

Banco de México and recent developments in domestic public debt markets

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Abstract

This paper describes major policy actions that have recently contributed to the development of the Mexican domestic-currency debt market, and concomitant benefits. Among the most important are a significant reduction in exchange-rate exposure and a decline in refinancing risk for the government and private sectors alike. Another positive outcome of the development of government securities markets has been investor base diversification. This paper explains how capital inflows have translated into larger and more stable foreign investor participation in local debt markets. Empirical evidence presented suggests that these capital inflows have had positive funding implications, lowering both interest-rate levels and volatility.

Keywords: Public debt management, financial markets, Latin America

JEL classification: H63, E63, N26

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1. Introduction

The development of financial markets has yielded several benefits for the Mexican economy. Among them are a significant increase in the share of domestic-currency liabilities in the total, which has reduced the exchange-rate exposure of government and private-sector debt servicing. Other developments are a lengthening of the yield curve, which has limited refinancing risk for the government and provided reference rates for private issuers, and an ample peso interest rate swap (IRS) market, allowing investors a better risk distribution. More liquid and deeper markets, in turn, have contributed to a more efficient allocation of resources by reducing transaction costs. They have also been essential in the economy's ability to take advantage of capital inflows by channeling them towards more productive uses.

The law governing the central bank, Banco de México, requires that in addition to the mandate to safeguard price stability, the bank must promote the healthy development of financial markets and serve as the fiscal agent of the federal government. Hence, in coordination with the government and other financial supervisors, it has played a key role in putting into place the building blocks of the institutional framework that has enabled the development of the domestic debt markets. Undoubtedly, the current liquidity and stability that the domestic public securities market enjoys, even amid severe external financial turmoil, result from this progress, as well as from sound macroeconomic and financial stewardship.

This paper describes major policy developments in recent years and identifies some of their benefits. We build on previous research and document the latest advances in government securities markets, notably, the lengthening of the sovereign yield curve and the increase in the share of local-currency government securities in the total. We discuss Banco de México's role in this process. One outcome of the development of government securities markets has been the diversification of the investor base. This has been accompanied by capital inflows that have translated into higher foreign participation in local debt markets, apparently investors with more stable profiles. Empirical evidence suggests that these capital inflows have had positive funding implications, decreasing interest-rate levels and volatility. Adequate fiscal and monetary policies and a respect for freely functioning markets, together with international recognition (e.g., the inclusion of Mexican government securities in Citigroup's WGBI), have all been pivotal to these results.

This note is structured as follows. Section 2. discusses various policy actions taken by the authorities to develop the government securities market. Section 3. briefly describes the recent evolution of interest-rate derivatives, which have served as a complement to the government securities market. Section 4. summarizes how these actions brought about further development of local debt markets. Section 5. advances the hypothesis of a change in investor profile towards more stability. Finally, section 6. offers conclusions.

2. Policy aimed at developing local debt markets

For several years now, Mexican policymakers have been committed to developing domestic debt markets and have taken steps in this direction as conditions have made it possible. Previous research (see, for instance, Sidaoui, 2002; Pérez-Verdía and Jeanneau, 2005) refers to many important institutional achievements over the last decade. This section describes how sound macroeconomic policies, together with financial reforms, have contributed to the development of local debt markets.

2.1 Sound macroeconomic policy

Sound fiscal, monetary and debt management policies pursued since the Mexican crisis of 1995 have been conducive to higher macroeconomic stability and to the development of financial markets. Pérez-Verdía and Jeanneau (2005) show how most public finance indicators improved since 1995: both fiscal-deficit-to-output and public-debt-to-output ratios followed decreasing paths between 1995 and 2005. As a consequence of the 2008 financial crisis, the Mexican government provided fiscal stimulus to moderate the dampening effect of external conditions on the domestic economy. Although this stimulus temporarily weakened public finance numbers, the financial position of the government remained sound. By the end of 2010, total public debt as a proportion of GDP was 32.2% (versus 21.8% in 2005), while the narrowly defined fiscal deficit was 2.8% of GDP (which compares to 0.1% in 2005).² Pérez-Verdía and Jeanneau (2005) show as well inflation converging towards Banco de México's target of 3%.

2.2 Minimal market intervention

The Mexican authorities are convinced that free markets are best suited to allocating resources and determining prices. Therefore, they have facilitated the development of the debt markets by liberalizing almost every segment of the financial sector. Furthermore, consistent efforts have been made to provide markets with sound legal, operational, and institutional infrastructure. Government interference with the market price-discovery mechanism has been avoided. On the very few occasions there has been a market intervention, it has been under extreme market stress and limited to providing liquidity.³ No capital controls have been imposed, even in view of massive capital inflows in the recent past. Instead, the strategy to cope with capital inflows has been a combination of various policies believed to increase the chances of attracting potentially longer-term investors, thus decreasing the likelihood of sudden stops without provoking severe market distortions. The hallmarks of the strategy are a stable macroeconomic outlook together with predictable and reliable policymaking, and sterilization by the central bank of the impact of capital surges on domestic liquidity (see section 2.6 for additional details). As a result of these and other events where the propensity to intervene has been tested, the Mexican government has earned a reputation for promoting the independent and orderly functioning of markets.

2.3 Pension system reforms

Debt market development cannot proceed unless there is a dependable supply of long-term loanable funds from institutional investors. Reforms to the Mexican pension system have strengthened the demand for government securities. The transformation in 1997 of a pay-as-you-go system into an individual contributory pension system for private workers resulted in a surge of large pension funds. Later on in 2007, the pension system of public employees went through a similar reform which further increased assets managed by pension funds, hence stimulating additional demand for securities. By the end of 2010, the net assets of these funds amounted to 1.4 trillion pesos, equivalent roughly to 10% of GDP. The resources under

² Source: Finance Ministry (SHCP) public finance and debt statistics.

³ During periods when liquidity tends to dry up, causing high market volatility, authorities have introduced auctions to sell foreign currency. The auction mechanism is pre-announced to the public, it is for a limited amount of foreign currency, and it starts at a floor of 2% above the previous day's reference exchange rate, or the Fix. This scheme was used in the late 90s, during the Lehman crisis in 2008, and, more recently, since November 30, 2011. Additionally, a few extraordinary auctions of foreign currency were carried out on days of particularly scarce liquidity in 2008 and 2009.

their custody have grown very fast; just a few years back, in 2004, they were 6.5% of GDP. Almost half of their assets are invested in government securities, which account for 12% of the total outstanding. Aside from being major investors in local government debt, pension funds have contributed to the demand for long-term securities. This is a natural result of their investment horizon. As of October 2011, the average duration of government securities they held was 7.3 years (the average maturity of outstanding government debt is 4.5 years).

