statistics provides detailed tables for each individual country as well as various comparative tables. For more information <https://www.cemla.org/forodepagos/statistics.html> Queries related to the Yellow Book Statistics can be directed to the WHF Secretariat: mmorales@cemla.org.

necessary, but not sufficient condition to avoid disruptions coming from the FinTech sector, as it is discussed in Box 1.

Box 1. Wirecard. A recent case of Fintech data mismanagement

Wirecard was founded 1999 in Munich as a payment gateway for collecting card payments in online purchases. In 2006, it moved into banking as Wirecard Bank, both issuing credit cards and handling money on behalf of merchants. This unusual hybrid of banking and non-banking (payment processing) operation, makes its accounts harder to compare with either banks or PSPs, exclusively.

After significant geographic expansion in Asia and a major capitalization between 2011 and 2016, Wirecard was alleged for market manipulation and the German financial supervisory authority, BaFin, started an investigation of the case. Notwithstanding the allegations, Wirecard announced the acquisition of the Citi prepaid payment card business to enter into the US payments market, and the year after expanded the same business of Citi through over 10 countries in Asia. In parallel, Wirecard also developed new business lines based on contactless payments technology. By 2018, Wirecard was the first so-called fintech to enter the DAX30, the stock index for the thirty largest companies of Germany.

Two years later, the Asia Wirecard legal group started an investigation on “round-tripping”, a fraudulent scheme to deviate money using third-parties. This was the start of a two-years ups and downs in its market value and continuous scrutiny from the press, and financial regulatory authorities, and audit efforts to clarify whether financial information reported by the fintech company was or not manipulated. By June 19, 2020, Wirecard announced that near €2bn were missing which confirmed the multi-year accounting fraud of a growing and promising fintech.

Data mismanagement in this remarkable case can be twofold. First, on a regulatory perspective, notwithstanding that Wirecard was subject to regulatory reporting requirements and public disclosures to investors, it was able to circumvent proper prudential oversight and data mismanagement practices stemmed from inappropriate accounting and reporting of the fintech and the related auditing firm, as most likely the missing money were associated with their inflated value, investors funding and little to their core business lines; financial authorities must always have a clear picture of exposures and financial health of such large companies, and they must be able also to monitor and enforce that systemically important financial institutions to be compliant on a verifiable basis. Second, on a payments perspective, Wirecard was able to deviate money to third parties by having unclear processing business rules to mask intended wrongdoing transfers; central banks and financial authorities must have oversight powers to monitor closely prominent domestic payment infrastructures and not just focusing on wholesale (large-value) payment and market infrastructures, and to be able to address such practices to avoid spurring systemic consequences in the overall financial system.

Source: Financial Times.

If necessary, the Data Gaps WG could rely on the expertise of the Working Group on Payment Systems Issues of Latin America and the Caribbean (WGPS-LAC), the initiative behind the Yellow Book Statistics, to work together on a statistical framework adapted for payment FinTech activities. Liaison with multilateral organizations, such as the CPMI, will be desirable in this respect.

2.4 Economic and financial statistics

Against the backdrop of the digital revolution, the emergence of both: new technologies in the provision of services on the financial markets and alternative operators poses a significant challenge to national and international statistics authorities in terms of characterizing and quantifying the FinTech phenomenon for the elaboration of economic and financial data. An example of these

difficulties would be how to compute FinTech activities in lending markets, as in many cases, the financial brokerage business carried out by FinTech firms has no direct impact on their accounting statements.

With a few exceptions, countries and jurisdictions do not have official registers of FinTech firms, since their activities do not require registration with a supervisory authority, and this, together with continuous FinTech innovations, have hampered the construction of exhaustive censuses of FinTech firms.

In addition, the fact that there is no commonly accepted definition of the FinTech industry and business in the methodological manuals (National Accounts or Balance of Payments) is one of the reasons why official statistics have so few data on FinTech. Some examples of the issues that would be desirable to update are the modernization of the international classifications of economic activities or the challenge of establishing a statistical solution for crypto-assets and their associated activities.

Due to usual institutional organization in the production of National Accounts statistics, in some cases Central Banks have to compile in whole or in part the contributions to the Financial and Non-Financial Accounts of the National Accounts or the dissemination of the information about the sectorization of units on the institutional sectors of the National Accounts. Within this remit, the Central Banks have considered appropriate to launch some initiatives on the FinTech industry, with a view to measure and monitor its development in their respective national financial systems or to establishing the bases for production of regular statistics on this growing segment of the financial industry for use by analysts and researchers.

These statistical projects on FinTech are more complex than usual because of: (i) they have a transversal nature with data from entities between financial and non-financial sectors, (ii) FinTech firms have high rate of births (new entities), (iii) there are extraordinary levels in the closure of corporations, given the low survival rate of businesses linked to small start-ups in their first years of operation, and (iv) the usual changes in the activities of the firms.

From the national experiences on FinTech statistical projects, the methodology used to identify FinTech firms in respective countries should be to build a database on FinTech firms, drawing on information available from public (National Competent Authorities, Central Banks or mercantile registries) and private sources (industry associations, private consultancy firms or commercial data providers).¹⁰ Likewise, due to the existence of unstructured data sources for FinTech firms, it would be useful to explore the possibility of using innovative procedures and methods to capture information (such as web-scraping or data analytics techniques). Additionally, the collaboration among statistical authorities, at the national as well as international level, should be an essential feature of these

¹⁰ This has been the approach taken by Banco de España. It has been a cumbersome and highly manual work because, in most cases, the only information gathered was a commercial name or a brand. Then, searching the web was necessary in order to identify clearly the legal identity of each firm. Afterwards, it was checked if all firms were effectively FinTech and, finally, some economic information was retrieved from mercantile registries and from the Central Balance Sheet Data at Banco de España.

projects with the aim of improving the efficiency and coordination of the statistical initiatives and the minimization of the reporting burden for the entities (see Appendix 2).

Accordingly, the statistical initiatives on FinTech sector would be enhanced significantly (i) with the establishment of an official register of FinTech firms at national level and (ii) if the reporting obligations for these entities were harmonized with the information requests of traditional financial institutions.

2.5 Other implications

a) The role of BigTech

In this report, we define BigTech as large existing companies whose primary activity is different than financial services, but that have engaged in the provision of financial products as part of their core business lines, thanks to the intensive use of new technologies. Within this definition, BigTech companies can either directly or indirectly play a role in the provision of financial services. Broadly speaking, BigTech usually have started supporting and providing payment-related services, either directly or in cooperation with traditional financial entities, but expanding into the provision of credit, savings, etc.¹¹

BigTech are positioning themselves as a significant type of FinTech entity connecting their business model with features of financial services provision (initiation, authorization, notification, etc.). This is explained given their comparative advantage to achieve economies of scale and scope in financial services provision, by using their (commonly, cross-border) platforms, messaging applications, search engines but also the expertise on analyzing information. One of the main reasons behind BigTech interest to provide traditional financial services is explained by the network effects that allows them to monetize customer information that they manage, which is derived from the different services they could offer. This represents a new ecosystem in which, financial services are not necessarily at the heart of the customer's experience, and in some cases, BigTech have established dedicated intermediaries, to focus in meeting (financial) customers' needs with a holistic approach, such is the case of Tencent (WeBank) and Alibaba (MYbank), the Asian giants.

As an example, M-Pesa can be classified as a BigTech, playing a key role in payment and banking-related services in Africa, with Vodafone (a multinational telco based in UK) as the BigTech company behind. Similarly, the promising payment services offerings of Google, Amazon, Facebook and Apple are also notable BigTech developments in the United States and other major developed economies.

Table 1 provides a list of several relevant international and regional examples. As can be seen, many of them are gaining presence in payments and lending activities. However, the potential for them to provide additional financial services depends on several factors, but there are a few that could be considered as critical:

¹¹ Tanda, Alessandra, Schena, Cristiana-Maria, "FinTech, BigTech and Banks. Digitalisation and Its Impact on Banking Business Models". Palgrave MacMillan Studies in Banking and Financial Institutions. 2019

- 1) Regulatory framework enabling their presence either as stand-alone initiatives or as allies with existing financial entities);
- 2) Market failures, such as low competition and poor access, favoring them to meet unbanked or underbanked customers' needs; and,
- 3) Reputational aspects of the financial sector, which in many cases have resulted in self-exclusion and that BigTech companies could fill by offering solutions going beyond financial services.

