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Sharing and using financial micro-data¹

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¹ This paper was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

Sharing and Using Financial Microdata

Alejandro Gaytan González, Manuel Sánchez Valadez and Mario Reyna Cerecero¹

Abstract

Banco de Mexico has been collecting financial microdata of all market operations by banks and brokerage houses for over 15 years. This data collection was possible because of a broad data sharing agreement between Mexican financial authorities after the 1995 financial crisis. More recently, new needs for monitoring financial institutions and markets, and the lessons of the 2008 global financial crisis, have made necessary improving data collection, data sharing and dissemination of microdata. Over the last years: i) Banco de Mexico has taken the task of a “Trade Repository Like” for derivative operations with new collection templates and new improvements on the quality of data and services; ii) a new data sharing framework with other financial authorities has been implemented, and new MoUs have been signed; iii) the revision and expansion of metadata is an undergoing process for improving the use of these microdata bases; and, iv) designed and developed a new dissemination portal for microdata.

Keywords: microdata, data sharing, derivatives.

JEL classification: C81, C82, G19, G29

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1. Introduction

Banco de Mexico has been collecting financial microdata of all market operations by banks and brokerage houses for over 15 years. The Mexican financial crisis in the mid 1990's, unveiled several data gaps and potential improvements in the collection of financial information. As a response, Banco de Mexico started collecting financial microdata for its flexibility in providing solutions to different information needs of users in Banco de Mexico and other financial authorities. This decision transformed the financial information model from a traditional model to generate central bank statistics to a model heavily based on timely daily granular microdata, mainly with all market operations by all banks and brokerage houses (Gaytan and Sanchez, 2017).

Banco de Mexico concentrated the collection of microdata of financial market operations, regulatory regimes and consumer credit, while the Bank and Securities Supervisor collected microdata on mortgages, commercial credit portfolio, in addition to a set of other regulatory reports. This specialization was the result of an agreement to reduce the regulatory burden of information reporting and to share financial information between financial authorities. In 2000, different financial authorities signed this data sharing agreement: Banco de Mexico, the Ministry of Finance (SHCP), the Bank and Securities Supervisor (CNBV), the Financial Service protection Agency (CONDUSEF), the Deposit Insurance Agency (IPAB), and some years later, the Pension Funds Supervisory (CONSAR). Recently, the 2008 financial crisis and the international initiatives to improve financial stability, has implied several improvements in the acquisition, management and sharing of financial information, including the G-20 data gaps initiatives, the implications of Basel III, the initiative to mitigate risks in the Over the Counter (OTC) derivative market, shadow banking, among other.

Financial information at the level of market operations microdata allows attending different users and information needs, such as open risk positions of an individual institution or the network of exposures in different markets and in the whole financial system. The increased complexity of the interlinkages, instruments and institutions, require increasing capacity to identify potential risks, even though the costs of a detailed model of microdata is high, specially "in times of financial turmoil, the advantages of having the precise information surpasses any maintenance costs associated with such a model, nonetheless, there are also great benefits in steady times" (Gaytan, 2014). The costs of such an information model are high both, for the authority that collects it and for the reporting institutions. Thus, to maximize the social value of this model, it is important to broaden its use by improving the data sharing schemes among authorities and find ways to provide wider access to academic researchers, market analysts and the public.

The paper proceeds as follows: section 2 presents a description of current data sharing schemes at Banco de Mexico. In section 3 describes enhancements on the scope of information of financial system managed by Banco de Mexico, focusing on information of derivative operations. Meanwhile, section 4 describes recent undertakings to expand data sharing with other Mexican financial authorities and the improvement of tools for data dissemination for diverse audiences. Finally, section 5 mentions some challenges ahead regarding data sharing.

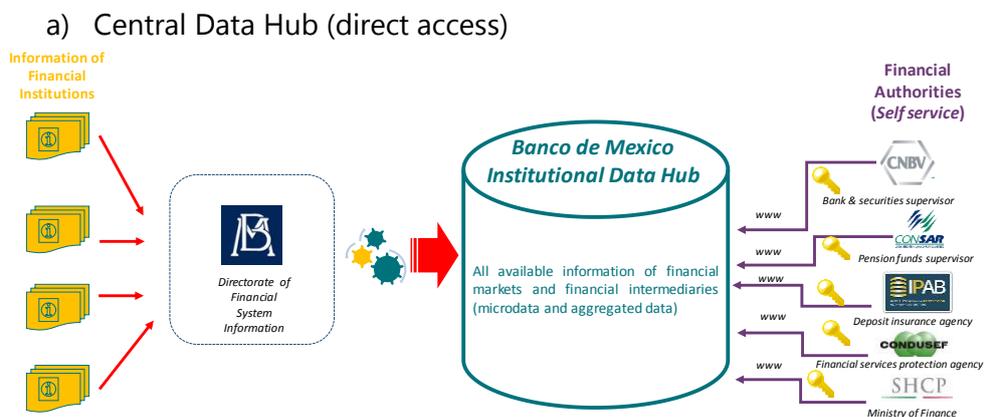
2. Current Schemes for Data Sharing at Banco de Mexico

The 2000 agreement signed by financial authorities to coordinate actions to compile, store, share and disseminate the information received from financial intermediates, set the foundations of a more efficient system of financial reporting to authorities (Gaytan and Sánchez, 2017).