2.4 Improved securities clearing and settlement systems

Reliable clearing and settlement systems are key components for the sustainable operation of financial markets. Banco de México, the National Banking and Securities Commission (CNBV), and the National Securities Depository Institute (Indeval) have worked closely together to develop centralized and automatized clearing and settlement systems. The legal framework has been enhanced to provide certainty to market participants carrying out market transactions. Indeval, the centralized securities custodian, offers services such as the settlement and transfer of securities, collateral management, securities lending, and the infrastructure for repo operations. Currently, operations are settled on a near real-time Delivery versus Payment (DvP) protocol. Furthermore, Indeval is linked to foreign clearing and settlement systems such as Euroclear and Clearstream in order to facilitate trading with securities issued abroad by Mexican firms and institutions (Jiménez Vázquez, 2011).

2.5 Completing the market's information set

Efficient resource allocation depends on reliable prices. In this regard, Banco de México has been providing reference interest rates and securities prices to the market for a long time. On a daily basis, the central bank publishes the peso/dollar Fix rate (an auction-determined exchange rate for U.S. dollar liabilities payable in Mexico), as well as the 28- and 91-day reference interest rate, or TIIE (the 182-day TIIE is published once a week). As documented by Sidaoui (2002), the TIIE has become a widely used benchmark for loans, yields, and as an underlying rate for futures and swaps. Moreover, daily, Banco de México publishes the price vector it uses to mark to market its holdings of government securities.⁴ In addition, private price vendors have been authorized in order to preclude conflicts of interest among market participants.

Furthermore, in a permanent effort to improve upon transparency and information quality, Banco de México publishes an array of financial and economic indicators which have been progressively standardized to meet international criteria (e.g., IMF, CUSIP). Also, the central bank publishes its policy stance and various reports on inflation, monetary policy, and the financial system on a timely basis and in accordance with a pre-determined calendar. These announcements provide news agencies with updated information.

To improve the predictability of the issuing patterns for government securities, the government, Banco de México, and the Institute for the Protection of Bank Savings (IPAB, the nation's deposit insurance agency),⁵ preannounce their issuance program on a quarterly basis. The program includes details on the securities as well as on the amounts to be auctioned each week. In addition, the government has published debt guidelines on a yearly basis since 2004. This has the advantage of allowing investors to estimate the supply of securities ahead of time and to adjust their investment strategies accordingly.

⁴ Banco de México averages information from private price vendors to create its own price vector.

⁵ The deposit insurance agency regularly issues debt, which is viewed by the markets as quasi-government debt.

2.6 The use of government securities as monetary policy instruments

Although the central bank can issue its own paper to carry out open market operations (see below), it has chosen to use government paper instead. This decision was made in order to foster the development of the government debt markets. Banco de México is prohibited by law from financing the government. Thus, a mechanism was designed that allows it to use government paper without acting as financier (see Box 1). In the last couple of years, there has been a significant increase in reserve accumulation, and the use of government securities to sterilize the resulting liquidity has proved effective. In what follows, we describe how the central bank has alternated the use of its own and government securities for liquidity management.

Banco de México only used government securities to manage liquidity until 2000. Nevertheless, in order to test the market acceptance of central bank paper that year, the bank issued its own securities and used them to implement monetary policy. At that time, a market niche was perceived due to the fact that investors were looking for an instrument to reduce price sensitivity to interest rates because they feared episodes of higher interest-rate volatility. Thus, Banco de México began issuing Monetary Regulation Bonds (BREMs), which were bonds indexed to the daily overnight interbank lending rate.⁶

Six years later, the central bank and the government reached the conclusion that it was to their mutual benefit to use one security. They substituted the BREMs with government paper with identical characteristics, Bondes-D. An objective of the switch was to facilitate the government's interest-rate and currency-exposure reduction strategy (to be described in section 4.1). Another aim was to enhance the liquidity of these securities given the fact that both entities were to use the same paper for their financing needs.

Currently, the federal government auctions Bondes-D every second Tuesday, while Banco de México does so every Thursday. These floating-rate bonds are completely fungible from the market's perspective.⁷ Since both risk-free issuers use the same instrument, predation is avoided. At the same time, the use of Bondes-D has two appealing advantages: it preserves the government's floating-rate niche, and the markets of other government securities are not distorted as a consequence of Banco de México's liquidity management operations.

2.7 The issuance of warrants

A part of the active debt management strategy has been to identify opportunities to cater to particular investor needs. In November 2005, the government realized there was demand from investors exposed to Mexican sovereign debt in dollars for an instrument that had an embedded option for the same credit risk in pesos. Since then warrants have been sold on different occasions to fulfill this demand. These instruments entitle their holders to exchange securities denominated in foreign currency for securities denominated in local currency. At the time of issue, the warrants establish the ratio at which, during their validity, specific securities may be exchanged. The warrants give investors the option to hold sovereign risk constant, but at the same time to manage their currency exposure. The option granted by the warrants becomes profitable as the spread between foreign-currency and local-currency yields narrows. As section 4.1 will explain, to date, the warrants have contributed to reducing the government's foreign-currency liabilities.

⁶ It should be noted that these changes have been coordinated with the government in order to protect its debt segments and to avoid distortions in the securities market.

⁷ The reason for making this distinction is to provide the market with information on how much the government and the central bank are issuing each time.

Box 1

The use of government securities for liquidity management

Direct sales of government securities are one of the instruments Banco de México (henceforth “the Bank”) uses to manage liquidity (mainly to sterilize international reserve accumulation). Legal support for these operations stems from articles 7 and 9 of the law that governs Banco de México. Article 7 entitles the Bank to deal with this class of securities. Article 9 contains accounting guidelines for the operations:

“Banco de México shall not lend securities to the Federal Government nor purchase securities from it, except when purchases of securities that are payable by the Government comply with one of the two following conditions:

I. When said purchases are covered by cash deposits, made by the Government in the Bank with the proceeds of the placement of said securities, and which may not be withdrawn before their maturity date; the amounts, terms and yield on these deposits must be equal to the amounts, terms and yield of the securities being traded; [...]”

Therefore, when the Bank purchases securities from the government for liquidity management purposes, its balance sheet is affected as follows. On the liability side, the Bank constitutes a cash deposit in favor of the government; the deposit cannot be withdrawn before the securities mature. These deposits are labeled in the Bank accounts as a “government-securities monetary-regulation deposit” (henceforth “deposit”). On the asset side, the Bank records the holdings of purchased government securities.

Once the securities are on the books of the Bank, they are marked to market daily. This procedure ensures that before the securities are sold to the market, all the holdings on the asset side are perfectly matched by the deposit on the liability side. Further, if the securities are coupon bonds, the accrued interest of current coupons is computed and provisioned both on the asset side (government securities holdings) and liabilities (deposit) side of the balance sheet. Whenever coupons are due, the Bank simultaneously debits the provisioned interest and credits the government account.

When the Bank sells securities to the market, it creates an imbalance between its assets and liabilities. This happens because the deposit is held as a liability until the securities mature. In the case of coupon bonds, an additional imbalance arises from the fact that the Bank continues to credit the deposit with the accrued interest on current coupons from securities sold, but ceases to provision this interest on its asset side. When a coupon matures, the Bank transfers resources to the government account to pay the bond holders.

Similarly, when securities mature, the Bank debits unsold securities at face value from the government’s account, and credits the government with the face value of securities sold. Finally, the Bank pays bond holders by debiting the account of the government. The re-pricing of securities as well as interest is then reflected in Banco de México’s P & L.