Table 1. Relevant international and regional examples

Name	Core business	Principal financial services offered (deposits – D -, payments -P-, lending -L-, investment -I-, savings -S-, processing support -A-)		Type of participation (stand-alone -S-, joint-venture – J - unknown -U-)	Geographical working sphere
Mercado Libre	E-commerce	P	Mercado Pago	S	Argentina Colombia Mexico
		L	Mercado Crédito	S	
Amazon	E-commerce	P	Amazon Cash		Mexico
		L	Paga en 4	J	Spain
		L	Credit Line	J	Spain
		L	Amazon-Fintonic	J	Spain
Tigo / Movistar	Telecom	L	Movistar Money	J ¹²	Spain
		P	Tigo Money	S	El Salvador
				S	Honduras
Rappi	Delivery	P	RappiPay	J	Colombia
				U	Mexico
Google	Search engine	D	Cache	I	USA
MasMovil	Telecom	L	Xfera Consumer Finance	J ¹³	Spain
Orange	Telecom	D	Orange Bank	S	France Belgium Spain
Vodafone	Telecom	D/P	M-pesa	S	7 countries in Africa ¹⁴
Apple	Telecom	P	Apple Pay	S	Worldwide
Google	Search engine	P	Google Pay	S	Worldwide
Samsung	Telecom	P	Samsung Pay	S	Worldwide

¹² The product is known as Movistar Money and is offered through a financial institution that is 50-50% owned by Movistar and Caixabank.

¹³ Through a financial institution that is 49-51% owned by MasMovil and BNP Paribas.

¹⁴ Kenya, Democratic Republic of Congo, Egypt, Ghana, Lesotho, Mozambique and Tanzania

The presence of BigTech on the financial industry is notably growing in advanced and emerging economies. Its presence has the potential to change dramatically the financial landscape taking into account the capacity to develop and implement proposals and the broad base of customers.

From a regulatory viewpoint, we identify the following scenarios for which BigTech could create significant data gaps, depending on the business model prevailing in each case:

- BigTech companies providing financial services in a one-on-one relationship with customers. This is the scenario that could create the largest gaps if the BigTech companies offer financial or financial-like services that fall outside the regulatory perimeter (e.g. credit granting in certain jurisdictions without being deposit takers), and neither the central bank, nor other relevant authorities will be able to monitor their activity and its potential implications for monetary and financial stability. An interesting example relates to lending by a BigTech. Mercado Credito, for instance, may not fall under the regulatory perimeter, thus its intermediation activity will not be reported, with immediate effect on credit statistics and credit risk register, among other potential consequences. Another case in point is a Telco company providing financial services and operating completely out of the financial regulatory remit. In some Latin American and Caribbean jurisdictions (e.g. Colombia, Paraguay and Uruguay), e-money regulations have helped to embrace such business models by forcing the Telcos to set up a non-bank financial institution, in effect an e-money service provider. This approach could help to minimize data gaps for such business models.
- BigTech companies providing auxiliary services to traditional financial entities. This is an approach becoming typical in most jurisdictions, as BigTech companies have comparative advantages that financial entities could exploit when the regulatory framework enables these third-party service providers to interact. Data gaps could arise if specific customers data, particularly that of non-financial nature, is used without supervision or only with indirect supervision from relevant authorities. Google as a search engine global platform may support incumbents to integrate payment card information seamlessly into specific transactions. The presence of BigTechs handling customers' data in this type business model is not extensive yet, however authorities should be continually monitoring its development in the domestic markets, to detect and prevent data gaps and other unintended consequences for the financial stability and consumer protection.
- BigTechs providing services in cooperatives schemas with financial entities. This is a scenario where joint ventures take place, especially when a BigTech company and traditional financial entities merge a business model in a co-branded product. For this case, data gaps could be minimized if the financial authorities have set clear rules for the joint venture and the related auxiliary services connected to such co-branded products. This is an approach that BigTechs have been exploring considerably in and out the region. From delivery services to e-commerce, there are a growing number of Latin American and Caribbean jurisdictions where BigTechs are cooperating with incumbents, and for which it is not perceived additional data gaps.

In light of the above scenarios, it is important for the authorities to monitor the progress and functioning of BigTech companies, as their presence could be growing in an unsupervised fashion. As this raises several concerns for central banks and financial authorities, it is important that central banks will be able to measure how much systemic is the role of a BigTech. In other words, it will be desirable for the authorities being able to measure the influence of such FinTech companies in the financial system. With that, authorities would be able to understand what new systemic interconnections and interdependencies may be created, for each possible scenario (i.e. unknown business models).

On the other hand, the cross-border dimension of a BigTech is a major concern going beyond domestic regulation and supervision. International coordination is therefore a measure that should not be underestimated by central banks and other relevant authorities.

Finally, given the potential of BigTech to impact other monetary and financial dimensions (e.g. financial stability effects), the data requirements or policy actions identified in those areas would also need to be considered.

b) Cybersecurity

Finally, cybersecurity as a growing concern for the global financial system, is an issue that central banks are not necessarily tasked. This could be a call for a domestic interinstitutional coordination given the implications for customers and thus, the confidence in the financial system.

In effect, the financial sector is at the forefront of cyber-attacks as found by international reports that show every 2 of 10 cyber-attacks around the world happen in the financial industry, while in Asia this share rises to 4 of each 10. Furthermore, dwelling time has been reduced dramatically to a point in which the absence of prevention and detection measures, could cause major disruptions in wholesale payments system's functioning and international financial systems.

From a FinTech perspective, the international financial community acknowledges that cybersecurity is one of the most significant concerns around FinTech.¹⁵ This can be explained by the growing number of financial system's core and critical functions relying much more in technology aspects and new market players playing a key role in the provision of financial services. In most cases, its relatively new and unknown presence in the ecosystem may fall out current business rules and arrangements, making inadequate the existing controls for data (and money) management against cyber threats. Moreover, the interconnectedness and increasing number of endpoints, both mobilizing massive volumes of data have contributed to make more vulnerable the financial system globally.

¹⁵ References:

- CEMLA. "Key Aspects around Financial Technologies and Regulation Policy report, June 2019. Available at: <https://www.cemla.org/FinTech/docs/2019-06-KeyAspectsAroundFinancialTechandRegulation.pdf>
- IIF-EY. "10th Annual IIF/EY Global Risk Management Survey", November 2019. Available at: <https://www.iif.com/Publications/ID/3638/10th-Annual-IIFEY-Global-Risk-Management-Survey>
- FireEye. "M-Trends 2020". February 2020. Available at: <https://content.fireeye.com/m-trends/rpt-m-trends-2020>

The above requires central banks and other relevant financial authorities to design appropriate measures. For instance, if a cyber-attack could trigger a series of liquidity events preceding a financial distress, for which emergency mechanisms should be readily available as shown by Duffie (2019).¹⁶ Likewise, extending the scope of domestic operational regulatory requirements and applying updated international standards to strengthen the cybersecurity perimeter at micro- and macro- level will be desirable to keep ensuring the stability of the entire financial system.

In this context, central banks and other financial authorities are joining forces with the industry to deal with the potential consequences of cyber-attacks. Since 2016, an increasing number of central banks are endeavoring to build up cyber resilience frameworks for financial entities and market infrastructures (including, third party service providers, when possible). Special focus has been paid to promoting identification, detection, testing and defense capacities. There are two initiatives which are noteworthy. The CPML framework¹⁷ for cyber resilience in financial market infrastructures, and the European Central Bank (ECB) Cyber Resilience Oversight Expectations (CROE) comprise both international guiding references.

Some potential data gaps

But while these initiatives are useful to define a cyber strategy at domestic level, there are significant gaps around incidents, threats and risks vector that could impede an effective implementation or irrelevant results of such a strategy. Below, we explore some of the possible data gaps around cyber risk that might affect the ability of authorities to deal with this global threat:

- Incident dynamics: While forensic analysis after an incident deals with sensitive information on the vulnerabilities that allowed attackers to penetrate systems, platforms, processes, data reflecting anomalous behavior at institution- and transactions-level. Central banks are establishing Incident Response Teams (CSIRT) with the aim to be better prepared against threats, and also to collect evidence about incidents and resulting measures. In principle, this will allow to determine the origins, possible implications and connection with other incidents. Thus far, it has not been possible to share data about the activities led by each CSIRT due to the nature of the information they manage.
- Testing activities: Besides an effective response, authorities must promote responsible testing protocols aimed at simulating realistic scenarios. Currently, each financial institution or market infrastructure at domestic level may have different approaches to design testing and penetration exercises. Unavoidably, lack of information on what are the minimum data requirements to design such activities could led to unlevelled stress testing scenarios.
- Regulatory requirements: Financial authorities paid great attention to financial risk management in the aftermath of the Global Financial Crisis. The Basel III framework supported

¹⁶ See Duffie, D. and Younger, J. "Cyber Runs". Hutchins Center Working Paper #51. Brookings. June 2019.

¹⁷ This framework was published in 2016, and it also includes the strategy to enhance security in endpoints of wholesale payment systems against cyber risk, recently released in 2019.

better data collection by national central banks to monitor financial stability, for instance in terms of large exposures or the systemically importance of institutions and market infrastructures. Concerning operational and cyber risks, the Policy Development Group of the Basel Committee (BIS), and more recently a task force of the Financial Stability Board (FSB) is laying the grounds for a coordinated framework for regulated entities to fulfill specific information requirements (e.g. incident response), that will support central banks in monitoring cyber risk. However, there is an evident need to keep reviewing if the current regulatory requirements are enough and embrace the relevant stakeholders to have a broad and accurate picture of cyber threats, internationally and at country level. Furthermore, central banks should rely on novel techniques to leverage existing data on cyber risk to develop monitoring tools. This applies to incident dynamics and responses, with both a backward- and a forward-looking perspective.

