



The Money Market Information Model of Banco de México¹

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ABSTRACT

Banco de México has been collecting granular information on money market transactions since 1998. In this paper we present the structure of the information model which consists on daily information on spot transaction with securities, the repurchase agreements (repos) and securities lending, fails, a security by security database and holdings. The information available goes beyond the minimum set of variables identified by Adrian et.al. (2013) to monitor the repo and security lending markets. We present a brief description of the money market using a set of statistics and inform about some of the uses of the information for market monitoring and surveillance.

Keywords: money market, repo, securities lending, financial information

1. INTRODUCTION

The financial crisis that started in 2007 showed that the information about the financial system was insufficient for an accurate identification of the accumulation of risks, the exposure to counterparties and the network of exposures. For example, the lack of information on transactions performed in OTC markets on derivatives, repos, and securities lending, did not allowed an estimation of the size of the markets, let alone the risk exposures that had been taken and, the network of these exposures for the institutions and the system. Central banks and other financial authorities worldwide have since started collecting microdata in these markets and, when possible, details of each and all transactions. Adrian et.al. (2013) review the problems in the repo and security lending markets during the crisis and provide a minimum set of characteristic of these contract to monitor them, this set includes: i) principal amount, ii) the interest rate, iii) collateral type, iv) haircut, v) tenor, and vi) counterparty. In addition, the analysis of the extent to which financial institutions are interconnected in the different markets would shade light in the propagation mechanisms of financial distress from an into these markets. The size and complexity of these markets have made it difficult to collect this information (Gorton and Metrick (2012) estimate the size of the US repo market around \$10 trillion).

As a result of the financial crisis of 1994-1995, Banco de México developed a financial system information model based on granular microdata consisting on daily information of all transactions by banks and brokerage houses on the money market (spot transactions, repos, securities lending, fails, holdings, security by security catalog), the FX market, the derivative market (futures, forwards, swaps, options), interbank loan and deposits and time deposits (see Gaytan (2014) for a description of the model).

The structure of the paper is as follows: Section 2 presents the information model at Banco de México and some quality controls, Section 3 provides an overview of this market in Mexico by recurring to some statistics from this model, Section 4 describes some of its uses for market monitoring and Section 5 concludes and identifies the future improvements to the information model.

2. The Money Market Information Model at Banco de México

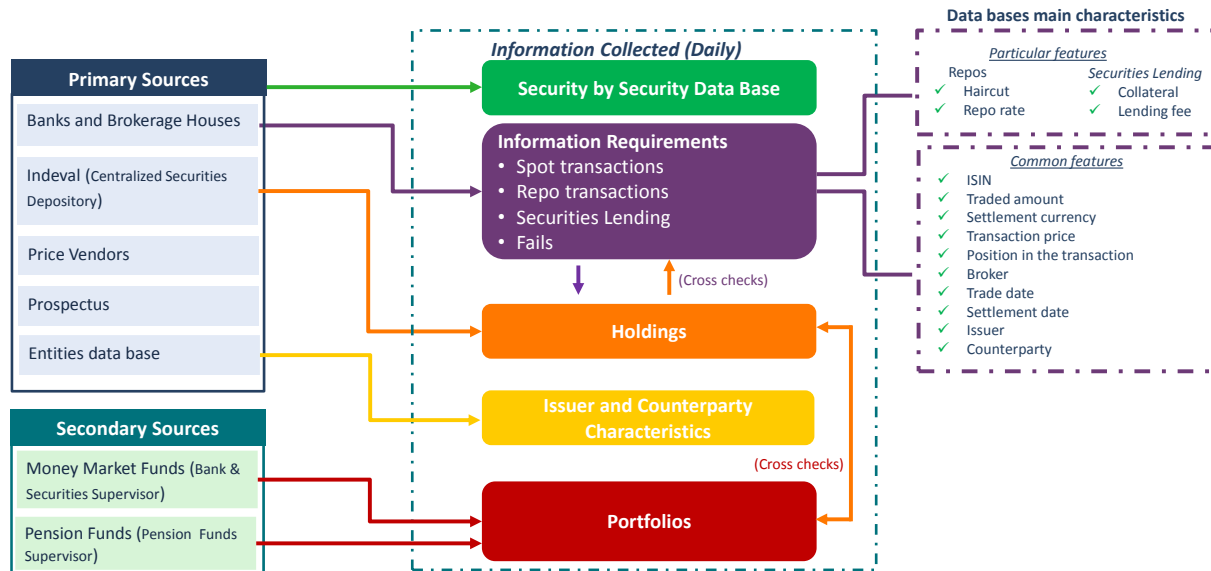
Banco de México has being collecting daily information of all money market transactions performed by banks and brokerage houses (reporting institutions) since 1998. The main features of the information model are summarized in Figure 1. The first data model is a security by security database that is a catalog