2.8 Additional measures to enhance the liquidity of government securities

In order to foster liquidity, several other measures have been adopted. They include market makers,⁸ a strips market,⁹ and the reopening of previously issued securities. Additionally,

⁸ As Pérez-Verdía and Jeanneau (2005) explain, market makers are financial institutions that commit themselves to bid for a minimum amount of securities at primary auctions of government securities, to always make two-way quotes for a minimum amount of fixed-income securities, and to maintain a cap on the bid-offer spread. In exchange, market makers are entitled to take part in green-shoe auctions, to hold regular meetings with government debt-management authorities, and to have access to Banco de México’s securities lending facility.

⁹ The strips program was launched in 2005 to foster liquidity in the secondary market. Nevertheless, very few bonds have so far been stripped, and turnover of these securities is minimal (García Padilla, 2011).

several exchanges and repurchases of securities have been carried out to smooth the maturity profile or to increase the liquidity of particular issuances. More recently, to support the potential inclusion of Mexican government securities in the WGBI¹⁰ (which took place in October 2010), a syndication program was introduced in February 2010. One goal of this program was to furnish new issues with an acceptable initial total outstanding amount, thus enhancing their liquidity from the outset and enabling them to be included in global fixed-income indices.

The creation of a securities-lending scheme provides another way to add liquidity to the market for government paper. To illustrate this point, consider a long-term bond owned by a pension fund. Typically, given its investment horizon, the pension fund would very likely hold this bond until maturity. However, by lending this security to another investor, the pension fund would earn a fee and get the bond back upon expiration of the lending agreement. As a consequence of similar lending operations, the liquidity of the market for the securities increases.

The central bank proactively carried out regulatory modifications to facilitate repo transactions and securities lending. In particular, a master contract for both operations was designed in 2007 in accordance with international guidelines from the Public Securities Association, the Bond Market Association, and the Securities Industry Association. Further, to foster the development of the private securities lending market, Banco de México increased the cost of its securities lending facility. Currently, there are two privately owned firms that provide securities lending intermediation: Accipresval, owned by Citibank, and Valpre, owned by Indeval.

3. The development of derivatives markets

In principle, derivatives add liquidity and depth to government securities, since they offer hedging possibilities for different portfolios, therefore expanding the range of investors demanding the underlying assets. Hence, Banco de México, in coordination with other regulators, made institutional arrangements to provide the legal and operational framework for a derivatives exchange. MexDer, the Mexican derivatives exchange, was created in 1998 in order to provide a standardized environment for trading commonly used derivatives. Asigna, MexDer's clearinghouse, guarantees that obligations arising from transactions in MexDer will be honored. More recently, in 2006, Banco de México revisited the regulation that establishes which underlying assets are eligible to become derivatives and the type of market participants that may trade these securities. Furthermore, any intermediary that wishes to participate in this market has to comply with minimum requirements the central bank imposes for management, operations, and internal governance.¹¹

¹⁰ The WGBI (World Government Bond Index) is an index of fixed-income sovereign securities from 24 countries that is constructed by Citigroup. Eligibility criteria include a minimum total outstanding amount of each bond (at least USD 20 billion a year), a minimum credit rating (BBB- by Standard and Poor's or Baa3 by Moody's), and low barriers to entry. Mexican government bonds already met the last two requirements: long-term local sovereign Mexican debt is rated A by Standard and Poor's and Baa1 by Moody's, and it can be settled on Euroclear. As of March 2011, the market value of assets linked to the WGBI was approximately USD 18.1 trillion (Tapia Rangel, 2011). Mexico was the first Latin American country to be included in the WGBI.

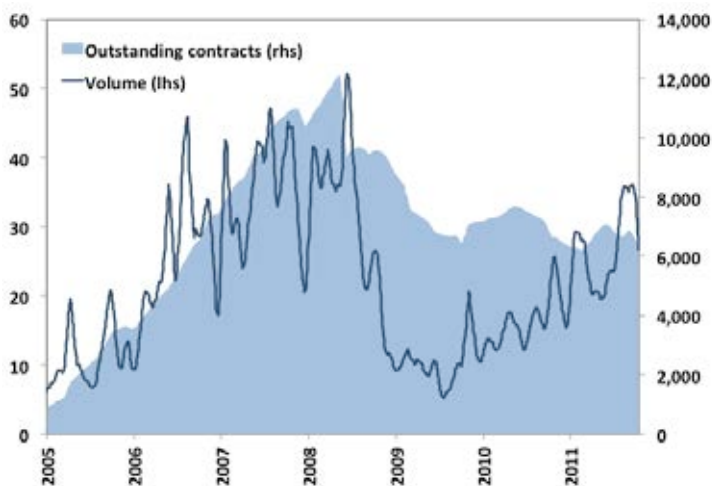
¹¹ There is a guideline, known as "Banxico's 31 points," which states minimum requirements by which institutions trading derivatives must abide, regulated by Banco de México (Circular 4/2006).

Derivatives markets have complemented the government securities market. There are no comprehensive measures of the peso OTC interest-rate derivatives market.¹² However, interest-rate swaps (IRS) within Mexican financial institutions and between these institutions and other investors, which are systematically reported to Banco de México, could serve as a lower bound for the volume operated in the peso OTC interest-rate derivatives market, since a significant fraction is traded off-shore. Using this information, Figure 1 illustrates the size of the peso IRS market, as measured by outstanding IRS contracts reported to the central bank, and the traded volume of these derivatives. Although the market shrank during the recent financial crisis in 2009, it should be noted that traded volume has gradually recovered over the past three years.

Figure 1

Peso-denominated IRS reported by financial institutions to Banco de México: outstanding contracts and traded volume

In billions of pesos: 2005-2011



Source: Banco de México

Filter: 20-day moving average

NB: Total outstanding IRS are calculated by adding the absolute value of both legs, since the goal is to gauge the value of the total number of outstanding contracts, regardless of which party is on the other side of the contract.

Perhaps the most interesting development in the derivatives market has been the lengthening of the horizon of interest-rate derivatives investors have access to. This has allowed investors to pair derivatives with investment strategies on the full span of the yield curve. In MexDer, futures on the 28-day TIIE are by far the most widely traded¹³ interest-rate derivative and are available up to a five-year horizon. However, MexDer offers other instruments that may well meet investors' needs to hedge virtually every portfolio of government securities: 2- and 10-year interest rate swaps, as well as futures on 91-day Treasury certificates (Cetes), and on 3-, 5-, 10-, 20-, and 30-year bonds. Additionally, futures

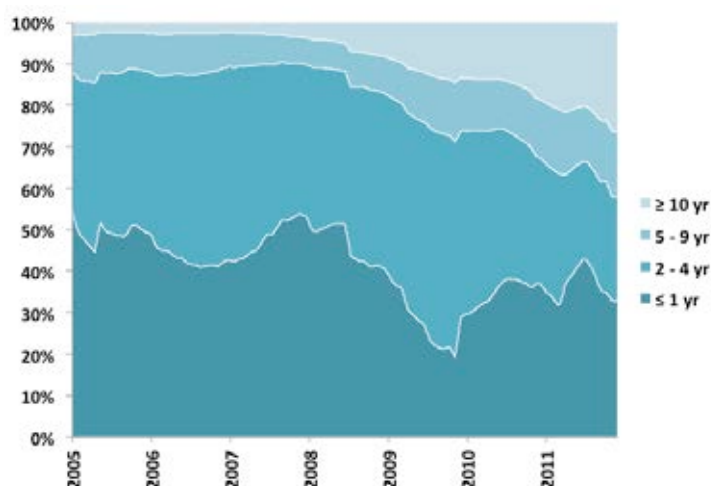
¹² Today there is an ample IRS market both in nominal and real (inflation-linked) interest-rate instruments.