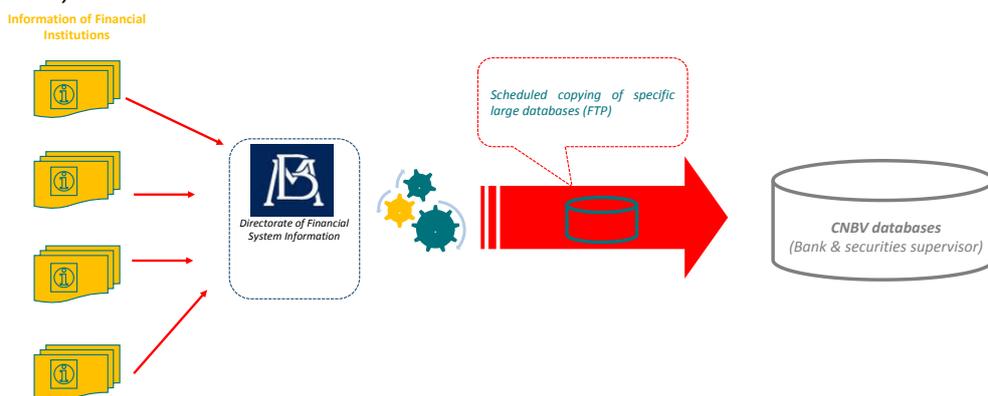
Currently, Banco de Mexico uses three main schemes for sharing data with other financial authorities and information users (Figure 1). First, a Central Data Hub which provides secure direct access both to granular and aggregated microdata of financial institutions reporting to Banco de Mexico. This hub provides querying tools to databases, reporting services and business intelligence tools. Second, a controlled service scheme to share very large volumes of a predetermined set of microdata delivered according to a calendar agreed with the user. Finally, public platforms to access time series and interactive graphics.

The data sharing schemes with financial authorities were significantly improved starting in 2014, when a financial reform included the basis of a new, mandatory framework of data sharing among domestic financial authorities for specific purposes: preserve financial stability, avoiding disruptions in the functioning of the financial system and/or the payments system. In addition, Banco de Mexico was given the faculty to share information with foreign financial authorities after the signing of Memorandums of Understanding (MoU) that establish the conditions of the information exchange and include the reciprocity principle. These changes made possible improvements in the analysis, supervision and regulation functions of financial authorities (Gaytan and Sánchez, 2017).

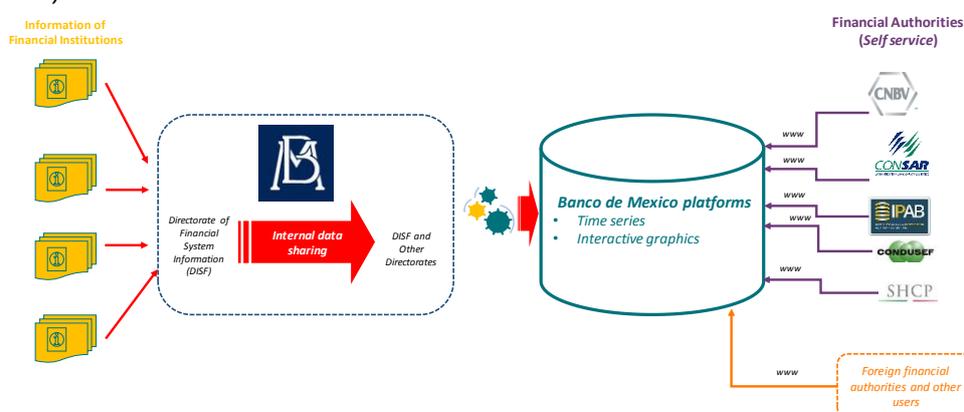
Figure 1. Data Sharing Schemes



b) Controlled Service



c) Self Service



Source: Gaytan and Sanchez (2017).

3. Recent Improvements in the Model of Financial Information

Over the last years, Banco de Mexico has been working on improving the scope of its financial system information model. With respect to the credit market, Mexican financial authorities have information loan by loan of banks and other regulated credit institutions (Sofomes E.R.), Banco de Mexico collects data on consumer credit portfolio (credit cards and other consumer loans) and the CNBV collects mortgage and the commercial loan portfolio. In recent years there have been important improvements. Banco de Mexico started requesting information Credit Bureaus' databases on loans to firms and households, which has improved the integration of the information and has increased the availability of data on loans provided by unregulated financial institutions. In addition, the bank supervisory improved the collection of commercial portfolio with an improvement in the consistency and detail of information. On the other hand, Banco de Mexico has improved the collection of consumer credit by:

- i) Improving individual credit risk information;
- ii) Requesting information on the consumer credit clients, that will help to improve both financial stability and financial inclusion analysis; and,

- iii) Including the initial Total Annual Cost (CAT),² which is the most appropriate cost of loans for comparison of credit products across institutions.

The global financial crisis also had important implications for the development of new precautionary regulation for financial institutions. Basel III established new standards for capital adequacy to incorporate several capital adjustments for financial stability, and new standards on liquidity the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) were implemented. In Mexico capital adequacy regulation, is a CNBV responsibility and liquidity is a joint regulation of Banco de Mexico and the CNBV. However, Banco de Mexico collects and verifies the information of both regulatory regimes as it uses the microdata model to replicate a large proportion of these ratios using the microdata of operations. Currently the LCR is a daily requirement with a 10 days lag revision. These improvements have enhanced financial stability analysis and surveillance of financial institutions.

Banco de Mexico, has also implemented new information requirements to improve the surveillance of the payment system. In 2015 Banco de Mexico improve the template, timeliness and quality of the report of all credit and debit card transactions, increasing the fields of the information to include data on the location of each transaction and the activity of the business, among other.³ The timeliness of the reporting is one day. More recently, this information was extended with a new requirement to include not only information on the transaction, but also, information that includes all the confirmation messages related to each transaction. In 2017 Banco de Mexico implemented a new requirement about all cross-border transactions made by financial intermediaries via correspondent banking.

Another important improvement has been the information model on derivatives. Banco de Mexico has been collecting information transaction by transaction on derivatives operations performed by banks and brokerage houses since 1999, and it was a natural step to operate with the functions of a "Trade Repository (T.R.) like" infrastructure for the international initiative of IOSCO-CPMI to reduce the risk in the OTC derivative market.

To better perform the functions of a T.R. like, in 2015 there was an important update of the reports to include new developments in markets and instruments, information to respond to new demands by users and information related to the regulatory changes, particularly the standardization of OTC operations and the central counterparty. In this respect it was designed to fulfil a set of data elements consistent with the reviewed by international institutions (IOSCO) and regional regulators (ESMA), which includes a better identification of underlying assets, products (ISDA taxonomy), netting agreements, among other.