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of securities issued and their main characteristics. The sources for this database are, in order of relevance, INDEVAL (Securities Depository), the reporting institutions, data vendors and some prospectus.

Figure 1. The Money Market Information Model of Banco de Mexico



Source: Banco de México.

Information about the money market operations is the second and the main element of the model. The reporting institutions send information of all their spot transactions (securities buy and sell), repos, securities lending and fails. The information about this operations has some common elements: trade date, ISIN, traded amount, settlement currency, transaction price, position, broker, issuer, counterparty. For repos there is additional information about the haircut, and the repo rate and in securities lending about the lending fee. This data model contains the minimum set of variables for all transactions identified by Adrian et.al. (2013) to monitor the repo and security lending markets. With respect to data quality, several business rules are in place, two of the most important are: i) the crosscheck of the operation data reported by the two parts of the contract when both counterparts are required to report; and, ii) the crosscheck of the information in these reports with other reports as: FX operations and regulatory regimes, bank balances, capital adequacy and the liquidity coverage ratio. The model has also information on custody as the reporting institutions are also the custodians of securities, that feature allows to identify changes in the holdings of securities of other financial institutions and among non-financial sectors.

The coverage of the model is exemplified by the repo market, as Banco de México regulation establishes that banks and brokerage houses, the reporting institutions, are the only domestic financial institutions (other than the central bank) that can perform repos. While all the other domestic financial institutions can only perform reverse repos. The reporting institutions in addition, can perform reverse repos with Banco de México and foreign financial institutions.

The third element of the model consists on securities holdings. This information can be obtained from two sources, from the centralized securities depository and as a consequence of a stock and flow approach using the information on market transactions. Both sources are used to strengthen data quality. The fourth element of the model is the information on the identification and characteristics of issuers and counterparties of the operations. This information is part of a general database of entities.

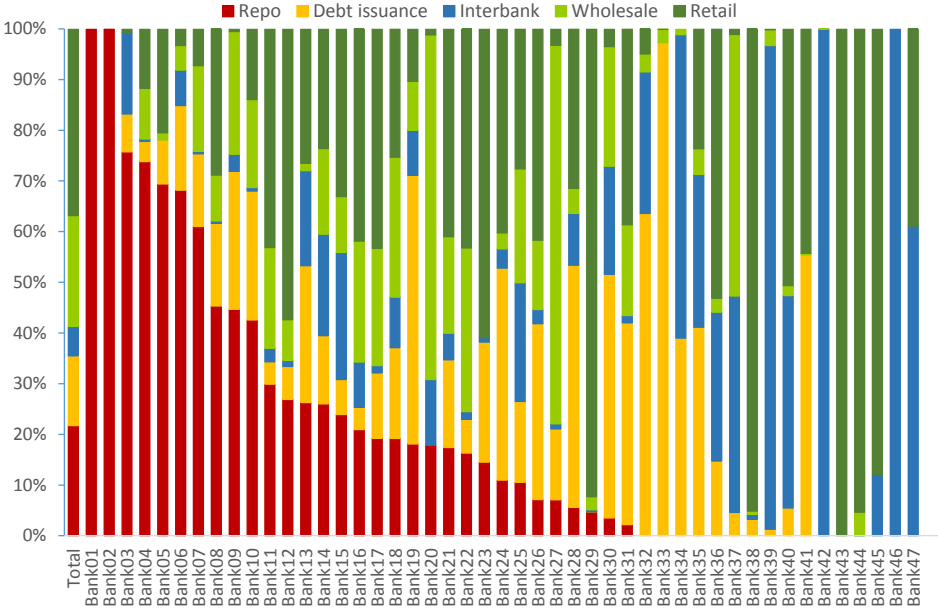
Finally, Banco de México also receives from other financial authorities (CONSAR which is the Pension Funds Supervisor and CNBV the Bank and Securities Supervisor) the securities portfolios of pension funds and money market funds.