- New services providers: The financial ecosystem is becoming complex with the entrance of new players, both as intermediary (e.g. serving as third-party service provider), and as final endpoints (e.g. becoming financial service providers). This is a direct source of vulnerability, as the transmission of sensitive data may be significantly challenged by attackers. Moreover, many of the activities held by such new entrants relates to software and supporting provision; with higher levels of concentration that could enlarge the cyber risks vector. Central banks may not be suitable to regulate such new service providers or related third parties, leading to a situation in which a cyber strategy is implemented without a scope to promote safe practices on cyber risk in such under- or unregulated companies.

Emerging practices

Developing a strategy to prevent the financial system from a cyber-attack is gradually required for financial authorities to raise awareness and control at the industry level. Beyond the financial system, there are, at least, two main challenges which may deserve immediate attention.

First, promoting inter-institutional coordination with other industries and relevant authorities, including the telecommunications and the Government as a whole. Several jurisdictions establishing national strategies against cyber-crime demonstrates this is a priority worldwide issue.

While there are diverse national initiatives reflecting the above, the cybersecurity strategy of Mexico that became available in 2020 is an example of inter-institutional coordination. The Mexican Central Bank established a strategy, which is permanently coordinated with the National Council for Financial Stability and the Ministry of Finance. The strategy pays greater attention to oversee channels and providers of data transmission as well as to foster cyber intelligence sharing among the market infrastructures, financial entities, and third-party service providers, aiming a better coordination for incident response and prevention practices.

In terms of regulatory requirements at domestic level, it is also notable the establishment of targeted regulation for cybersecurity, including reporting requirements that could enable authorities to fill gaps, for instance, to design stress testing frameworks which are cyber risk inclusive. Recently, the central

banks of Aruba and Dominican Republic enacted regulation aimed at promoting more rigorous controls, policies and measures of cyber risk management for the domestic financial system participants. These efforts focus on the integrity and availability of critical information and services for the financial system. Moreover, the regulation invites to foster institutional culture and risk management with related third parties, which in some cases could be the weakest link in the chain. Compliance with new regulations may also be a channel to ensure that new service providers adhere to a framework which observes specific data requirements, allowing central banks to have the entire picture of the cyber security situation in their domestic financial systems.

Second, international coordination is part of the essence as cyber-attackers do not know about borders. The progress of cyber risk shows that national cybersecurity strategies and international standards are not enough, and that permanent cooperation overseas play a key role. Having formal international coordination mechanisms and developing networks to share intelligence could help to fill gaps in sharing data on cyber events.

As mentioned earlier, the FSB is currently coordinating a working group to establish a global CSIRT and with that central banks will be able to address cyber threats with intelligence shared by its members, which will include G20 economies. The Financial Systemic Analysis and Resilience Center (FSARC) was set by large financial institutions in 2016, with the goal to identify and take action on measuring the systemic risk from a cyber perspective. Yet the outcomes of such collaboration efforts may not be at hand of regional central banks, therefore it is vital to identify avenues to promote a “data-sharing framework” to strengthen the ability of central banks to monitor and develop supporting tools to deal with cyber threats.

Brazilian Cybersecurity initiatives in the financial system

Regarding the treatment of cyber risk, three challenges should be remarked: (i) The fact of being cross-border; (ii) the spread of this risk can be facilitated in countries with a fragile legal framework, without adequate measures for its prevention and mitigation, and which do not restrict the action of cyber criminals; and (iii) in some cases, the spread of the effects of this risk may be supported by sovereign governments. In this context, international coordination is essential, with initiatives from international organizations, such as the FSB and between different jurisdictions, in order to exchange experiences and information seeking to assist the supervision and treatment of this risk.

In Brazil, Resolution 4,658, of April 26th, 2018, provides the cybersecurity policy and requirements for contracting services of data processing, data storage and cloud computing to be observed by financial institutions and other institutions licensed by the Central Bank of Brazil. For payment institutions, similar requirements were established in Circular 3,909, of August,16th, 2018, which came into force as of September 1st, 2019. The main role of these regulations, together with the corresponding supervisory actions, is to promote innovation in the Brazilian financial system safely. In this sense, it allows financial institutions, payment institutions and other licensed entities to use innovations, while observing prudential requirements in the contracting process. Such measures are even in line with the promotion of a more solid and efficient national financial system. The

implementation of these measures is already underway in the country, with the completion of all stages by December, 31th, 2021.

c) COVID-19 and FinTech

The pandemic has had an impact on every aspect of the industry, and financial services are not the exception. We outline some opportunities and risks that FinTech organizations would face in the coming months. In principle, it seems that there are greater opportunities than risks and that this will translate into more space for FinTech companies and, consequently, a greater need for information about them.

Opportunities

Social distancing and confinement provoked by COVID-19 implied a boost on the consumption of digital services and e-commerce using the Internet, the work field of FinTech and most of BigTech like Amazon and Facebook (Marketplace). This tendency will just accelerate as society becomes more digital literate in a post COVID world, so FinTechs are well positioned to take advantage of the next wave of digitization that is coming.

Their adaptation capabilities to the changing conditions dictated by the COVID-19 pandemic will be more important than ever in order not just to survive but to thrive. FinTech organizations are used to quickly change their business and operational models so they may be more willing and more prepared to cope the pandemic consequences, than traditional businesses, who must deal with legacy technologies and models.

In the particular case of BigTechs, these companies will emerge, without a doubt, stronger after COVID-19, as the society is reframed around digital services. For example, once at the crossroads of the public opinion and the government, Amazon and Facebook are now essential services for the population in lockdown. From a FinTech point of view, it is expected to see more partnerships between traditional financial institutions and BigTech companies, like the one between Goldman Sachs and Apple in the past.

Risks

FinTechs require funding to develop their products and services and to operate; therefore, they are highly dependent on investors, unlike traditional financial institutions which have more stable and reliable funding sources. Current market conditions created by the pandemic, threatened the flow of capital and investment to this sector. Now, FinTechs have to compete for capital not just against other FinTechs but against a whole lot of other businesses, as long as the economic fabric gets destroyed by economic downturn. In the particular case of BigTechs, their financing may not be affected as much as for smaller FinTech companies. As a consequence, there is the risk that their role as potential transactional financial services providers, could be exacerbated, implying important regulatory concerns.

In both cases, this situation makes FinTech organizations and end users vulnerable. FinTech may require new partnerships with other FinTechs or will be subject to takeovers by a stronger FinTech or a traditional financial institution. End-users who will be used to use their international remittances services may be in danger if FinTech companies disappeared suddenly, for instance.

Either way, it is foreseeable some degree of market consolidation and regulation in the future but also more cooperation (FinTech needs the funding and the incumbents need the agility and capability to deliver new proposals), but again it will depend on the availability of capital flow as described before.

But this crisis will not affect all FinTechs equally. Those who provided services around international money transfers will suffer as the global flow of capitals stop, but those around lending and funding individuals and businesses have a better chance to survive. Nonetheless, this crisis highlighted the importance of digital financial services to be able to respond to a crisis situation like the one presented by this pandemic. FinTechs could be particularly welcome to develop tools to distribute some of the public measures to support more vulnerable households, or to better identify small firms with a viable business model that require liquidity assistances. Moreover, they could develop different initiatives to improve digital identity, since this is something essential to find new ways to provide remote financial services.

In view of the above, central banks should reinforce their monitoring tasks in order to have all the activities within the FinTech ecosystem identified and classified with a high level of detail (higher than what could be needed for the purpose of supervision or the elaboration of economic activity statistics). In doing so, data is of the essence.

3. Current Situation

Based on the survey on central banks and FinTech data, conducted by the IFC on Central Bank Statistics, this section collects and summarizes the information from 16 Latin American and Caribbean (LAC) countries, and analyses several issues surrounding FinTech data. The countries who participate on the survey were Argentina, Bolivia, Brazil, Belize, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Honduras, Jamaica, Mexico, Peru, Suriname, Trinidad & Tobago, and Uruguay.

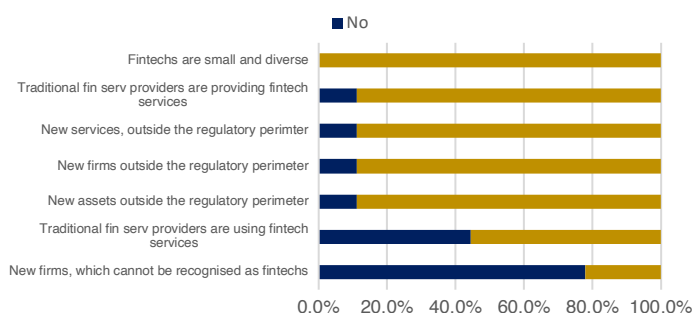
3.1 Overview of common reporting practices from FinTech activities

The majority of LAC central banks report that FinTech is creating gaps in their statistics. The leading causes for these gaps are the fact that FinTech is emerging outside the regulatory perimeter, and that these firms are still too small and diverse to include them inside the statistical framework correctly. Accurately, 90% of the central banks see the development of new assets, services, and firms outside the regulation as reasons for FinTech creating gaps in statistics. Moreover, all central banks agreed that the size of these firms and their diversity are also sources of these gaps (Graph 1).