Another improvement is to centralize in a single template, a catalogue of entities, the characteristics of counterparties of all operations, including derivatives, of the banks and brokerage houses in financial markets. These characteristics include the tax identifier as well as the Legal Entity Identifier (LEI), economic activity, residency, and relevant relations with the party, among other.⁴ This new requirement allows a better

² The CAT is the domestic name of the Annual Percentage Rate (APR), which includes the annualized interest rate plus all fees attached to the loan.

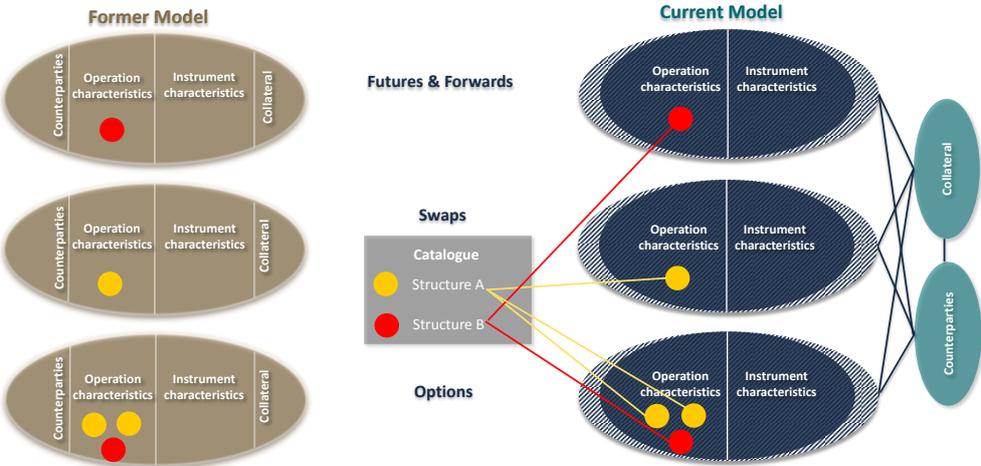
³ To identify the kind of activity of merchant is used the Merchant Category Code (MCC).

⁴ The economic activity identification is according to North American Industrial Classification System (NAICS).

identification of the different entities trading in the domestic financial markets and of foreign exposures. In addition, and linked to the counterparty information, the data on collateral of derivative operations was separated from the individual transaction as collateral is generally related to a set of operations with the same counterparty (Figure 2).

Before 2015, the template had some limitations to account precisely of the "strategies" with derivatives operations, and these limitations sometimes hindered the complete identification of what transactions were part of the strategy, to close this data gap, it was created a precise way to link transactions that form part of a "structure" or "strategy".

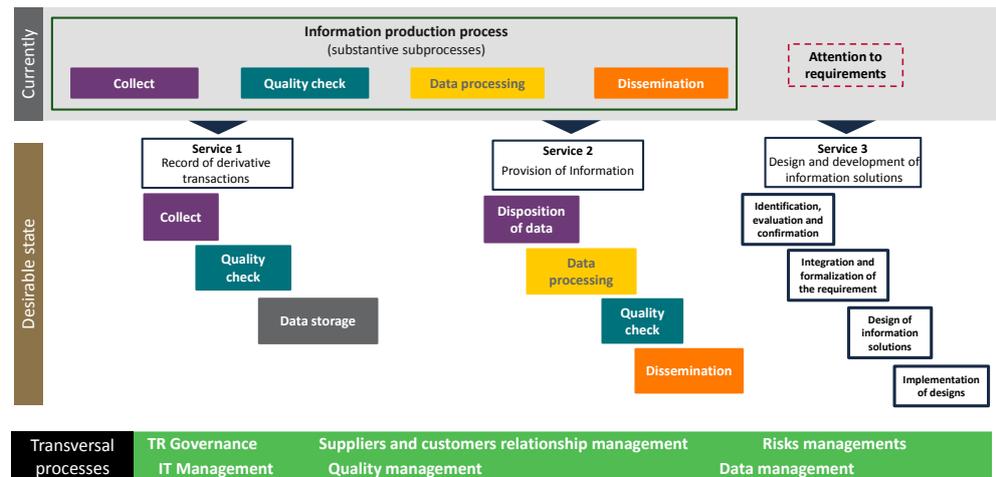
Figure 2. Changes in Derivatives Information Requirements



Source: Banco de Mexico.

Nevertheless, to operate as a T.R. like for derivatives it is not sufficient to improve the data model, it is also necessary to adjust the operation of processes of data and adjust the services provided to perform the functions of a Trade Repository in a central bank. IOSCO-CPMI define a series of best practices established in a set of Principles for Financial Market Infrastructures defined in the report "Principles for financial market infrastructures" (BIS & IOSCO, 2012). To implement the necessary changes, it was defined a new operational model for the functioning of the T.R. like. Figure 3 presents the change in the operational model, based on a services approach. The idea is to pass from a model centred on the service of the provision of information to another with three main services: Registration of derivative transactions, the provision of information and the design and development of information solutions. The registration of operations is a necessary service that Banco de Mexico will have to provide so that the financial institutions could comply with their obligation of reporting to a T.R.

Figure 3. Redesign of Operative Model of Trade Repository



Source: Banco de Mexico.

One of the main functions of the initiative of Trade Repositories is to increase the transparency of the OTC derivatives market, which implies the establishment of mechanisms of data dissemination and data sharing. A T.R. should provide information to market participants, other domestic and foreign financial authorities and provide publications of the operation of the derivative market. Currently, the scope of data dissemination is done using the schemes for data sharing at Banco de Mexico that were presented (Figure 1). The data hub and the direct access scheme to microdata are and can be used to attend data requirements of financial authorities and there is a broad set of statistics and graphs of the operation of the market published using the time series platform and the interactive graphic platform. Nonetheless, a broader definition and implementation of improvements of the data dissemination processes and tools is still work in progress.