3. The Money Market in Mexico

In this section we present a very brief description of the current situation of the money market in Mexico using information on funding and market operations in 2016 and 2017.² The money market is an important source of funding for financial institutions, more than 20% of banks’ funding is from the repo market (Figure 2). Nonetheless, there may be some differences in funding by type of bank. In particular, it is worthy to explore differences in participation in the money market of: i) large banks, ii) banks that are subsidiary of foreign banks focused on portfolio investment; iii) all other domestic banks.³

Figure 2. Commercial Banks Sources of Funding in percentage (February, 2017)



Source: Banco de México.

Figure 3 shows that the deposits, mainly retail are the main source of funding for large banks while repos represent around the 20%. Banks focused on portfolio investment use as funding source more wholesale deposits and repos represent only 10% of the total. For other banks repos represent almost a third of total funding, around the same level as retail deposits.

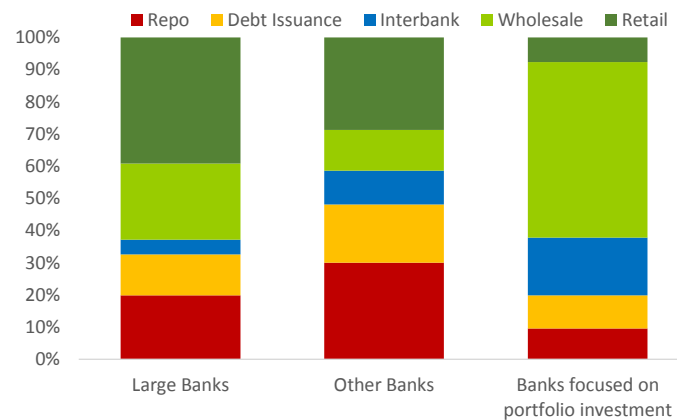
Using the information on repos and reverse repos we can obtain a description of funding of the complete repo market in México. Table 1 presents the repo market by reporting institution and the source of funding sector, it includes the average of daily funding for the second semester of 2016 and the corresponding average rate, and Table 2 presents the corresponding figures for the reverse repo operations.

² For a comprehensive description of the repo market see Lopez et.al (2017).

³ There are 7 large banks, defined by their size of assets.



Figure 3. Type of Banks Sources of Funding in percentage (February, 2017)



Source: Banco de México.

The main source of funding in the repo market in México is the private non-financial sector, both for the complete market, contributing with more than 40% of total repos, and for each of the reporting institutions, almost half of the repo funding of large banks is provided by this sector. In addition, funding with this sector is at relatively lower interest rates for large, other banks and to a less extent brokerage houses. The second source of financing is the interbank market itself. Other important funding source for development banks and brokerage houses are non-financial public corporations. As it can be seen in Table 2, large banks are the main funders in the reverse repo providing 36% of the total.

In general all reporting institutions (banks, development banks and brokerage houses) are net borrowers in this market except for banks focused on portfolio investment which are net lenders as they provide net financing mainly to large banks. Nonetheless, in the market between reporting institutions the net borrowers are only large and other banks. In terms of financial flows it represents an intermediation of resources in this market from banks focused on portfolio investment, development banks and brokerage houses to non-investment commercial banks.