¹³ According to MexDer's website, open interest in TIIE 28 futures accounted for more than 96% of open interest in interest-rate derivatives by the end of October 2011.

on UDIs, the inflation-indexed units on which real-rate government securities are based, are also available. Data on the OTC IRS market collected by Banco de México reflect as well the usage of longer-term derivatives. In fact, as depicted by Figure 2, the proportion of longer-term swaps, mainly in the “≥ 10 year” bucket, has steadily increased, while the proportion of short-term swaps (less than 1 year) has become smaller.

Figure 2
Outstanding peso-denominated IRS reported by financial institutions to Banco de México by maturity

% of total: 2005-2011



Source: Banco de México

Filter: 20-day moving average

NB: Total outstanding IRS are calculated by adding the absolute value of both legs, since the goal is to gauge the value of the total number of outstanding contracts, regardless of which party is on the other side of the contract.

4. The advantages of a well developed government securities market

Sound policymaking and the growth of complementary markets have enabled the Mexican government to pursue a strategy to mitigate vulnerabilities by reducing interest rates and currency risks. They have also helped to finance the government’s deficit and to develop domestic securities markets. We next describe how the policy actions explained in the previous sections have contributed to this strategy.

4.1 Lower currency risk exposure

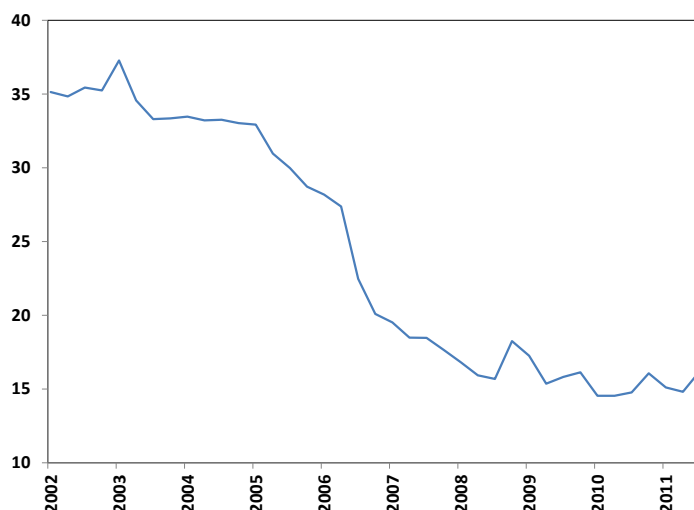
The growth of domestic financial markets has allowed the Mexican public sector to stop relying on foreign markets for its financing requirements. The debt denominated in foreign currency has declined from 35% of local-currency debt at the beginning of 2002 to 16% in

late 2011 (Figure 3).¹⁴ This has reduced public-sector exposure to exchange-rate risk, a key financing vulnerability. In fact, since 2001, the government has had the capability to completely finance its deficit in the domestic markets at its choosing.

Figure 3

Ratio of foreign-currency to domestic-currency government securities

%. 2002-2011



Source: Banco de México and the Finance Ministry (SHCP)

The reduction in external debt was achieved through several actions. First, the government was able to prepay an important portion of its external debt between 2005 and early 2008 thanks to two factors: its ability to get funding in the local markets at reasonable terms, and its ability to buy a large amount of dollars (USD 25.5 billion) without distorting the foreign exchange market. The foreign currency was purchased from the central bank's international reserves at market prices (at the Fix). By using international reserves, the government and the central bank avoided sending unintended signals that could have been read mistakenly by the market as changes in the stance of monetary or exchange policy.

Second is the issuance of warrants described in Section 2.7. These warrants granted investors wishing to incur some sovereign risk but limit their currency exposure the option of exchanging foreign-currency-denominated government bonds for nominal and inflation-indexed local securities. As a result of this program, the government has reduced its external liabilities by nearly USD 5 billion since 2005.

Third, all of the maturing foreign-currency bonds were replaced with debt issued in the domestic markets.

4.2 Lower interest-rate risk exposure

The government has continuously sought to alter the mix between foreign-currency-denominated and floating-rate securities on the one hand, and peso-denominated fixed-rate or inflation-indexed securities on the other, in favor of the latter. Figure 4 clearly illustrates this point: the share of fixed-rate peso-denominated securities has more than doubled from 28% of the total in 2002 to 60% of the total in late 2011. Lower and more stable inflation has

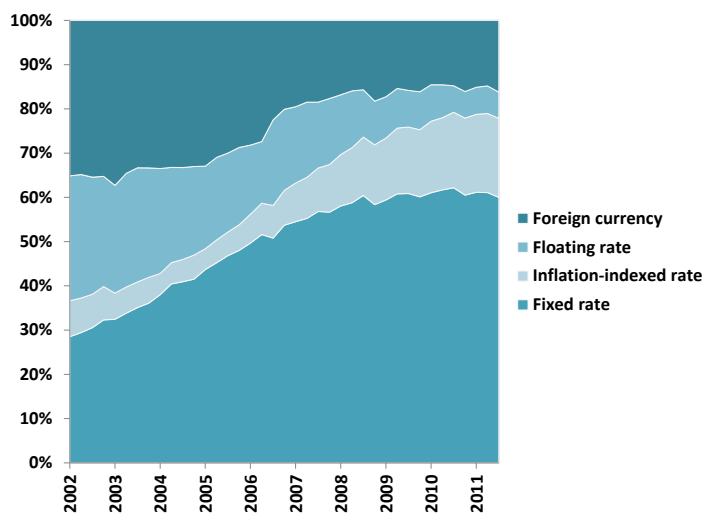
¹⁴ The pace at which this share has decreased slowed in 2009, when the federal government turned to external markets to take advantage of better funding conditions.

arguably contributed to the increase (Pérez-Verdía and Jeanneau, 2005). However, more stability has not only contributed to a larger share of fixed-rate securities, but also to extended government-debt maturities.