4. Recent Improvements on Sharing and Dissemination of Microdata and some Potential Uses

As mentioned above, the financial reform strengthen the data-sharing scheme. In recent years as a complement to the 2000 general agreement, two MoUs have been signed between Banco de Mexico and the Financial Services Protection Agency (CONDUSEF) in 2015, and with the Pension Funds Supervisory Agency (CONSAR) in 2017. In addition, Banco de Mexico is currently working on MoUs with other domestic financial authorities.

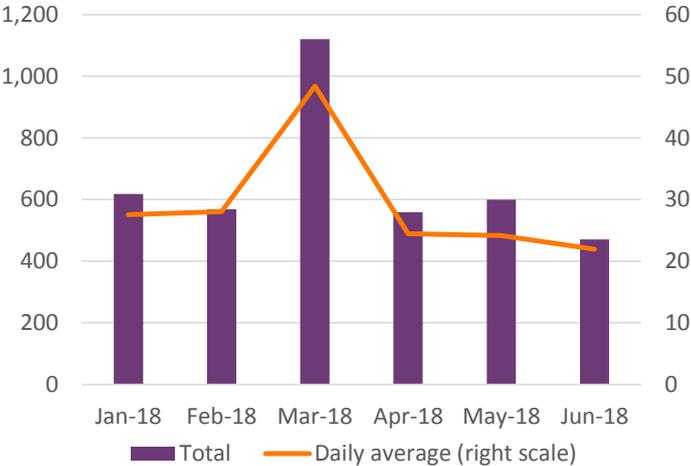
Banco de Mexico shares information with CONDUSEF about banks' financial products (deposit products and credit products) and their characteristics and services, fees and interest rates, transactions in retail payment systems (checks, ATM transactions, TPS transactions, electronic transfers, etc.) and e-commerce payments.

CONSAR and Banco de Mexico share information on derivatives and securities transactions performed by banks with the Pension Funds (SIEFORES), daily information of investment portfolio of these funds and data on savings, and the demographic characteristics of workers.

Data dissemination by publication is another important way of increasing the value of the information collected. Banco de Mexico has been expanding publication of financial data, particularly on derivatives.

In 2016, Banco de Mexico published a broad set of statistics on derivatives (turnover and outstanding operations, and the forward exchange rate). In the same year, it was launched an interactive portal for financial information (PIIF). In this platform, it was included a graphic overview of the derivative market in Mexico using some of the most relevant published derivative statistics. More recently, graphic information was published on outstanding government securities sector by holder (securities issued by the Federal Government, the deposit insurance agency (IPAB), and Banco de Mexico). Figure 4 presents the access statistics to the PIIF, even though the current number of visits remain low, we expect an increase when data of other topics is incorporated.

Figure 4. Visits to PIIF

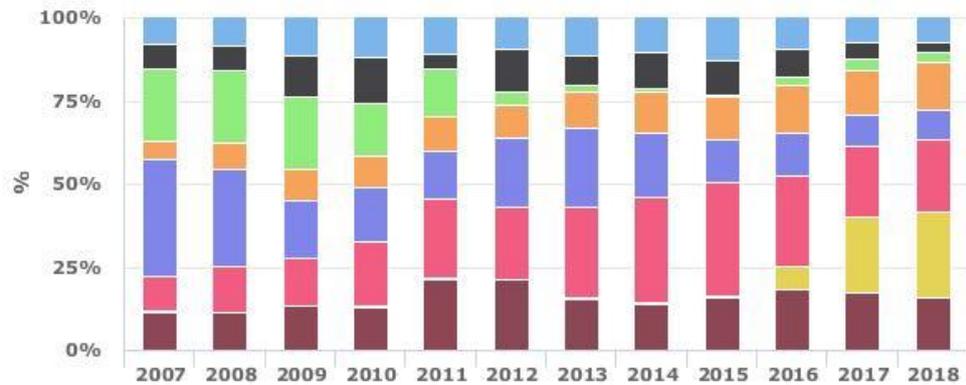


Source: Banco de Mexico.

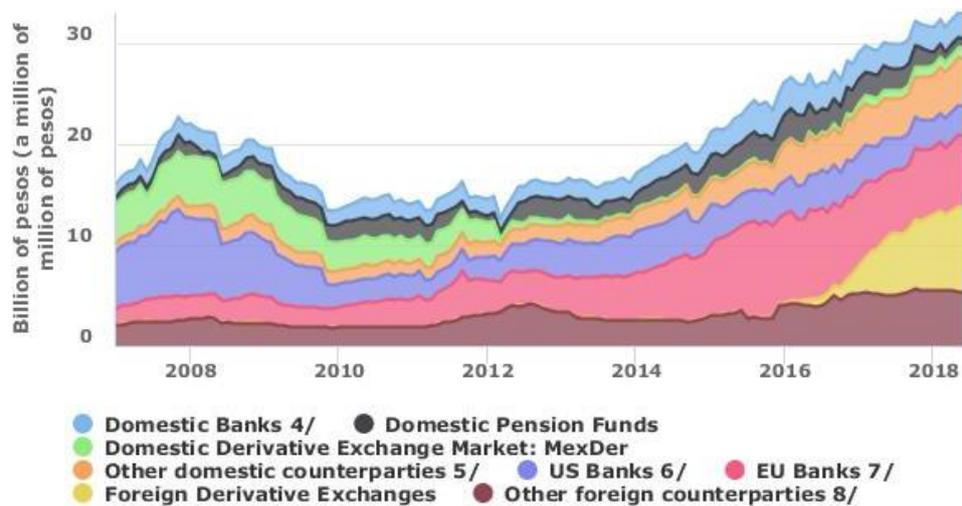
Although currently the PIIF has only being used to disseminate graphic information, this portal will be used to disseminate micro-data on loans and market operations. Figure 5 and Figure 6 are examples of derivate operations information included in the PIIF. Figure 5 shows outstanding derivatives by type of counterparty and, Figure 6 shows turnover and average exchange rates on forwards on US dollar vs Mexican peso.

Figure 5. Outstanding Derivatives by Type of Counterparty

a) Structure ^{1/3/}



b) Outstanding ^{2/3/}



1/ Figures at end of year. Figures at the end of June in 2018.

2/ Figures at end of month.