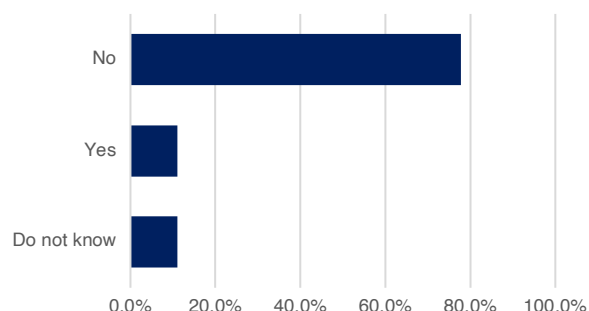
Another cause for FinTech's creation of gaps in statistics, highlighted by 90% of the respondents, is the provision of FinTech services by traditional financial intermediaries. The above represents a unique opportunity for traditional banks to serve underbanked individuals and SMEs through the adoption of these services or to deepen their collaboration with FinTech firms. The provision of these new services may become a challenge for the compilation of statistics due to the problems that central banks may have to separate FinTech firm's information from the one of commercial banks or because the regulator does not have access to the data of all their affiliated firms.

The lack of regular information on FinTech makes it challenging to include them inside the classification system. According to the above, around 80% of the total Central Banks surveyed do not have a particular position for FinTech firms in their current statistical classification system. Ten percent do not know, while only 10% answered that FinTech has a specific place in their classification systems (Graph 2).

Graph 1. Why is Fintech creating gaps in statistics?
(In per cent)



Graph 2. Do you have a special position for Fintech firms in your current statistical classification system?
(In per cent)



In addition to the gaps, the survey also covers the sources of information and coordination that some central banks are using to address FinTech issues. The study shows that nowadays, not many central banks have started to collect data on FinTech on a regular basis (Graph 4); however, half of the respondents have already initiated coordination with other related authorities (Graph 3).

Regarding the coordination, around 47% of central banks pointed out that they have regular cooperation between authorities on FinTech (Graph 3). For instance, the Central Bank of Chile has communication with the Financial Market Commission (CMF), the Ministry of Finance, the Ministry of Economy, Development, and Tourism, and the Financial Stability Council, regarding FinTech issues. On the other hand, the Central Bank of Mexico pointed out its cooperation with the National Banking and Securities Commission (CNBV) and the Ministry of Finance. In Colombia, they have collaborated with the Financial Supervisor and FinTech associations.

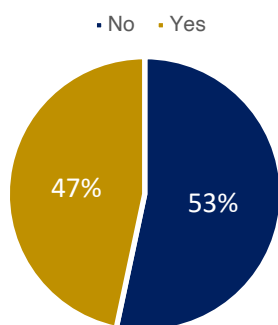
At the same time, Honduras has coordination with the Financial Innovation Bureau, which has allowed the Central Bank of Honduras and the National Bank and Insurance Commission to identify new players and the digital transformation challenges. Trinidad & Tobago reported coordination with the Financial Intelligence Unit and the Securities and Exchange Commission. In the case of Jamaica, they are in coordination with the Financial Services Commission.

Concerning the collection of FinTech firm data, the survey shows three primary sources of information for central banks: (i) FinTech industry associations data, (ii) FinTech firms’ regulatory reports, and (iii) business registry data (Graph 4). The collaboration with FinTech associations seems key to start approaching FinTech reporting institutions, and an alternative source of information.

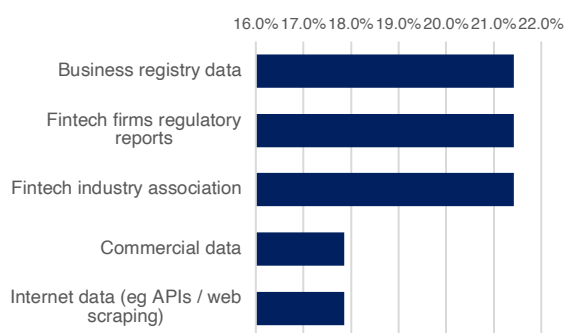
The initiatives reported on the survey regarding the collection of information by regulatory reports and business register data are yet in a preliminary phase. This may be related to the lack of regulation of FinTech firms; because instead of requiring information from the entities, central banks depend on their goodwill to collect the data. For example, in the case of Colombia, the central bank collected FinTech firm’s data by interviewing firms, industry agents, consulting agencies, and academics organizations.

It is also worth to mention that a portion of the countries (18%, see Graph 4) has also used techniques such as APIs and web scraping. This mechanism has the advantage of being less expensive than the application of surveys; consequently, it could be an excellent opportunity to improve the data collection of central banks and regulators.

Graph 3. Regular cooperation between authorities on Fintech



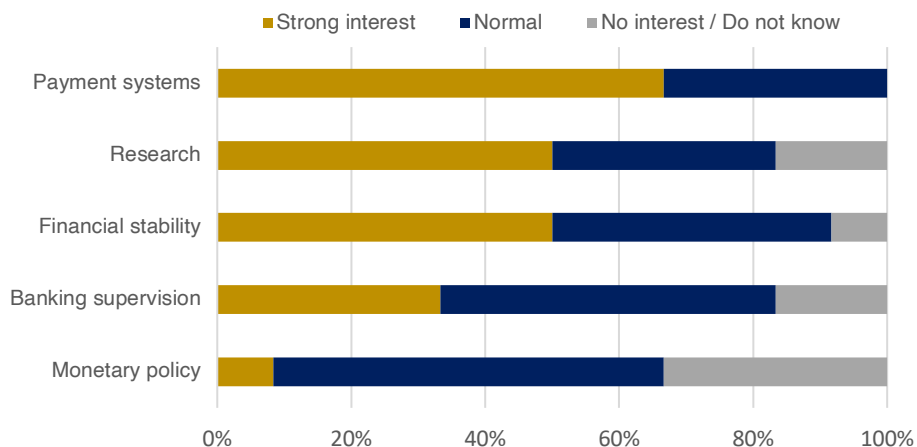
Graph 4. From which data sources are you collecting data on fintech firms?



Regarding the existence of FinTech data needs for some business areas, the survey shows that LAC countries identified payment systems, financial stability, and research as the departments with a more substantial interest in FinTech data. On the contrary, monetary policy has a high percentage of no interest (Graph 5). The above is consistent with the segments of the FinTech market that have developed the most in the region, which are Payment and Remittances, Lending, and Enterprises Financial Management.¹⁸

¹⁸ IADB and Finnovista (2019) “FINTECH Latin America 2018 growth and consolidation” (<https://publications.iadb.org/publications/english/document/FinTech-Latin-America-2018-Growth-and-Consolidation-final.pdf>)

Graph 5. FinTech data needs in the following business areas (In per cent)



3.2 Challenges and current initiatives to improve FinTech reporting.

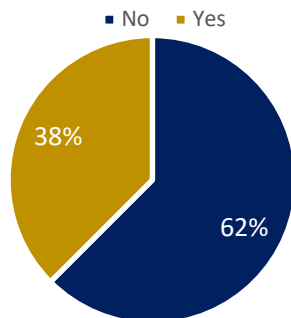
According to the survey, around 40% of the respondent countries pointed out that their central banks are launching statistical initiatives to close FinTech data gaps (Graph 6). In particular, the Central Bank of Honduras and the National Bank and Insurance Commission have created the Financial Innovation Bureau, to promote innovation and healthy competition in the provision of financial products and services by using innovative technology. In Trinidad & Tobago, the Central Bank is in the initial stages of developing a reporting framework to collect information on FinTech data from the payment’s perspective. Additionally, they are in the early stages of developing an innovation hub that will also facilitate gathering information on FinTech.

Currently, most central banks are updating the lists and collecting financial statements of FinTech firms to close FinTech data gaps. This suggests that these initiatives are an excellent place to start measuring the FinTech industry. Other actions widely used by central banks (around 50% of the respondents) are the adjustment of reporting requirements to cover FinTech firms and collect loan (transaction) level data from FinTech credit institutions (Graph 7).

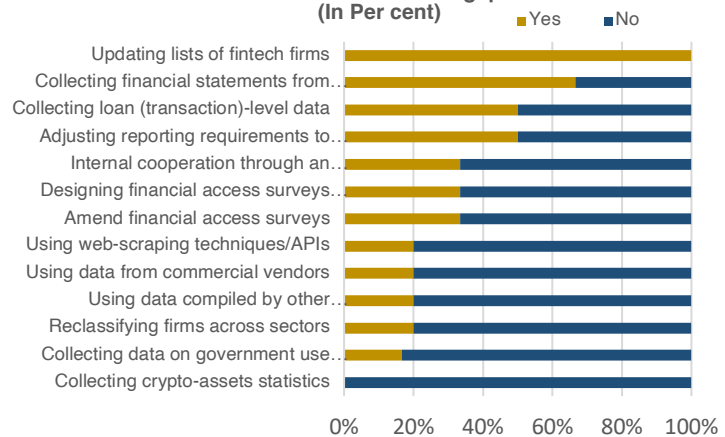
It is also interesting to highlight that no country reported being producing statistics on crypto assets. The above might be related to the fact that cryptocurrencies and blockchain are still small segments in LAC, compared to the use of other technologies and services (such as mobile wallets, mobile apps, crowdfunding, among others).