Figure 4

Outstanding federal government securities by currency and rate type

% of total: 2002-2011



Source: Banco de México

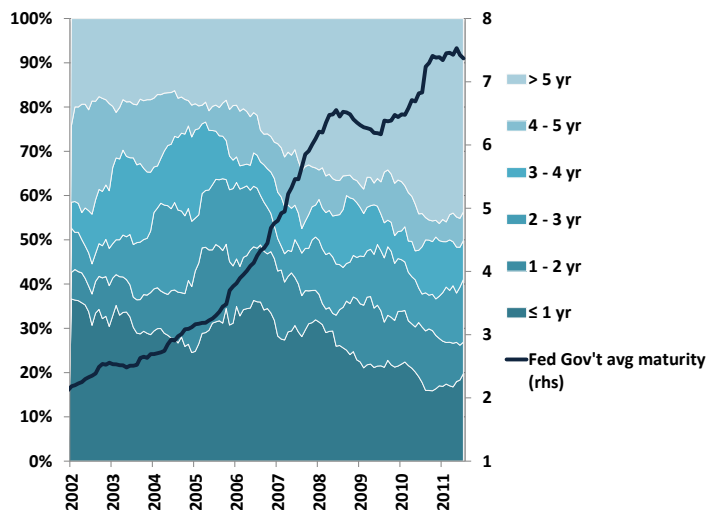
4.3 Lower refinancing risk for public and private issuers

The government has gradually increased the length of its nominal yield curve from 6 months in 1995 to 30 years since 2006. This action has reduced its refinancing risk and provided the market with long-term reference rates. A major benefit is that private issuers have been able to rely more on the domestic markets for their financing needs. Debtors have extended their debt maturities, which in all probability has also decreased their refinancing and foreign-exchange risks (see Figure 5).

Figure 5

Federal government debt average maturity (in years) and the distribution of private securities by maturity

% of total: 2002-2011



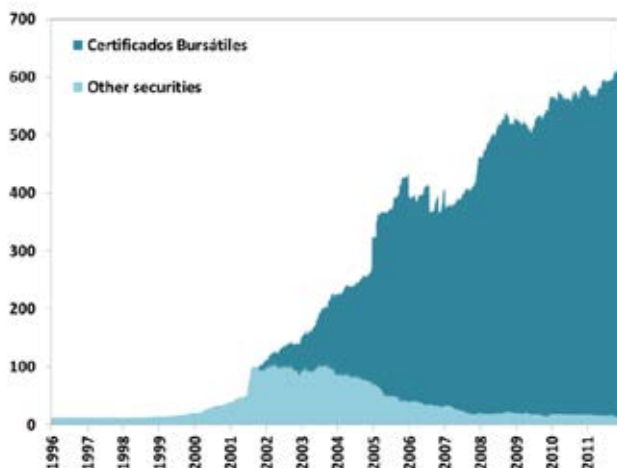
Source: Banco de México

Indeed, private and public corporations' domestic debt issuance has seen a significant increase since 2000 (see Figure 6). This has been supported, in part, by a legal reform that created a new instrument (the "Certificado Bursátil"), making the process to access markets much easier. The new law eliminates red tape and simplifies the issuance process: authorities grant an "umbrella permit" to place debt and the choice of instrument and maturity is left to the issuer's discretion. In contrast, the previous procedure required case-by-case authorization.

Figure 6

Outstanding securities issued by the domestic private sector

In billions of pesos: 1996-2011



Source: Banco de México

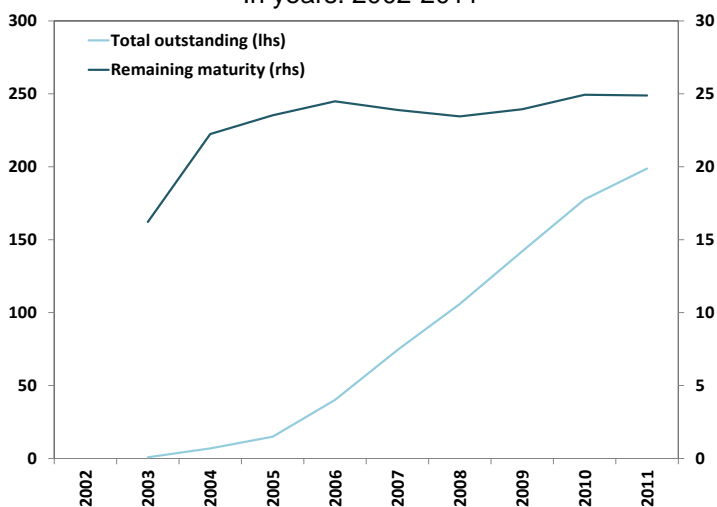
Excludes securities issued by financial institutions.

Among the debt instruments that have benefited from longer risk-free reference rates are mortgage-backed securities. The development of this market allowed mortgage intermediaries to broaden their funding sources (see Figure 7).

Figure 7

Mortgage-backed securities: total outstanding (in billions of pesos) and remaining maturity

In years: 2002-2011



Source: Banco de México

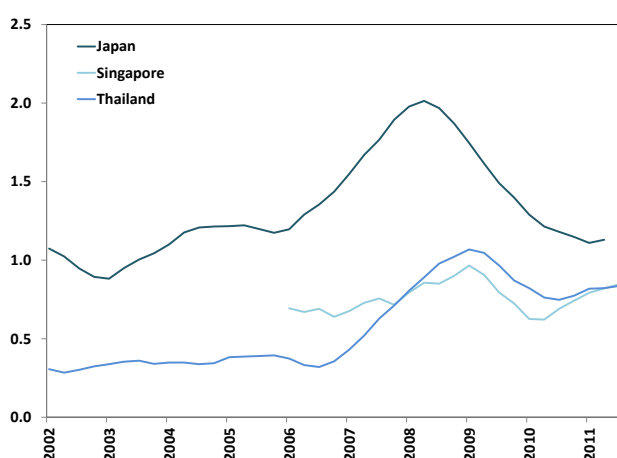
4.4 Higher liquidity

During the recent financial crisis, global liquidity almost seized up, and this had a sizeable effect on the turnover of several sovereign debt markets (Figure 8). The Mexican market was not an exception. Figure 9 shows turnover and volume of government bonds from 2003 to 2011. Traded volume increased until 2007 and then sharply decreased in 2008. Turnover increased during 2007, reversing a downward trend documented by Pérez-Verdía and Jeanneau (2005). However, turnover also fell during 2008. As global liquidity has begun to return, both turnover and traded volume have rebounded, although they have not yet reached their pre-crisis levels.