3/ Figures on Options and Warrants are preliminary from September 2015, due to significant revisions in course.

4/ Figures are only on domestic commercial banks transactions.

5/ Domestic development banks, brokerage houses, other financial entities, and non-financial entities other than private enterprises.

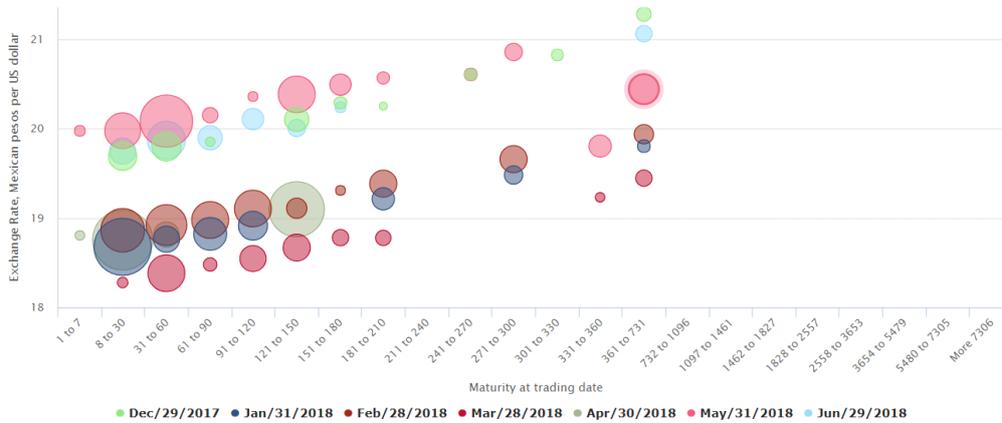
6/ Figures are only on commercial banks located in the United States.

7/ Figures are only on commercial banks located in the European Union

8/ Figures are only on commercial banks located in Latin America and others foreign financial entities and non-financial entities.

Source: Banco de Mexico.

Figure 6. Turnover and Average Exchange Rates on Forwards on US Dollar vs Mexican Peso related to FX Swaps



Source: Banco de Mexico.

Recently all financial information at Banco de Mexico went through a process of revision of its metadata to determine a set of characteristics that will help the identification of its characteristics and, thus, its use. These metadata are included in a new financial data inventory. The metadata includes information about the collection (frequency, timeliness, granularity, etc.), metadata about its content, the sources of information to help traceability, the reporting institutions, sensitivity information among other. It is worth mentioning, that the revision and expansion of metadata is an undergoing process for improving the use of the microdata bases managed by Banco de Mexico.

5. Concluding Remarks

In our view, one of the main objectives of enhancements in the model of information at Central Banks is to maximize the potential social value of data. According to the experience of Banco de Mexico, in order to maximize the social value of information it is necessary to improve: i) efficiency in the generation of information, ii) accuracy of information and iii) dissemination of information.

In the case of Banco de Mexico, the process of generation of derivative operations information is under revision and enhancement, which has implied adopting international best practices, improving information security and increasing the focus on solving user's needs. From this experience, these improvements will be adopted into the rest of the information process at Banco de Mexico.

As was mentioned above, having microdata allows improve the accuracy of information. In effect, having microdata allows the Banco de Mexico to check consistency between different information requirements, which in turns helps improve information quality. In particular, one potential enhancement is to join diverse data bases allowing an easy identification of parties and counterparties in different markets, which could be helpful to identify risk exposures.

Another key aspect is data sharing practices. Banco de Mexico has improve data sharing agreements and platforms. In this respect, the PIIF, a relatively new platform of data dissemination, has allowed to share new statistics under different formats.

These improvements notwithstanding, Banco de Mexico is still working on data dissemination, specifically in microdata dissemination. In this respect, a data room is an option to expand microdata dissemination to diverse audiences.

It is worth mentioning that our final objective of all improvements in the model of financial information and data sharing practices is to increase the amount and quality of information in order to do better analysis and to take better decisions, which as result will maximize the potential social value of information.

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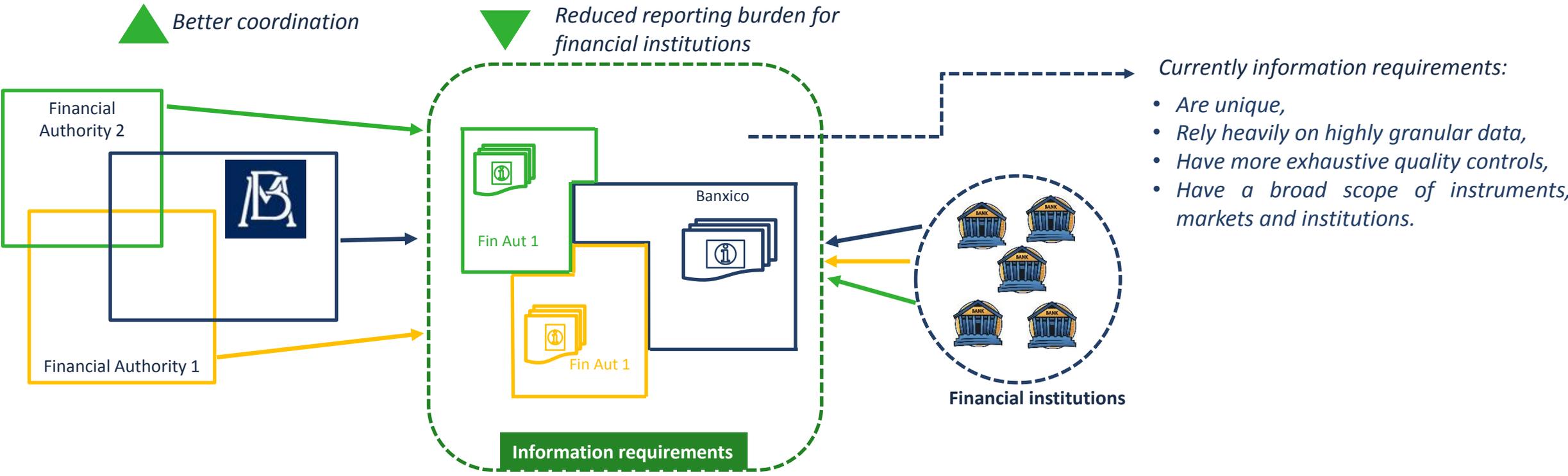
Introduction