As an example of other initiatives carry on in the region, the Central Bank of Argentina is developing FinTech credit simulations on websites to generate a database on the financial cost of online credit. In Honduras, they are producing statistics with information collected from two companies that provide e-money payment services.

Graph 6. Percentage of LAC countries which are launching statistical initiatives to close Fintech data gaps

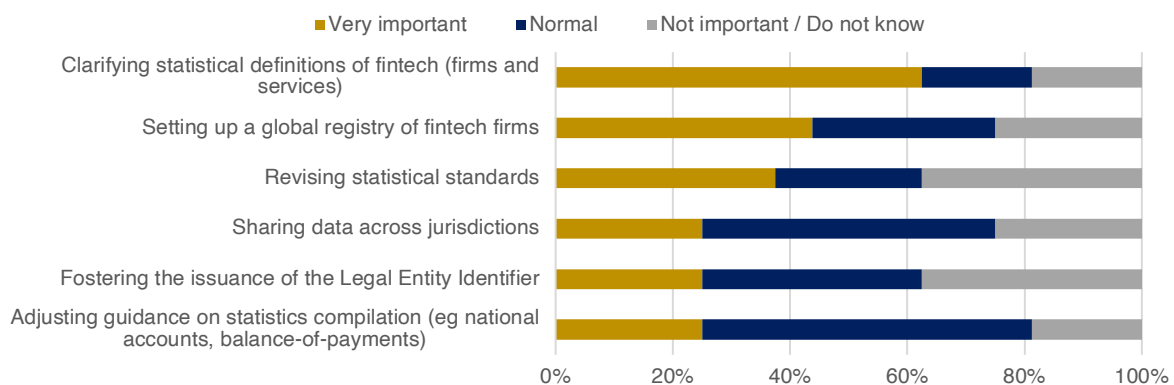


Graph 7. Initiatives your Central Bank is implementing to close Fintech data gaps (In Per cent)



Looking ahead, one of the biggest challenges involved in the production of FinTech statistics is the international cooperation and agreement on FinTech definitions. To close FinTech data gaps, most LAC central banks considered necessary to clarify the statistical definition of FinTech and adjust the guidance on its compilation. Another international initiative, also seen as very important, is the creation of a global registry of FinTech firms and reviewing their statistical standards. On the other hand, other actions were not considered as urgent as the ones mentioned above; for example, only 25% of the respondent countries considered very important fostering the issuance of the Legal Entity Identifier (LEI) to close FinTech data gaps (Graph 8).

Graph 8. The importance of interntational initiatives to close FinTech data gaps, according with LAC countries (In Per cent)



4. Policy Discussion

This section points out the main policy implications in terms of data gaps and the related initiatives to close them. We identified these main potential issues to be further discussed and developed in LAC countries and which have not to be considered as policy recommendations. The issues identified can be grouped in two broad aspects: Broadening the regulatory perimeter and making efficient information requirements.

4.1 Broadening the financial regulatory perimeter, when applicable, to include Fintech activity

Even though in some jurisdictions the current size of the sector is still small and at the moment do not represent a threat to the financial system, the trend exhibited in recent years points towards an increased relevance in the medium term. In this sense, when applicable, broadening the financial regulatory perimeter to include Fintech activity could be the first recommendation. Recognizing Fintech activities in national legislation would allow financial authorities to set data requirements for supervisory and financial stability purposes. National legislation should be focused on credit, deposits and payments services, as well as in allowing other innovative models or disruptive technologies.

4.2 Leveraging on international coordination

Current international cooperation and coordination arrangements among jurisdictions should be used to include a discussion on ways to address Fintech activity and, in particular, on how to close Fintech data gaps. For example, a coordinated International register of Fintech Firms would allow an expedited identification of Fintech activity, as many such firms usually operate in several jurisdictions. Furthermore, defining data management practices and data standards for Fintech, based on international practices for other entities, would help close the identified gaps.

4.3 Designing efficient information requirements

Priorities should be established when addressing the closure of data gaps through the identification and monitoring of Fintech potential risks that could impact financial stability or the operation of the payments system and those on which better knowledge of them could improve the understanding of monetary policy transmission channels.

Moreover, in order to design an appropriate reporting framework, the implementation of observatories, Fintech hubs, laboratories or forums for cooperation, as well as promoting private-public dialogue could prove useful to allow financial authorities to get knowledge about new business models. Likewise, the use of sandboxes could help authorities to define efficient data requirements.

Finally, the use of innovative procedures and methods to compile information (such as web-scraping or data analytics techniques, among others), as well as the establishment of cooperation and information sharing arrangements, not only at international level or with other domestic authorities but also among the different areas within the Central Bank, would also help ease the reporting requirements.

5. Conclusions and recommendations

As an emerging and sometimes disruptive industry, the Fintech sector creates data gaps which impact several of the main tasks performed at central banks, including: monetary policy, financial stability, payment systems and economic and financial statistics, among others. According to the IFC survey sent to CEMLA Membership, Latin American and Caribbean central banks reported that Fintech activities are creating gaps in their statistics because, notwithstanding that these firms are generally still too small, their diversity and the lack of regular information makes it difficult and challenging to include them within the classification system in Central Bank statistics. Additionally, most of LAC countries highlighted that another cause for data gaps is that traditional financial intermediaries also provide Fintech services.

In the case of monetary policy, central banks must have a profound knowledge on how, and for how long the transmission mechanisms impact the economy. For this purpose, to have an accurate picture of the Fintech industry is crucial. The Fintech industry have implications on monetary policy because of its credit disintermediation role, additionally to the new payment services innovations provided by these new players.

On the financial stability side, one of the relevant factors is the degree of interconnectedness in the financial system, as shocks could spread more easily as interconnectedness increases. While interconnectedness is not bad by itself, it is important to measure and analyze it in order to understand potential risks and be aware of how they could be propagated or amplified across the financial system. Also, given the computational nature of such participants, there is the need of building a detailed map of technological dependencies which can be used to study possible system-wide operational disruptions.

Regarding payment systems, innovations on payment services have changed dramatically the landscape at the national, regional, and international level. The CPMI established a payments statistical reporting framework that is called the Red Book Statistics. The initiative led by CEMLA since 2001 on payment systems data on a regional basis, known as the Yellow Book Statistics are comparable with the CPMI framework, and are periodically updated in tandem with the Red Book.

In regard to the compilation of economic and financial statistics like the National Accounts or the Balance of Payments, the adequate registration of Fintech related activities poses a formidable challenge to central banks and statistical agencies. In this sense, the IFC recommendation to revise the International Standard Classification of All Economic Activities (ISIC) at United Nations level with

regard to section K (“Financial and insurance activities”), as formally submitted to the United Nations Statistical Division (UNSD) in 2019¹⁹, should be supported by central banks to achieve the ultimate goal of allowing that section K contains all activities with regard to the full value chain of financial intermediation, and provide all the relevant categories for integrating fintech segments.

Cybersecurity as a growing concern for the global financial system, is an issue that central banks are not necessarily tasked. However, the financial sector is at the forefront of cyber-attacks as found by international reports which show that every 2 out of 10 cyber-attacks around the world happen in the financial industry. The international financial community acknowledges that cybersecurity is one of the most significant concerns around Fintech. This can be explained by the risks related to FinTech due to the infrastructure that FinTech services provide to other financial entities, the clients, and links among them. In this context, cybersecurity risks could potentiate and spread to all the entities involved. For this reason, it is important to close the data gaps, so we can know the complete picture of FinTech services and their reach.

Another implication is the challenge that BigTech represent for central bank duties and the data gaps which emerge in relation to their activities. BigTech companies are positioning themselves as a significant type of Fintech entity. These companies have not only important advantages like economies of scale, the cross-border nature of their platforms but also, the data they gather from their users and the sophisticated data analytics they have developed.

Finally, all these potential data gaps arising from increased Fintech activity in the financial system represent a challenge for financial authorities in the region. We would like to stress the importance of closing data gaps as necessary, but not a sufficient condition to avoid disruptions related to the FinTech sector. International cooperation and sharing experiences between central banks can be a valuable asset in defining useful information requirements, as well as in the design and implementation of efficient and consistent data management practices, in a way that supports innovation in the financial system.

¹⁹ IFC Report, Towards monitoring financial innovation in central bank statistics. Annex 4: IFC letter to the UNSD regarding ISIC Rev 4 issues. July 2020.