Figure 8

Turnover ratio (% of total outstanding) of selected government debt markets:

2002-2011



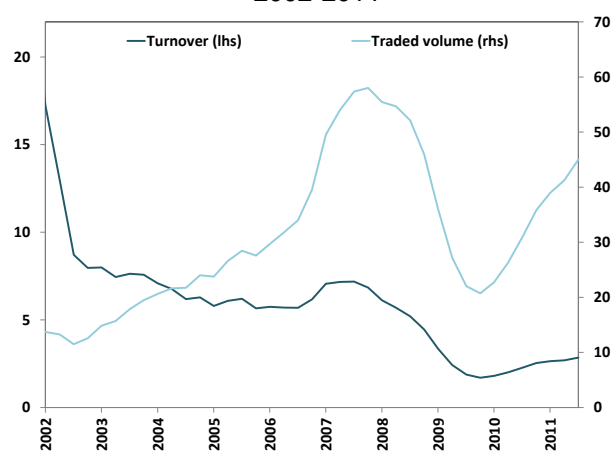
Source: AsianBondsOnline

Filter: yearly moving average of quarterly data

Figure 9

Turnover ratio (% of total outstanding) and traded volume (in billions of pesos) of Mexican government bonds:

2002-2011



Source: Banco de México

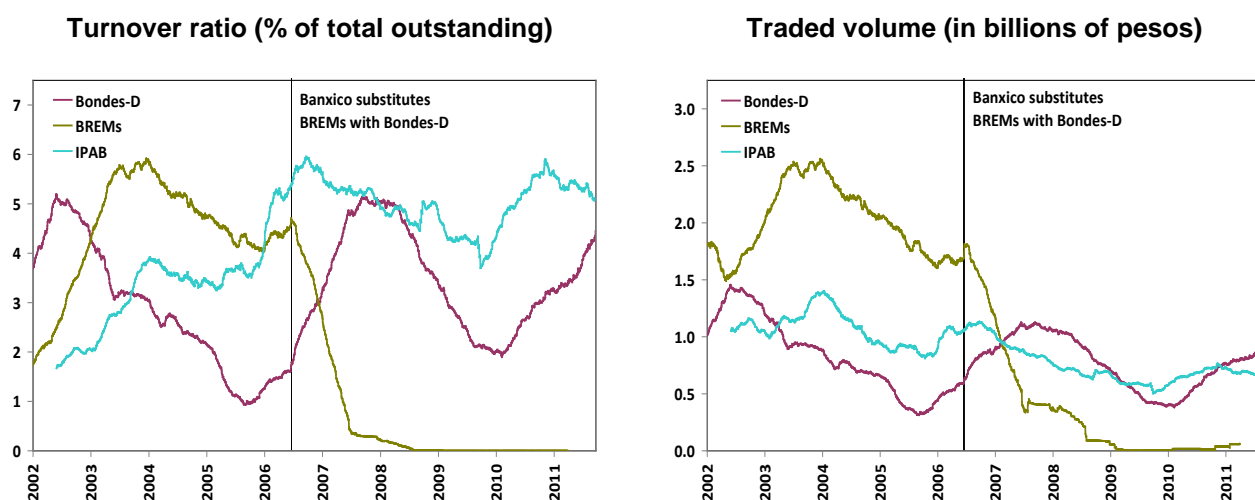
Filter: yearly moving average of quarterly data

Section 2.6 argued that a rationale for using government-issued (as opposed to central-bank issued) securities to sterilize international reserve accumulation was to avoid predation between similar securities (in this case, floating-rate bonds) from two institutions with comparable risk profiles (in this case, the federal government and Banco de México). In fact, there is evidence that predation could have been taking place. Figure 10 displays two liquidity measures (turnover on the left panel and traded volume on the right) for floating-rate securities issued by the federal government (Bondes, including Bondes-D) and by Banco de México (BREMs). IPAB securities are also included as a proxy for secular liquidity trends for public floating-rate securities. The fact that Bondes and BREMs exhibit a negative correlation for both liquidity measures could be indicative of how substitutable they were. In other words, to a certain extent, BREMs could have crowded out liquidity from Bondes. Unsurprisingly, turnover and the volume of BREMs traded sharply decreased once the central bank substituted them with Bondes-D. Although the liquidity of Bondes had already been increasing prior to the introduction of Bondes-D, the increase accelerated once the new securities were issued (particularly, traded volume, on the right panel). Therefore, it seems that substituting BREMs with Bondes-D has promoted the liquidity of the market for government floating-rate securities.

Figure 10

Liquidity measures for floating-rate securities:

Federal Government, Banco de México, and IPAB: 2002-2011



Source: Banco de México

Filter: yearly moving average

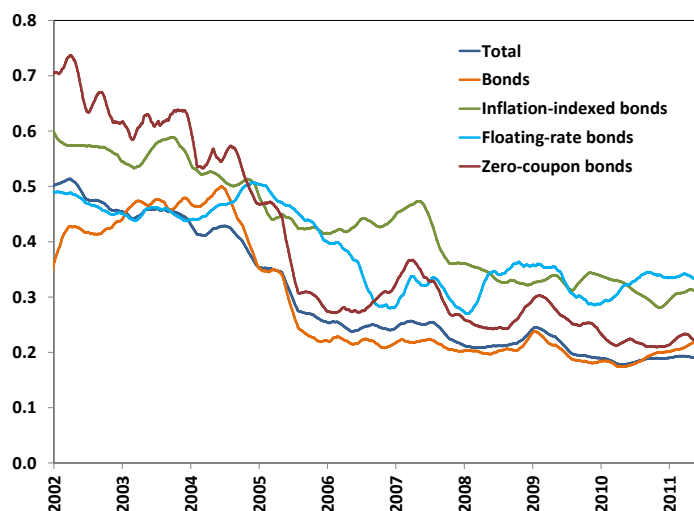
4.5 Higher diversification of the investor base for domestic public debt

As put forward by Pérez-Verdía and Jeanneau (2005) and by Tapia Rangel (2011), an enhanced institutional framework in tandem with macroeconomic stability has also promoted the diversification of the investor base. While the government has gained more confidence from foreign investors, the growth of domestic institutional investors, such as pension and mutual funds or insurers, has guaranteed a healthy demand for government securities. This development could be represented by a Herfindahl index of government securities holdings by investor category. Lower levels of this index would be related to a more diversified investor base. Figure 11 suggests that the investor base has indeed become more diversified; it suffices to compare the value of the Herfindahl index in 2002, around 0.5, with the 0.2 it attained in December 2011.

A major advantage of the increased investor diversification could be lower debt market sensitivity to shocks that are idiosyncratic to each investor profile. In addition, there is some evidence that suggests that the profiles of both institutional and foreign investors are of a more stable nature. Figure 12 shows rolling standard deviations of daily percentage changes in government securities holdings for some investor categories. The purpose is to capture how the volatility of holdings of each investor type has evolved over time. According to this measure of volatility, it appears that the holdings of mutual funds and foreign investors have become more stable over the last decade.

In what follows, we will discuss the role foreign investors have played lately in government securities markets.

Figure 11
Herfindahl index of government securities holdings by investor category:
 2002-2011



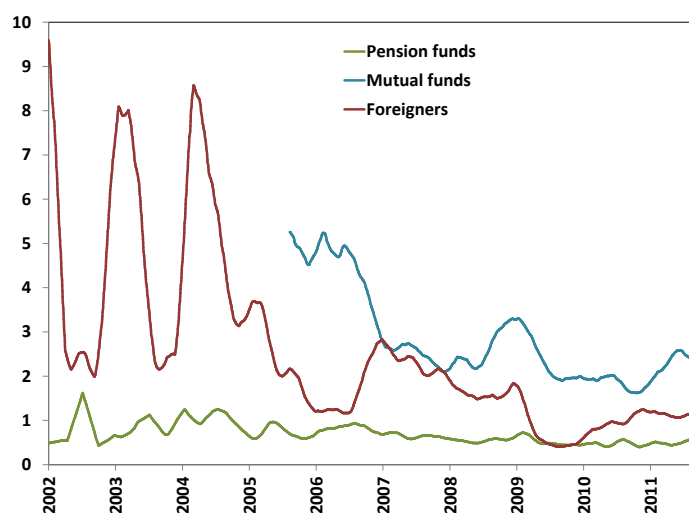
Source: Banco de México

Filter: 60-day moving average

The Herfindahl index ranges between 0 and 1. Higher levels of the index are associated with lower investor base diversification.