Table 1 Repo Market: Turnover (billion pesos) and Rates (percentage)

Party/Counterparty	Large Banks		Other Banks		Banks focus on portf Invest.		Development Banks		Central Bank		Brokerage Houses		Investment Funds	
	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%
Large Banks	9.4	4.68	1.5	4.65	4.6	4.65	6.0	4.66	6.2	4.74	6.4	4.64	0.7	4.67
Other Banks	2.1	4.72	0.8	4.64	1.6	4.63	2.0	4.68	1.1	4.63	1.3	4.72	0.3	4.70
Banks focused on portfolio investment	1.3	4.83	0.5	4.52	0.8	4.51	0.5	4.68	0.0		0.6	4.62	0.0	
Brokerage Houses	3.6	4.61	1.2	4.66	0.9	4.65	2.5	4.70	0.0		0.8	4.63	0.6	4.68
Development Banks	2.9	4.63	1.4	4.68	1.7	4.66	1.3	4.53	0.0		2.0	4.61	0.9	4.69
Total	19.4	4.69	5.4	4.63	9.6	4.62	12.2	4.65	7.3	4.68	10.9	4.64	2.6	4.68

Party/Counterparty	Pension Funds		Other Financial Domestic Corp.		Non-financial Private Sector		Public non Financial Corp.		Financial Foreign Residents		Other Foreign Residents		Total	
	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%
Large Banks	0.6	4.64	0.3	4.36	36.4	4.10	3.3	4.53			0.6	4.25	75.9	4.55
Other Banks	0.3	4.75	1.0	4.43	5.4	4.04	1.0	4.54	0.0		0.0	4.64	17.0	4.59
Banks focused on portfolio investment	0.0		0.0		3.2	4.56	0.0		2.3	4.33	0.0		9.1	4.58
Brokerage Houses	0.3	4.71	0.3	3.47	9.6	4.27	3.7	4.76	0.0	4.66	0.1	4.35	23.7	4.51
Development Banks	1.0	4.75	0.8	4.82	8.9	5.19	6.5	4.71	0.0		0.0		27.2	4.73
Total	2.2	4.71	2.3	4.18	63.5	4.43	14.5	4.65	2.3	4.49	0.7	4.42	152.9	4.58

Source: Banco de México



Table 2 Reverse Repo: Turnover (billion pesos) and Rates (percentage)

Party/Counterparty	Large Banks		Other Banks		Banks focus on portf Invest.		Development Banks		Brokerage Houses		Other Financial Foreign Residents		Total	
	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%	Bill. Pesos	%
Large Banks	9.4	4.68	2.1	4.73	1.3	4.83	2.9	4.63	3.6	4.61	1.6	4.35	21.0	4.63
Other Banks	1.5	4.65	0.8	4.65	0.5	4.52	1.4	4.68	1.2	4.66	0.0		5.4	4.61
Banks focused on portfolio investment	4.6	4.65	1.6	4.63	0.8	4.51	1.7	4.66	0.9	4.65	0.0		9.6	4.72
Brokerage Houses	6.4	4.64	1.3	4.72	0.6	4.62	2.0	4.61	0.8	4.63	0.0		10.9	4.64
Development Banks	6.0	4.66	2.0	4.68	0.5	4.68	1.3	4.53	2.5	4.70	0.0		12.2	4.65
Total	27.8	4.66	7.8	4.68	3.6	4.61	9.3	4.62	9.0	4.65	1.6	5.22	59.0	4.65

Source: Banco de México.

4. Uses of the information.

The money market information has several uses in Banco de México. As it was mentioned the money market transactions helps to determine the change in the holdings of a security by an institution. It is possible to replicate aggregated variables of the regulatory regimes (FX regimes, capital adequacy and liquidity coverage ratio) and the bank balances for consistency checks and simulation scenarios. Data is used by supervisors to follow up the regulatory observance. This information is also crucial to monitor the performance of governmental debt market makers.