Annex 1. Central banks' functions/areas and FinTech data gaps

Area	Identified data gaps / data needs	Possible solutions
Monetary policy	<ul style="list-style-type: none"> – Information on fintech credit, including the activity of crowdlending platforms. – Number and value of transactions processed via digital currencies. 	<ul style="list-style-type: none"> – Adapt the regulatory perimeter taking an activity-based approach and make sure that reporting requirements include FinTechs in a way that i) covers all data needs, ii) is proportional to the relevance of the firm, and iii) strikes a right balance between the usefulness of the statistics and the burden on the reporting agents.
Financial stability	<ul style="list-style-type: none"> – Data on the level of activity of FinTech companies (e.g. via financial statements). – Information on the level of interconnectedness of FinTechs with the financial system (e.g. characteristics and size of the financial services provided by FinTechs to other financial and non-financial entities, common users of FinTechs and other financial entities, exposures of traditional financial corporations on crypto-assets...). – Detailed information on the characteristics of FinTechs' business model in order to have a better understanding of their specific risks. 	<ul style="list-style-type: none"> – Establish an official register or, alternatively, build a database of FinTech firms drawing on information available from public and private sources in order to have all the activities within the FinTech ecosystem identified and classified. – Update the international classifications of economic activities. – Collaborate among authorities, at the national as well as international level, with the aim of improving the efficiency and coordination of the statistical initiatives, minimizing the reporting burden for the entities and addressing potential cross-border frictions. – Use innovative procedures and methods to capture information (such as web-scraping or data analytics techniques) and implement non-traditional channels to collect data by making use of new technologies.
Payment systems	<ul style="list-style-type: none"> – Data on the payment activity of new entrants, including cross-border payments, such as remittances. – Information on new interdependencies. 	<ul style="list-style-type: none"> – The use of sandbox schemes could be a useful tool.
Economic activity	<ul style="list-style-type: none"> – Census of FinTech firms that is periodically updated. – Data on new activities, such as crypto-assets. 	
BigTechs	<ul style="list-style-type: none"> – Measurement of the influence of BigTech companies in the financial system (information on their financial activity and on the services, they provide to traditional financial entities). 	

Area	Identified data gaps / data needs	Possible solutions
	<ul style="list-style-type: none"> – Information on new systemic interconnections and interdependencies. 	
COVID	<ul style="list-style-type: none"> – Database of FinTech companies and the services they offer. 	
Cybersecurity	<ul style="list-style-type: none"> – Reporting on incidents affecting FinTechs. – Detailed information on FinTech activities. 	

Appendix 1. National experiences and initiatives on payment systems to close FinTech data gaps.

BRAZIL

Brazil FinTech regulation framework focuses mainly on (i) payment services and (ii) the credit market. Regarding payment services, in the first decade of the years 2000's, the Central Bank of Brazil (BCB) noticed the growing participation of non-financial institutions in the provision of payment services, especially through payment cards (both debit and credit), electronic money, and digital payments such as the ones involving e-commerce or mobile devices.

Law 12,865 was published in October 2013 defining the relevant concepts to the Brazilian retail payment system, casting the bases for regulating payment schemes, and establishing the principles and objectives regarding both payment institutions and schemes.

The BCB adopted a FinTech regulation that is proportional and does not refer to payment schemes below a specific threshold, to which the regulation could be too burdensome, inhibiting innovation.

After the aforementioned Law and regulation were enacted, the payment sector grew substantially. Since then, the merchant discount rate (MDR) has dropped, new payment products were developed and the number of businesses (including street vendors) accepting payments via debit and credit cards has increased severely.

Given this scenario, it is safe to say that the BCB does not see a data gap concerning the payment system, considering that the payment institutions, even the ones below the said threshold, are required to send information regularly to the BCB.

One area of concern to the BCB is related to the lack or difficulty of access to the payment system that smaller institutions were having. The reasons behind this problem were due to anti-competitive strategy adopted by the incumbent institutions. These institutions, whenever they realized that FinTech clients still needed to use some services provided by them, started to charge the FinTech company much higher fees or even stopped providing the service altogether.

The BCB, aiming at solving this problem, approved the Resolution 4,649 in March 2018, which prevented banks from limiting the access of smaller licensed institutions to certain payment services, such as automatic debit.

Moreover, in order to further address this issue, the BCB is studying open banking, aiming at regulating this concept in Brazil. The CBB already has published a draft for public consultation and it is expected to issue a new regulation on the first semester of 2020.

Another area of improvement regarding the payment system is the adoption of fast payments in Brazil. The BCB is coordinating a group of institutions, aiming at developing the basis for the creation of the Brazilian fast payments' system, which should be launched by the end of this year.

Last, BCB has also published a draft on Regulatory Sandbox for public consultation. Following the steps of the most advanced countries in terms of financial regulation, BCB expects this new approach to foster innovative business models, which may help us tackle some of the issues we are facing in the moment.

Central Bank of Brazil's Information Governance Process.

As stated in the Supervision Manual of the BCB,²⁰ Information Governance is carried out according to the Central Bank of Brazil Information Governance Policy, regulated by the Information Governance Committee (CGI).

Information Governance aims to ensure enhanced efficiency in data management and minimize operational risks, making use of best practices and overseeing:

- i. the existence, consistency, integrity, precision and relevance of information;
- ii. the rationalization of data collection and information use processes.

Within the scope of actions involved in Information Governance, the inspection units are responsible for curation activities of databases related to the processes and activities of the value chain of the Central Bank of Brazil to which they are linked. The units that requires standardized information from the Information Provider Entities are considered information curators and thus responsible for curation activities of databases related to the processes and activities of the value chain of the Central Bank of Brazil to which they are linked.

The employee designated as the information steward of a database assigned to his or her inspection unit shall:

- a) be directly involved in the use of such data for the execution of the subprocesses or activities assigned to his/her unit in the value chain of the Central Bank of Brazil;
- b) have appropriate knowledge and commitment to ensure the quality of the data under his/her curation.

The additional responsibilities and activities shared by curation units and agents shall be carried out in accordance with the Central Bank of Brazil Information Governance Policy.

The observance audit activity consists of a set of procedures carried out in relation to the Information Provider Entities (EFIs) in order to ensure the timeliness and quality of the information coming from the National Financial System (SFN), due to legal and regulatory obligations. These actions are of a corrective nature and, therefore, may eventually result in the proposition of Sanctioning Administrative Process, in accordance with the Information Governance Policy (PGI), Ordinance No. 90,187, of August 17, 2016.

²⁰ See

<https://www3.bcb.gov.br/gmn/visualizacao/listarDocumentosManualPublico.do?method=listarDocumentosManualPublico&idManual=1>.

According to the Observance Audit Regulation, established by Administrative Rule No. 95.212, of October 16, 2017, the actors involved in the Observance Audit activity are the EFIs, curation units, curators and Observance Audit Team who are designated by the Head of the Conduct Supervision Department (Decon). It is curators' responsibility to adopt the actions considered sufficient to solve the problems of timeliness or quality related to the provision of the information subject to their curatorship. It is Observance Audit Team responsibility, in a complementary manner and when appropriate, by curation units' provocation, to take care of the problems in which the punctual action of the curator was not able to solve or of the situations classified by the curators as emergency. Regardless of curation units' provocation, Observance Audit Team will also approach EFIs in accordance with reporting analyzes and reporting indicators.

COSTA RICA

Even when there are some similarities within Latin America, the Costa Rican case is very particular. The country has special features, which have made the evolution of FinTech start-ups to be sort of a kind, mainly because of the central bank's efforts towards the development of the payments system and its active role in financial inclusion.

Two decades ago, the Banco Central de Costa Rica (BCCR) started to offer to the public the National Payments System (SINPE), which is an electronic platform that provides instant payments facilities 24/7. Also, since 2015, the Bank has provided agents with a digital payments' platform called Sinpe Móvil, which allows people to make money transfers within the regulated financial institutions in real time at no cost, only with a text message.

These are only two of the services which the central bank provides, but with them, the bank has developed a strong and secure network, which has the trust of all participants, institutions and agents, who in response maintain a low cash level. Therefore, FinTech in Costa Rica has not developed in large proportions towards payments so far.

According to a report by the Inter-American Development Bank (IADB) and Finnovista (2019), Costa Rica has good conditions and a positive outlook for the evolution of FinTech companies, but the funding mechanisms are one of its weaknesses. The report identified 25 start-ups related to FinTech activities in the country, and the industry is evolving every day.

Initial strategy

As of today, FinTech firms do not have specific requirements or regulation in Costa Rica. What is expected is that, if they offer services which are regulated, they should comply with the corresponding legal framework. However, the central bank updated its "Regulations for the Payments System" in September 2018, so that FinTech companies can register to use the SINPE platform. This authorisation provides firms with the collection of payment services offered by the bank, which cover corporate and individual clients. With this strategy, the central bank experimented a new flow of requests from new companies that nowadays are being analyzed.

The bank also conducted a one-time non-official survey to identify and characterize the business models these companies are implementing (or trying to implement) in the country. The data were gathered from a questionnaire distributed among the self-named “FinTech firms” that have requested access to the electronic platform of SINPE. This survey, therefore, had no formal method of identifying the firms; it was self-selection. Hence, the results do not consider the whole sample of FinTech firms in Costa Rica. With that, in June 2019, the BCCR identified 25 firms that responded the survey.