Investor categories used to compute the index are: banking sector, pension funds, mutual funds, insurers, other domestic investors, foreign investors, repo operations with Banxico, and collateral received by Banxico.

Figure 12
Rolling standard deviation of daily percentage changes in government securities holdings of selected investor categories:
 2002-2011



Source: Banco de México

Filter: 60-day moving average

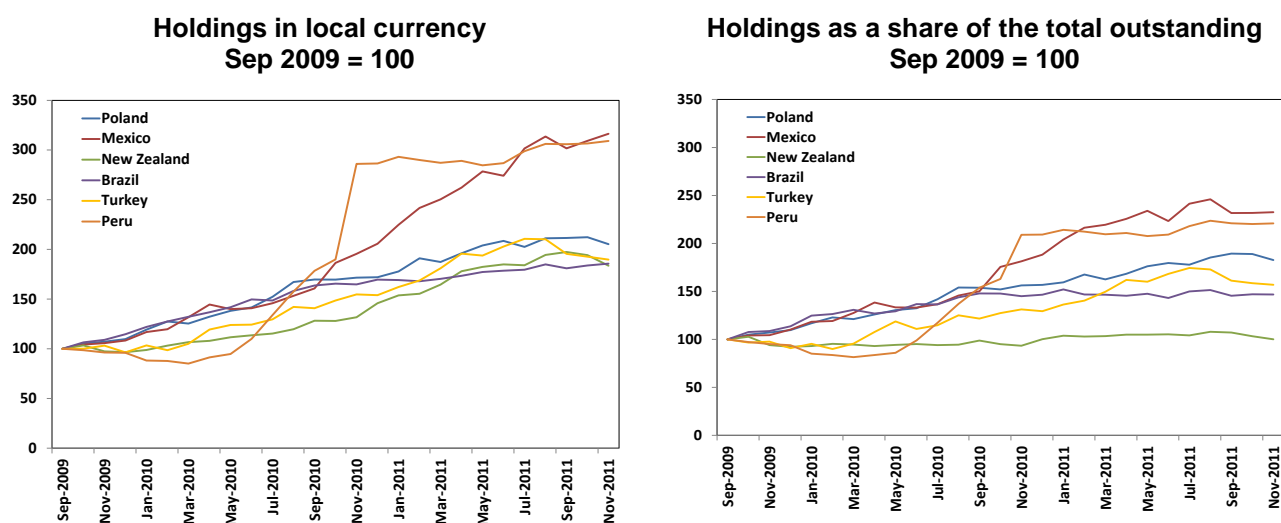
Rolling standard deviations are computed over 60-day windows.

5. The stability of recent capital inflows

Many emerging economies have recently received significant capital inflows. In Mexico, these inflows have resulted in unprecedented participation by foreign investors in the local government securities market. Indeed, as Figure 13 shows, foreign investor holdings of government securities have tripled since 2009, while their share of the market has more than doubled over the same time period. Figure 13 also shows that the Mexican government securities market stands out in emerging economies as one of those foreign investors favor.

Figure 13

Participation by foreign investors in selected emerging public securities markets: 2009-2011



Sources: Banco de México, the Reserve Bank of New Zealand, the Central Bank of the Republic of Turkey, the Turkish Treasury Secretariat, the Peruvian Ministry of Economics and Finance, the Polish Ministry of Finance, the Brazilian National Treasury.

In practice, it is not easy to measure the extent to which these flows are attracted by temporary arbitrage conditions, or by fundamentals. However, as previously suggested in Figure 12, a number of factors point to more stable foreign investment, presumably because investors have not only been attracted to Mexican financial markets by carry-trade opportunities but also by fundamentals. As Sidaoui, Ramos-Francia and Cuadra (2010) explain, Mexican public finances are in good shape, inflation has steadily converged to the central bank's target, financial system resilience indicators pass international standards with flying colors, and international reserves (together with liquidity arrangements with major foreign institutions) convey confidence in the ability to finance external accounts should external conditions significantly worsen. Finally, commitment to a floating exchange-rate regime is well established.

Another factor that lends support to more stable higher participation by foreign investors in the Mexican government securities market is the inclusion of Mexican bonds in Citigroup's WGBI since 2010. In addition to the fact that the market considered Mexico's inclusion in the WGBI to be yet another stamp of outside approval, the WGBI also raised awareness among foreign investors of the availability of opportunities to invest in Mexican local markets. Finally, the WGBI might have induced participation in government securities by those investors who replicate this index.

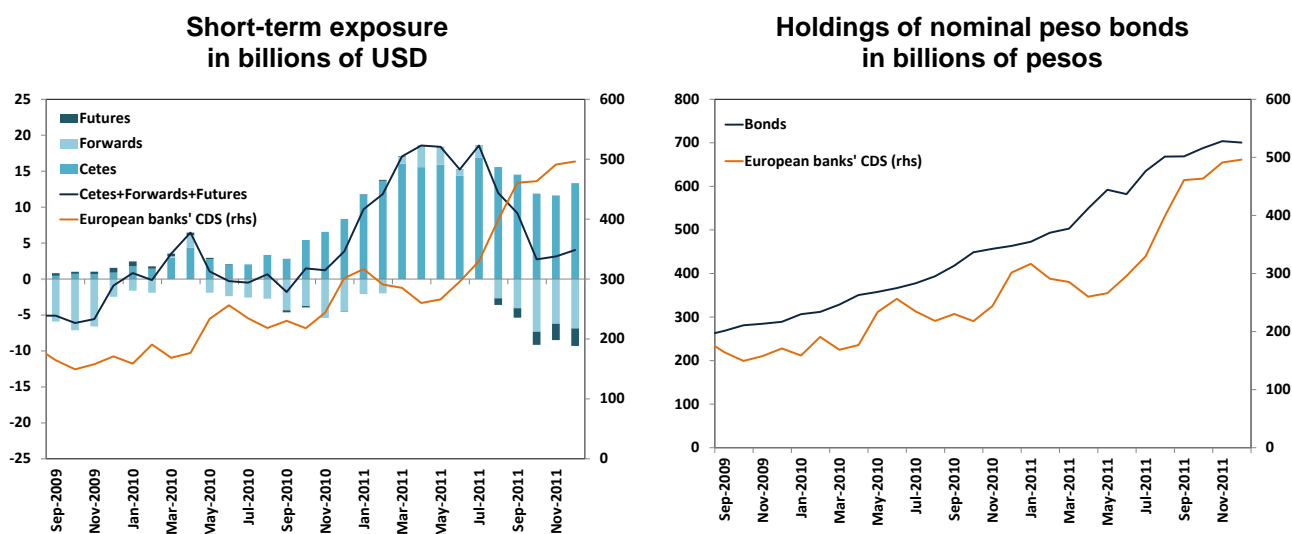
Foreign investor participation in Mexican government securities has been fairly resilient to global financial turmoil at least since 2009. Figure 14 depicts the exposure of foreign

investors to several Mexican public debt instruments and uses the CDS of European banks as a proxy for adverse external conditions. The left panel shows information on foreigners' short-term (Cetes) positions, with their positions in interest-rate derivatives netted out. Although foreign investors have sharply decreased their short-term exposure since August 2011, their short-term positions have remained quite steady in spite of a worsening external outlook. The right panel of Figure 14 offers a more supportive argument to the resilience of foreign investor participation: regardless of a riskier environment in Europe, their holdings of long-term government bonds have continued to increase, although at a much slower rate.