- The Mexican financial crisis in the middle of 1990's, unveil data gaps and inefficiencies in the generation and collection of information. To tackle these deficiencies, Banco de Mexico started to collect microdata, which by its flexibility were used to solving information needs of both financial authorities and internal users. In our view, improvements to the model of information should have as objective the maximization of the social value of data.
- Having microdata of financial transactions offers several advantages for financial stability analysis, including the determination of open risk positions of an agent or the network of exposures in the financial system.
- Nonetheless, the costs of such an information model are high to both the authority that collects it and to the reporting institutions. Therefore, to justify these costs it is important that the data collected be used to the maximum of its capacity, and for that an efficient data sharing scheme is needed.
- In 2000, several financial authorities, including Banco de Mexico, signed an agreement to coordinate actions to compile, store, share and disseminate the information received from financial intermediates, setting the basis to improve efficiency on information requirements to financial institutions.

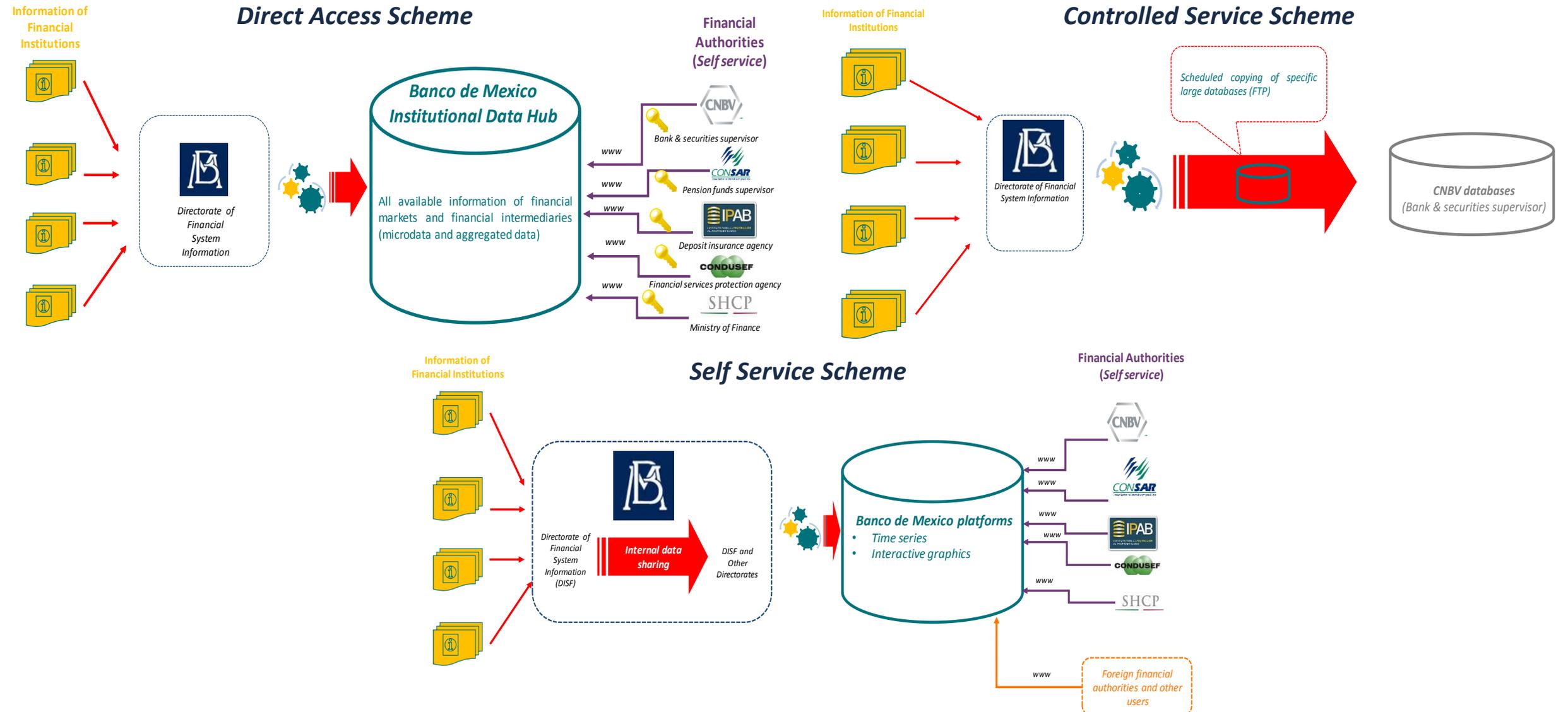
Current situation

- The cooperation framework build since 2000 has allowed Mexican financial authorities to improve significantly data sharing practices between them, completing the information used in their respective activities.