This strategy has opened a door for the communication with these entities, and the central bank and superintendencies are currently studying the FinTech market reality in order to state a formal plan, according to the best practices of the Bali FinTech Agenda and the actions suggested by the OECD.

Data issues

- Lack of a FinTech definition and selection criteria: As mentioned, until now, there are two references of the FinTech environment in Costa Rica, but even when both identified 25 firms, they were not the same. The study from the IADB and Finnovista only considers those which are 100% Costa Rican, and the BCCR’s survey has only studied those interested in having a connection to SINPE. There is a necessity of clarification about the FinTech definition within the industry in order to can correctly identified them.
- Lack of a classification system: The two mentioned references, have different contexts, methodologies and classification categories. Therefore, it is necessary to have a uniformed classification system in which these firms can be categorized in accordance to their business model. The classification should be flexible and open for the inclusion of new categories on an ongoing basis.
- Lack of available data and a process to regularly track the industry: The lack of available data is related with the fact that some of the business are in a very early stage or die very quick, so there is no record of the activity. However, it is also related with the fact that there is no place for the start-up firm to present the idea, information about the business model or the transactions. The strategy of opening the door to the SINPE can help with that, but it is not sufficient because there will be business models that will not fit in. It would be desirable to have a standardized process to obtain data and statistics in a regular manner about the FinTech companies and their activities.
- Lack of use of new instruments and tools: Apart of the use of traditional ways to get the information (such as surveys), there is an opportunity to use and explore new instruments and tools to obtain the data. The following table shows some examples:

Instrument or tool	Description
<i>Web-scraping and data analytics techniques</i>	Extractions from internet sites like <i>Google Trends</i> and the web page of the firm, and using analytics from social networks like: a) <i>LinkedIn</i> to know the number of employees, followers and year of foundation of a firm, and b) <i>Facebook</i> and <i>Instagram</i> to have a sense of the followers and consumer characteristics of a firm.
<i>Business model catalog and network interconnection</i>	Using for example a <i>business model canvas template</i> , in order to describe the firm’s business models that can act as a catalog, identifying the clients, partners, value preposition, cost structure, revenues streams, channels, etc., and using the

Instrument or tool	Description
	information to track the interconnections or links with known financial or business data from other participants in the financial system.
<i>Partnership, collaboration and communication with the industry</i>	Partner with the FinTech Association and other organizations in order to build up a data base, using their affiliates and some of the described tools. Also creating new mechanisms to open de communication with the firms (such as an Innovation Hub).

Finally, minimizing the data gaps from the financial-technological activities in the country can help to monitor the opportunities and challenges this type of business can incorporate into the financial system and their implications on monetary policy and financial stability.

HONDURAS

The Central Bank of Honduras (CBH), together with the National Bank and Insurance Commission (NBIC) and the support of the Inter-American Development Bank (IDB), formed the Financial Innovation Bureau (FIB) with the purpose of creating an environment of public-private collaboration, which favors innovation and healthy competition in the provision of financial products and services, through the use of technology and digitalization, with the aim of contributing to financial inclusion through the adoption and use of financial technology; also, promoting the development of FinTech in the country and create public policies that allow innovation to offer a better quality of life to the consumers.

Additionally, the Board of Directors of the CBH approved the creation of the Technical Committee for Innovation and Financial Technology (TC-IFT) and its Internal Regulations, whose purpose is, within the competence of the CBH, to advise, support and recommend its Board of Directors in regulatory matters and oversight of payment systems and financial stability, for the development of innovation in financial technologies; as well as, follow up on compliance of the resolutions and agreements issued by the Board of Directors in the aforementioned matter.

The FIB was launched on October 23, 2019 and according to the needs detected by the members of the bureau, two working groups have been formed:

1. Payments and Transfers
2. Transversal Technologies

These working groups will be responsible for submitting, to the FIB, proposals to strengthen and improve the country's FinTech ecosystem.

This strategy has allowed the CBH to identify new players in the Honduran financial ecosystem, the challenges that traditional banks face to digitalize and that FinTech companies face in order to establish themselves in the national territory; this knowledge will facilitate the development of a regulatory framework in line with the economic and social situation of the country; as well as, strengthening the institutional capacities of the public sector to favor financial inclusion in the broad sense of the concept.

It should be noted, that the FinTech ecosystem in Honduras is at an early stage with high development potential. Until October 2019, 23 FinTech initiatives have been identified, of which 21 are entrepreneurs and 2 correspond to corporate FinTech. Which are distributed in 7 business segments, the most representative being payments and transfers with 43% of the total initiatives, followed by initiatives related to block chain and crypto active technology (17%), business finance management and alternative financing (13%) and finally, personal finance management, scoring and InsurTech (4.3%).

Regarding its status of formalization of business activity, 61% already operates in the national market, 17% are legally constituted and are in the process of starting operations and 22% are in the early stage of conceptualization, development and validation of your business model.

It is important to highlight that, the corporate FinTech monthly present to the CBH statistical information of the amount and the quantity of operations carried out.

With the base established within the FIB, more FinTech initiatives continue to be identified, some of which are in the process of adherence to this forum for cooperation and private-public dialogue.

Regarding the regulatory framework in force in the country, there is a Law on Payment System and Securities Settlement (approved in 2015), from which it is derived the Regulation for the Authorization and Operation of Non-Banking Institutions that Provide Services Payment Using Electronic Money (INDEL), approved in 2016. However, to the date only one company has registered as INDEL.

As a result of all of the above, the CBH is reviewing the current legal framework in order to evaluate and recognize regulatory gaps that at the present hinder the adoption and progress of digital financial services an even regulatory risks that obstruct the development of the sector.

TRINIDAD AND TOBAGO

Over the last few years, the Central Bank of Trinidad and Tobago (central Bank/Bank) has received “expressions of interests” from entities wishing to develop FinTech products/services to facilitate payments, remittances and international trade in the domestic payments space. Some of these expressions of interest included initiatives for establishing cryptocurrency exchanges or platforms, digital wallets, bitcoin ATMs, ICOs, CBDC and the use of blockchain or DLT to facilitate KYC. However, in more recent times most of the expressions of interests have been in the area of e-money.

In light of these ongoing developments internationally and domestically as well as the Bank’s recognition of the possibilities FinTech promises for enhancing efficiency and financial inclusion, the Bank published its public policy statement on Financial Technology and Virtual Currencies in November 2018. It also developed a FinTech Policy with the objective of “promoting an enabling environment to accommodate ongoing financial innovation while mitigating risks”.

The Bank also developed an e-money policy to widen the categories of persons that can engage in e-money activities beyond the financial institutions licensed under the Financial Institutions Act.

Further the development of a Payments System Act is also contemplated that will address comprehensively in one Act all payments activities including issuance of payment instruments, clearing and settlement, payment system operators and payment service providers including those providing e-money services and virtual asset services

Plans for closing FinTech data gaps are in the early stages. However, reporting templates have been developed for some FinTech firms that are required to submit information to the Central Bank.

Appendix 2. Specific initiatives that LAC countries and Spain are launching in order to close FinTech data gaps.

CENTRAL BANK OF CHILE

The FinTech issue is of special interest to the Central Bank of Chile (CBC, Bank). It has become an important topic to be developed within the focus of New Technologies defined in its 2018-2022 Strategic Plan.

In this context, as one of the specific projects proposed to address FinTechs challenges, the Bank has created a Technological Observatory (Observatory) in 2018. This initiative intends to be a catalyst for knowledge acquisition and the adoption of disruptive technologies within the Bank. The Observatory's primary goals are (i) to centralize and organize the information related to disruptive technologies; (ii) to manage and coordinate the Bank with other institutions concerning this matter; as well as (iii) identifying and prioritizing eventual knowledge gaps and opportunities –related to these technologies– in which the Bank may conduct further analysis.

So far, through the Observatory, the Bank has been focusing on the understanding of the Chilean FinTech ecosystem mainly through the organization of seminars, workshops, and meetings with FinTechs firms. For the Central Bank of Chile, the Observatory is the starting point in the development of knowledge and analysis related to disruptive technologies and FinTech, and it is the first step to analyze a possible statistical dataset about FinTech.

Complementing the work of the Observatory, the TechLab initiative was created in 2019. This project aims to implement disruptive technologies, in an experimental stage, on cross-cutting processes within the CBC, and has focused so far on proof of concepts of blockchain, Artificial Intelligence, Machine Learning and APIs.

BANCO DE ESPAÑA

As in other countries, Spain does not have an official register of FinTech firms, since some of their activities do not need to be registered by a supervisory authority. This, together with the ongoing innovations in this area, has hindered the preparation of an exhaustive census of FinTech firms. Banco de España has designed an initiative aiming to lay the foundations for obtaining regular data on FinTech firms in Spain, thus enabling its performance to be measured and monitored. This will serve as a basis for the elaboration of the National Accounts and for the appropriate monitoring by authorities of the financial innovation process and its potential impact on the country's financial sector and financial stability. In the absence of an official and complete census of FinTech firms, any work in this regard needs to draw on numerous sources, both in the industry and at other authorities, together with manual verification work.