Figure 14

Participation by foreigners in Mexican government securities and CDS of European banks (in basis points):

2009-2011



Sources: Banco de México and Bloomberg (European banks' 5-year CDS).

It is still a matter of debate whether or not capital inflows have added stability to local debt markets. Peiris (2010)¹⁵ offers empirical evidence for a number of emerging economies, including Mexico, suggesting that the effect on interest-rate volatility of higher foreign investor participation in domestic government securities markets tends to be either negative or negligible.¹⁶ This result is unsurprising for Mexico due to the aforementioned evidence for foreign investors being attracted by fundamentals. Figure 15 depicts the negative correlation that has recently been observed between changes in foreign investor participation in Mexican government securities and interest-rate volatility (as measured by the historical volatility of 10-year bond yields).¹⁷

¹⁵ The countries considered in Peiris (2010) are Brazil, the Czech Republic, Hungary, Indonesia, South Korea, Malaysia, Mexico, Poland, Thailand, and Turkey. The analysis spans from 2000 to 2009.

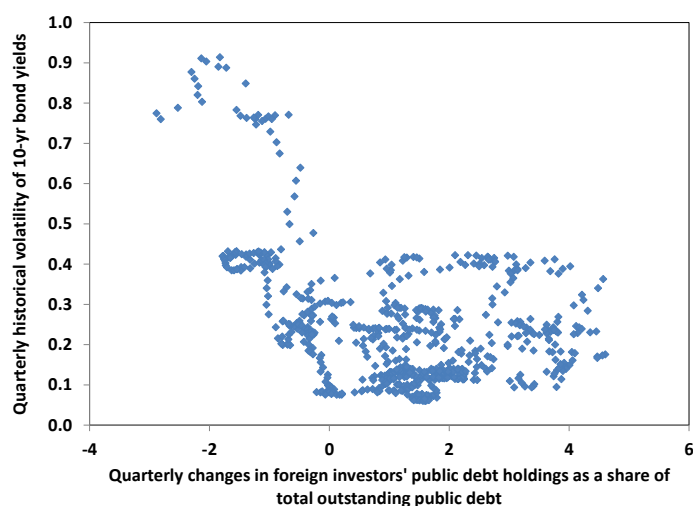
¹⁶ South Korea is the only country in Peiris (2010) that seems to have experienced higher interest-rate volatility along with higher foreign investor participation.

¹⁷ Causality cannot be inferred from Figure 15 alone: in principle, it is not possible to disentangle whether increased foreign investor participation lowers interest-rate volatility or whether causation occurs in the reverse direction. The picture is offered as an illustration of the negative correlation between the two variables, for which a more causal empirical analysis is in Peiris (2010), where the panel dimension is exploited to address endogeneity.

Figure 15

**The volatility of 10-year bond yields and changes
in foreign investor participation (%):**

2009-2011



Source: Valmer and Banco de México

Volatility was computed with 10-year constant-maturity bond yields.

Increased foreign investor appetite for government securities, *ceteris paribus*, would bring about lower interest rates. Pradhan *et al.* (2011)¹⁸ use a panel of emerging economies to analyze the effect of foreign participation on interest-rate levels. They conclude that emerging economies, including Mexico, have recently benefited from better funding conditions arising from stronger external demand for public debt.

Evidence largely suggests that recent capital flows could be of a more stable nature and have had a positive effect on the government securities market by diversifying the investor base and by generating cheaper borrowing opportunities. However, in the current uncertain environment, new episodes of turbulence in international markets could lead to higher risk aversion. Under such circumstances foreign investors usually do not discriminate among countries with better fundamentals. Mexico could be vulnerable in such a case. But, eventually, sound macroeconomic fundamentals will attract abundant and more stable capital inflows.

6. Concluding remarks

The development of domestic debt markets has contributed to better government financing terms and has helped the central bank to carry out its open market operations more effectively. It has also provided economic agents with a wide range of products for saving and obtaining financing as well as hedging risks. Several factors have contributed to the development of the Mexican local-currency securities market and span various fronts. Sound

¹⁸ The countries considered in Pradhan *et al.* (2011) are Brazil, Indonesia, South Korea, Malaysia, Mexico, Poland, Thailand, and Turkey. The analysis spans from 2000 to 2010.

macroeconomic policy, minimal market intervention, pension system reforms (which led to the expansion of large institutional investors), improved market transparency, and safer clearing and settlement of securities have all created a more robust institutional framework. These advances have fostered the development of secondary and derivatives markets, which in turn feeds back to the debt market.

The government has pursued an active debt management strategy in order to reduce its refinancing and interest-rate and currency-exposure risks. As a consequence of a more stable macroeconomic outlook, it has been able to lengthen its yield curve and to increase the share of fixed-rate, peso-denominated securities in the total. This has had positive spill-over effects on the private securities market by providing longer-term reference rates, thus allowing for an increase in the maturity of private debt instruments.

Banco de México has played an important role in the development of the government securities market. The federal government has prepaid its outstanding foreign liabilities in different ways. The currency needed for these operations was taken from Banco de México's international reserves, with virtually no effect on the exchange rate. The central bank has also contributed to the improvement of the liquidity of the government securities market by using these securities in its monetary operations.

Sound monetary and fiscal policies have led to international recognition of Mexican debt. Government securities have attracted considerable interest from foreign investors. Mexican bonds have been included in Citigroup's WGBI, fueling greater investor awareness of Mexican debt markets.

Overall, the Mexican government has succeeded in developing its local-currency securities market. So far, in the current context of high external volatility, this strategy has paid off fairly well. The investor base for government debt is more diversified, and increased foreign investor participation seems to have favored more advantageous borrowing opportunities for the government.

Still, some challenges remain for the attainment of higher levels of liquidity and greater government securities market depth. Although securities lending has increased, most of the activity is done by market makers through the central bank's lending facility, in spite of efforts to encourage lending among private parties (e.g., an increase in the cost of using the central bank facility). Another positive development would be an increase in the maturity of repo operations (currently, the bulk is overnight), which would ultimately lower market participants' refinancing risk.

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