Information exchange among Mexican financial authorities current situation



Schemes for sharing Information at Banco de Mexico

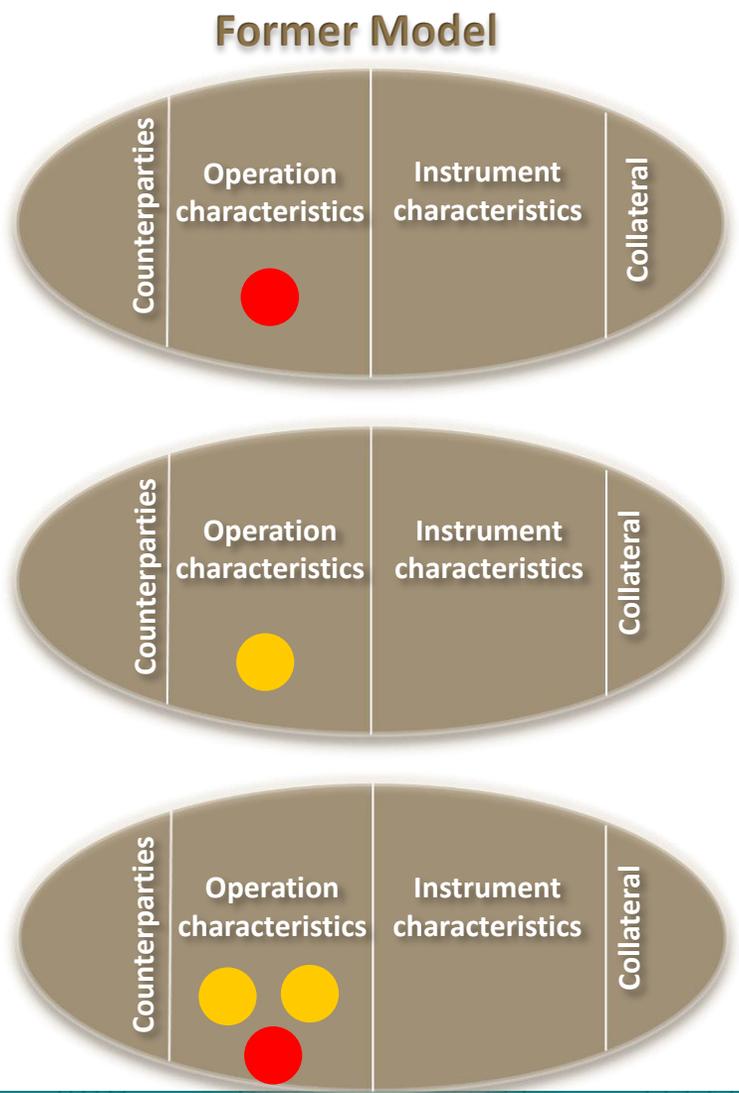


Recent Improvements on Model of Financial Information

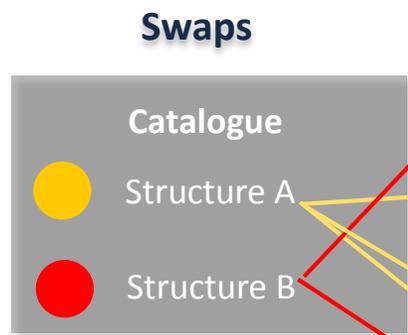
- Banco de México has been working on improving its model of information of financial system.
 - Market credit:
 - Collecting microdata reported by credit bureaus,
 - Enhancements on information requirements of consumer credits and,
 - Utilizing the improvements in the information requirements on commercial credit and mortgages (CNBV).
 - Regulatory information:
 - Collecting data to calculate the Liquidity Coverage Ratio (monthly basis 2014 and daily basis 2017),
 - Collecting information to calculate the Net Stable Funding Ratio on monthly basis and,
 - Incorporation of all changes for capital adequacy proposed in Basel III.
 - Payments:
 - Improvements in the information requirement to “Switches” (transactions with credit or debit cards),
 - Collecting information about confirmation messages of each transaction done with credit or debit cards,
 - Improvements in the information requirement in microdata on checks, transfers and direct debit and,
 - Collecting information about cross-border transactions.

Recent Improvements on Model of Financial Information

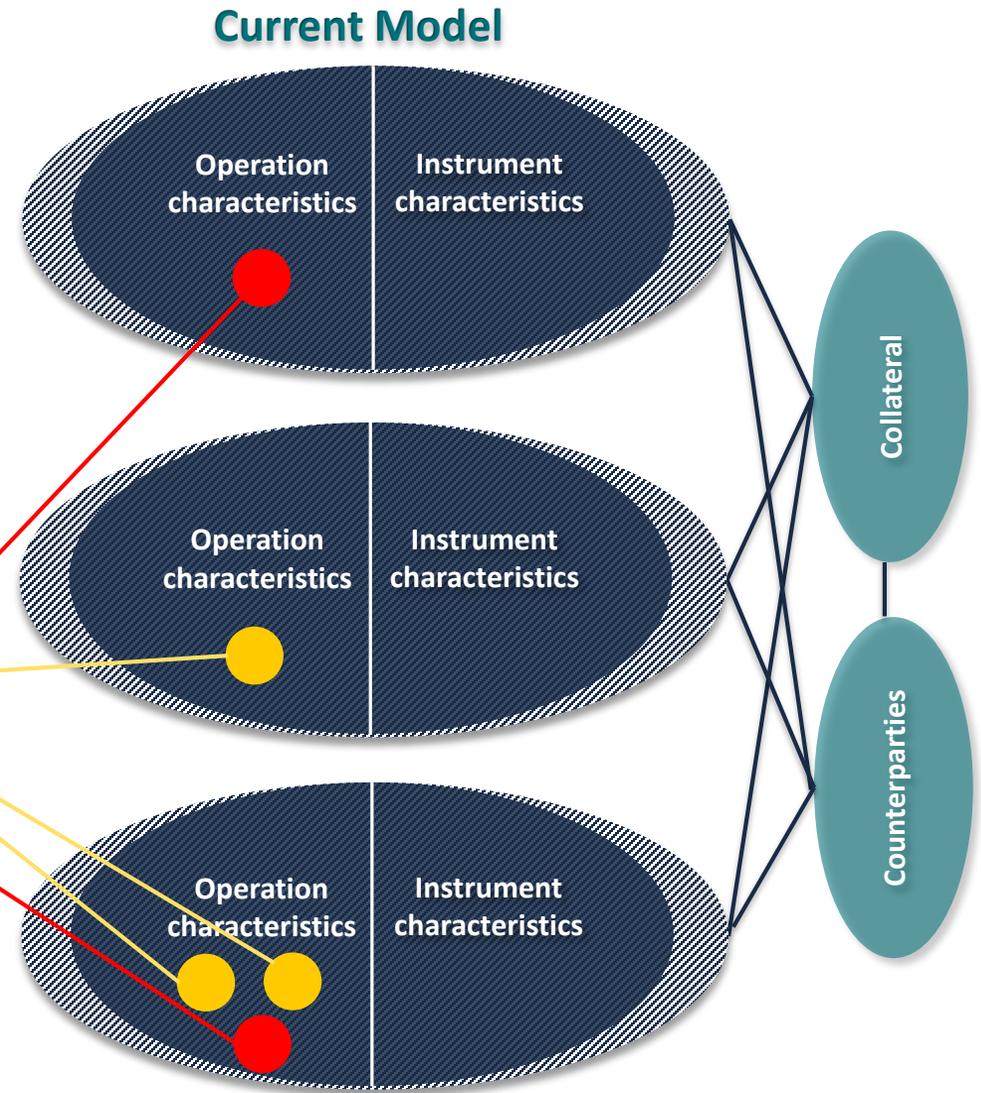
- In 2015 a key change in the information requirements was made to improve the information of derivative operations, having as result a more complete model information.