The methodology used to identify FinTech in this initial analysis consisted of preparing a database using information available on various public and private sources: the Spanish National Securities

Market Commission (CNMV), business associations (the Spanish FinTech & InsurTech Association and the Spanish Crowdfunding Association) and private consulting firms (Finnovating).

Using the aforementioned sources of information, almost 400 FinTech firms operating in the Spanish market were identified: around 130 firms whose core business consists of lending to firms and households and obtaining finance through electronic platforms (crowdfunding and crowdfunding), around 80 firms providing payment and foreign exchange services, approximately 70 firms providing investment services (financial consultancy) and, finally, around 120 devoted to other activities (mainly, the provision of technology and insurance intermediation services).

This preliminary list is a mere aggregation of trade names and links to websites since the primary sources used do not generally provide more than that. Furthermore, this initial list does not contain information to separate entities resident in Spain from those non-resident entities providing services in Spain remotely, either through internet portals or mobile applications. However, these two problems are not present in the case of crowdfunding platforms, which are necessarily registered with the CNMV, and of other institutions pursuing FinTech activities recorded in the official registers of the financial supervisors.

To fill in these primary sources' data gaps, the FinTech firm identification exercise was organized in three stages.

In the first stage, all these firms' websites were consulted for references enabling their formal identification. As a result, 250 resident and 30 non-resident entities in Spain were found. It was not possible to find information enabling the identification of the remaining 120 entities.

In the second stage, the annual financial statements filed with the Mercantile Register were obtained for those entities' resident in Spain for which tax identification numbers were available. Using the financial statements, it was possible to gather qualitative and quantitative information on these entities.

Accessing these firms' financial statements facilitated the obtainment of particulars such as their registered office, corporate purpose, National Classification of Economic Activities (CNAE) code and shareholder structure. Initial use of this information made it possible to geographically locate these firms: the highest concentration is in Madrid and Catalonia, with 100 and 55 FinTech firms, respectively.

In balance-sheet terms, the total volume for the identified firms amounted to approximately €1 billion at end-2018. This is a negligible amount in comparison with the total of the Spanish financial sector (in excess of €4.5 trillion).

Net turnover stood at €410 million. However, we should be mindful that, in many cases, financial intermediation performed by FinTech firms does not directly affect their financial statements, given that their activity consists solely of connecting lenders and borrowers. Consequently, the significance of this segment in terms of channeled financial flows may be underestimated.

In terms of employment, it can be estimated that at end-2018 the FinTech firms identified in the sample had close to 2,700 employees.

The database also includes information on the shareholder structure of FinTech firms: most firms do not report a parent company and may therefore be considered as not belonging to corporate groups. This is consistent with the fact that they are small and medium sized-firms, resulting from relatively recent business ventures. However, 15 companies were owned by non-resident companies and five belonged to large Spanish financial conglomerates, which signals the interest among traditional operators in the development of this new market segment.

Accessing the identified firms' financial statements also provides their CNAE codes. However, from a statistical standpoint, the information drawn from these codes plays an important but not decisive role when categorizing an entity. The usual difficulty of ensuring a consistent statistical classification is compounded in the case of FinTech firms by the shortcomings of the methodological manuals and the absence of any definition for this activity, given that the manuals are yet to be updated to include the situation arising from the use of new technologies.

The final stage in this statistical analysis is to complete the institutional classification of FinTech firms in the National Accounts and, specifically, to correctly assign them to the various financial and non-financial sectors of the economy. To this end, an action protocol has been established to perform an in-depth analysis of the selected companies, focusing on their core business in terms of net turnover, corporate purpose and the nature and structure of their assets. The companies may thus be systematically and correctly classified under the relevant institutional sectors: a) financial institutions, b) non-financial corporations.

The initial results identified clearly some 50 firms as belonging to the financial sector, specifically as financial auxiliaries (a category that mainly includes crowdlending/crowdfinancing platforms), electronic money institutions, payment institutions, and securities dealers and brokers. The next step consisted in classifying the remaining 200 firms, seeking to identify those that actually provide financial services and should therefore be included in the financial sector, and those that strictly provide technology services, thus remaining categorized under the non-financial corporate sector.

Therefore, the activities of more than 200 active Spanish firms were subject to in-depth analysis to ascertain whether they engage in a FinTech activity in the strict sense, regardless of whether or not it is their core business. The aim was to identify those firms that provide financial services by harnessing technology with the potential to create new business models, applications, processes or products. A functional approach was taken to this analysis, focused on each firm's activities as detailed on its website, irrespective of the type of company or its reported CNAE code.

The analysis concluded that almost 100 of the FinTech firms featured in the census may be exclusively considered technology firms that are engaged in the marketing of technology solutions not specific to the financial sector. Therefore, strictly speaking, they may be considered not to fit under the FinTech umbrella term. These tend to be firms that provide products and services to financial institutions or other FinTech entities, but do not have a direct relationship with end users.

In addition, it was found that more than 10 of the active firms may not be considered either financial or technology operators, with these being blogs or social networks on start-ups, entrepreneurs and finance; online business advisers and consultants; or mobile applications that track healthy practices, which sometimes are considered InsurTech.

It is possible to identify four major groups of relevant activities and services for the purposes of monitoring financial innovation:

1) Finance: crowdlending and loans (more than 50 firms)

The segment where the largest group of FinTech firms compete with traditional financial institutions is in the provision of financing in the form of: i) small-sized loans or fast microcredit, typically via the online channel; ii) trade finance for businesses and self-employed via notes discount, invoice factoring or credit facilities and iii) FinTech firms that engage in raising funds for business projects and start-ups (P2B, peer-to-business, crowdlending and equity crowdfunding) and peer-to-peer finance platforms (P2P crowdlending). This group also includes companies that provide services associated with the credit cycle, such as in customer acquisition, loyalty and retention; risk assessment and loan recovery.

2) Payment and foreign exchange services (almost 20 firms)

Included in this category are companies that streamline physical and online payments through a payment gateway or virtual point of sale (POS) terminal. These companies provide remote payment services to the general public via the internet, i.e. digital wallets, where users can store their card and account information and make online payments, thus bypassing the need to fill out payment forms. Also included are some neobanks that, for the time being, are focused on digital wallets and currencies. This is among the FinTech areas where innovation is strongest and competition is fiercest, probably because digital payments are a source of big data.

This group also encompasses services for virtual currencies or cryptocurrencies as a digital medium of exchange. However, no law on cryptocurrencies has yet been ratified in Spain, meaning companies and platforms that exchange cryptocurrencies are not regulated under Spanish law. Nor are they subject to any supervision or protected by deposit guarantee schemes, as the CNMV and the Banco de España warned in their joint statement on cryptocurrencies and initial coin offerings (ICO) published in February 2018. The Fifth Anti-Money Laundering Directive (5AMLD), in force since January 2020, specifically extends its scope to include providers engaged in exchange services between virtual currencies and fiat currencies (exchanges) and custodian wallet providers.

3) Investment services (around 50 firms)

Personal finance encompasses financial product comparison platforms and distributors, along with companies that provide personal finance optimization services by recommending products based on the user's risk profile and saving and spending habits. Also, under this category are mortgage advisory firms, stock trading simulators, rankings of financial advisers and investment experts, and online delinquency records.

There are also companies that provide automated investment advisory and management services, and trading platforms. Among the innovations to emerge in recent years, the so-called robo-advisors have gained particular traction. These are online advisors that manage asset portfolios with minimum human intervention.

Also included here are companies that provide investment analysis and stock tracking services: big data algorithmic trading systems built on artificial intelligence models that evaluate investor sentiment. In contrast with the traditional technical and fundamental analysis used by traders and fund managers, these offer a novel approach to investment based on behavioral finance.

4) Other activities (around 10 firms)

This group includes, among others, FinTech firms that offer remote, paperless customer identification and authentication services (electronic Know Your Customer or eKYC services) for digital onboarding. These allow users to register as new customers in a fully digital process via a computer or mobile device.

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In June 2018, the Department of Economic and Regional Integration published FinTech Brief Analysis document, in which, Central Bank of Ecuador identified 31 FinTech startups with a high technological component operating in Ecuador, indicating that the country was heading towards financial innovation registered by other countries in the Latin American region.

FinTech companies in Ecuador offer alternative solutions for payments. The most focuses on the Business Finance Management segment (32%), offering technological innovations for the implementation of best practices in business development. This document was supported by secondary sources such as Finnovista 2017, FinTech radar and CEMLA.

Currently, the Department of Monetary Management does not have statistical information on this kind of entities (FinTech). This department focuses on collecting information from savings and credit cooperatives in the sectorization and balances that are input for different products of Central Bank of Ecuador.

Nowadays, in order to collect this information, it is necessary to carry out a process of technical visits and surveys to know the relevance of this kind of entities and including the information of FinTech statistics.

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