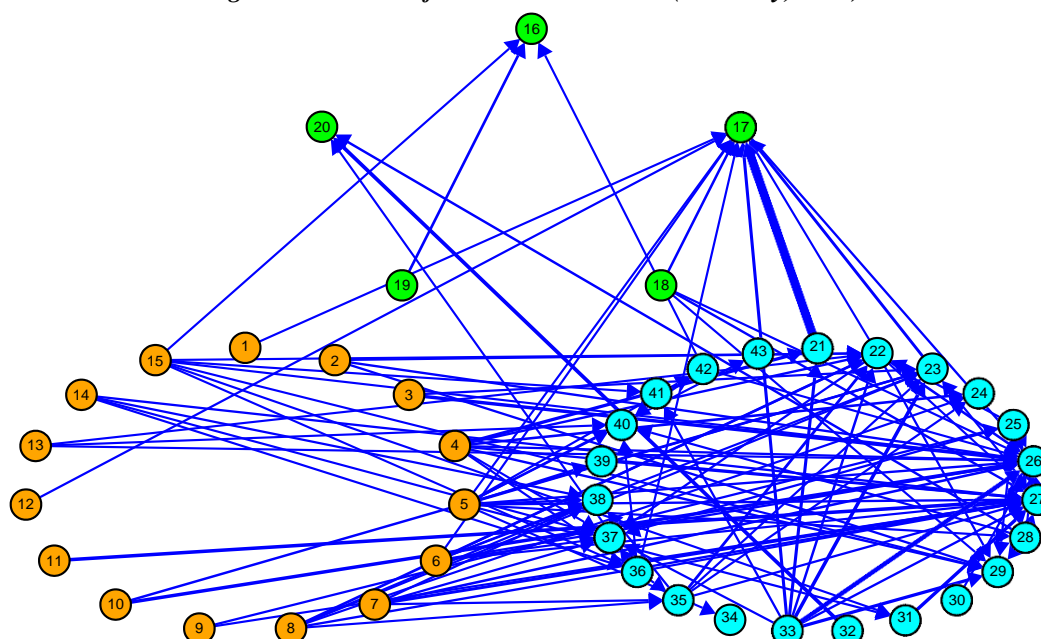
Banco de Mexico is utilizing its information model to develop the securities statistics presentation according with the Handbook of Securities Statistics (HSS). The available transactions will help to identify the parts that comprise the changes in positions between two specific points in time (flows), by separating the transactions from other changes that affect the positions.

One of the advantages of having daily information on all transactions in the repo and securities lending markets is that it is possible to study the network of exposures and the potential transmission of financial distress through the haircut and the repo rate. Lopez Gallo et al. (2016) present the complete repo network. In addition, they develop the network analysis for two networks, the interbank network and the extended network, the latter including commercial banks, development banks and brokerage houses. To analyze these networks, the authors use a set of indicators to identify characteristics of both networks: number of bilateral directed connections, a completeness index, clustering coefficient and some measures for core-periphery model. The size and the characteristics of each network are analyzed in a period of ten years, from 2005 to 2016. Some of the conclusions of this analysis are that although the completeness index (realized connections out of the possible) of the market decreased since 2006 and has remained low, around 3%, the average clustering coefficient (the proportion of triads which form a triangle) is relatively high, around 15%.

In repo markets there are two main sources of risk, the collateral issuer risk, and the risk of the counterparty of the repos. In Figure 4 we present the network of issuer risk among commercial banks (light blue), development banks (green) and brokerage houses (orange). The arrow points the issuer of the security and the width of the line the size of the exposure.



Figure 4. Network of collateral issuer risk (February, 2017)



Source: Banco de México.

5. Final remarks

The information about the money market transactions in Banco de México covers all repo and securities lending transactions and most of the spot buy and sell transactions. This detailed information is very useful to study the transmission of risk in these markets to an external shock. The network analysis can be complemented by including the exposures in other markets among domestic financial institutions to assess their vulnerability to different shocks, therefore providing more than the basic dataset mentioned by Adrian et.al (2013). There are some improvements that can be made to the money market information model of Banco de México. In particular, it lacks accurate information about foreign holders of securities issued by domestic agents. It is also necessary to include fails by third party operations and daily information on securities restriction to allow a better assessment of liquidity.

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