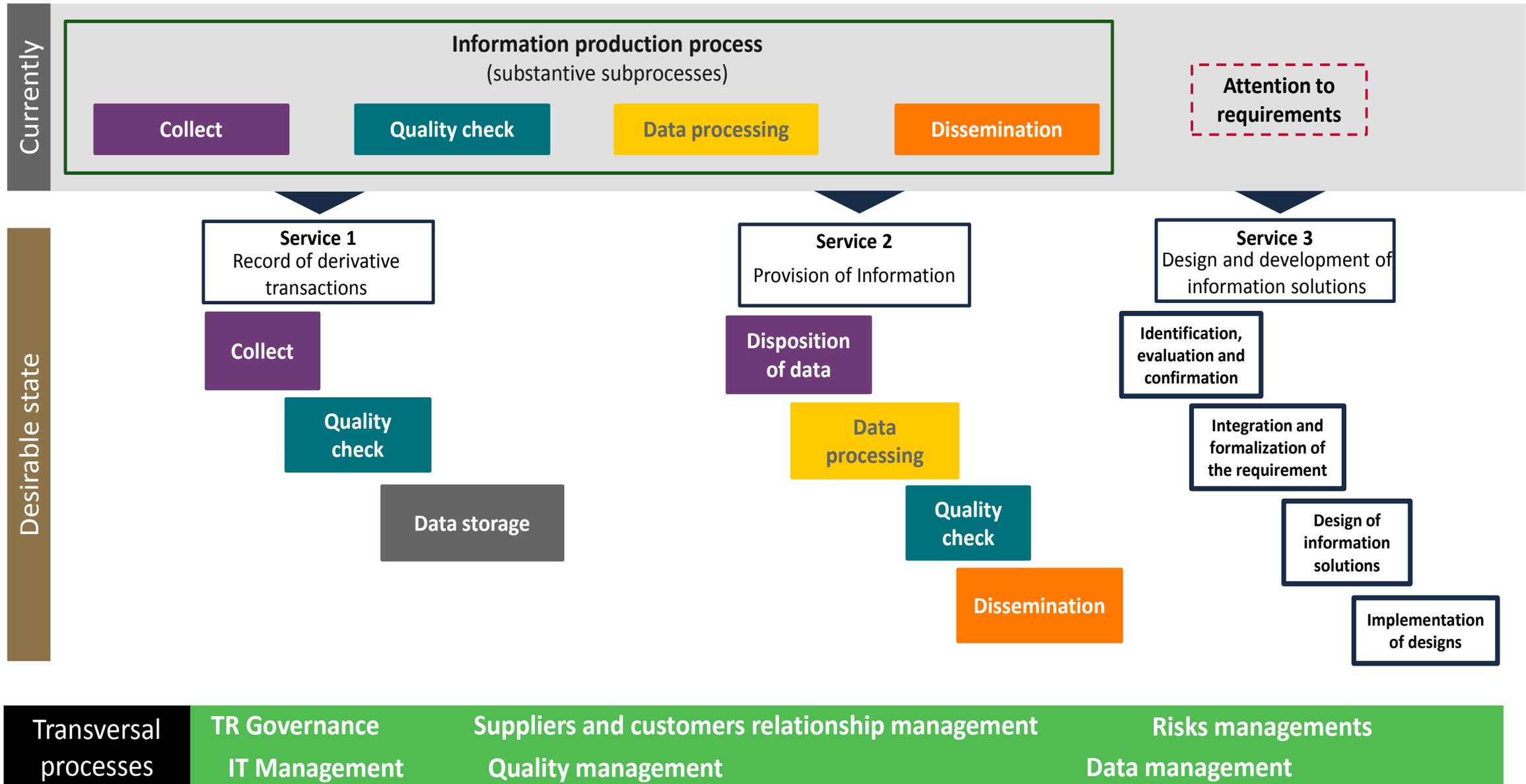
Futures & Forwards



Options



Trade Repository Operative Model



Recent Improvements on Sharing and Dissemination of Microdata

- Over the last few years, Banco de Mexico has promoted a broad interchange of information with other Mexican financial authorities through MoU's, in particular with the Financial Services Protection Agency (CONDUSEF) in 2015 and with the Pension Funds Supervisor (CONSAR) in 2017.
- In 2016, the Interactive Application for Financial Graphs (PIIF) was launched. The PIIF is a tool that disseminates through graphics and tables, data of the main relevant aspects of some financial markets. Currently data on derivatives and securities outstanding by sector is available.
- Since 2017, Banco de Mexico has an inventory of “information products”, it includes metadata to identify main characteristics of data, main topics of each product, sources of information used to generate each “information product”, among others. Revision and expansion of metadata is an undergoing process for improving the use of microdata bases managed by Banco de Mexico.

Final Remarks

- Banco de Mexico has a large experience on collecting microdata on financial markets. Over the last few years we have done improvements on scope of the model of information.
- In our view, one of the main objectives of enhancements in the model of information at Central Banks is to maximize the potential social value of data. According to the experience of Banco de Mexico, in order to maximize the social value of information it is necessary to improve: i) efficiency in the generation of information, ii) accuracy of information and, iii) dissemination of information.
- This will increase the amount and quality of information in order to do better analysis and to take better decisions, and as result will maximize the social value of information.



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