

Handbook of Mexican Financial Instruments

Mexico 2011
Market & Client Strategy

- Foreign Exchange Market
- Fixed Income Market
- Interest Rate Derivatives
- Equity (Mexican Stock Exchange)



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1. Introduction

1.1 BBVA Bancomer

Grupo Financiero BBVA Bancomer (GFBB) is the leading private financial institution in Mexico in terms of assets, deposits, loan portfolio size and number of branches. With a goal of long-term growth and profitability, its business model is based on a segmented distribution by customer type and follows a philosophy of risk control. BBVA Bancomer has over 70 years of experience in the Mexican market, with more than 15.7 million customers and 32,568 employees. As of the same date, GFBB's assets totalled 1,108 billion pesos, with total equity of 115 billion pesos.

BBVA Bancomer is a controlling affiliate of Banco Bilbao Vizcaya Argentaria (BBVA), one of the largest financial groups in the European Union. BBVA is a highly-liquid and profitable financial group operating in 32 countries, with more than 35 million customers and over 100,000 employees. BBVA is one of the world's leading financial groups and one of the strongest institutions in Latin America, backed by 150 years of experience.

The BBVA Bancomer Global Markets Unit designs, structures, distributes, and manages the risk of financial markets products following a model that seeks to satisfy customers' needs and risk-hedging strategies. The Global Markets division has posted recurrent growth bolstered by offering innovative investment products, hedge alternatives and tailor-made solutions for each client.

Globalisation of product lines, customer service and close collaboration with Markets' teams in other parts of the world have allowed BBVA Global Markets to make customised risk-management solutions and international investment products available throughout the BBVA Group.

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2. Foreign Exchange Market

General background

Throughout the largest part of its early history, the foreign exchange system in Mexico was characterised by fixed parity between the peso and the dollar. However, since 1991 there have been major changes. From November 1991 to December 1994, a dirty floating foreign exchange rate system was introduced. This system allowed the exchange rate to float within a range that broadened daily. The Central Bank (Banco de México) sold dollars when the upper limit of the range was reached and purchased dollars when the lower limit was reached. Planning meetings held between the federal government and the country's business, union and commercial leaders known as "Pacts" determined to what extent the upper range would change and for how long.

On 22 December 1994 when the Mexican peso crisis began, a new floating exchange rate system was adopted. Banco de México has had the authority to intervene in the foreign exchange market, purchasing or selling dollars via either spot trades or auctions of FX options in order to preserve price stability in the economy. An Exchange Rate Commission¹ was formed by the Secretariat for the Treasury and Public Credit (SHCP) and Banco de México, which authorises interventions of any kind. It is worth noting, however, that intervention is sporadically used as a tool for easing MXN volatility and accumulating international reserves. The Banco de México also accumulates reserves by acting as the exchange rate operator for the federal government, as well as the state-run oil company, PEMEX.

Mechanisms used to ease exchange rate volatility

Over the years, the Exchange Rate Commission has approved the following interventions:

- 1995 - Discretionary intervention in the foreign exchange market
- August 1996 - June 2001 - Auction of USD put options
- February 1997 - June 2001 - USD auctions
- May 2003 - July 2008 - Mechanism to slow reserve accumulation
- October 2008 - USD extraordinary auctions
- October 2008 - April 2010 - USD auctions with minimum price
- March 2009 - September 2009 - USD auctions without minimum price
- April 2009 - February 2010 - Provision of swap line with U.S. Fed
- February 2010 - to date - Auction of USD put options

The main features of each mechanism

a) Dollar auctions in the event of pressure on the foreign exchange market

Description:

From 1997 to 2001, Banco de México offered and auctioned up to 200 million USD between the country's banks in three different sessions: the first between 9:00 and 9:15 a.m., the second between 11:00 and 11:15 a.m., and the last between 01:00 and 01:15 p.m., every bank business day. Bids were submitted via electronic systems.

The minimum allocation price for dollar sells was determined by multiplying the FIX Exchange Rate published in the Official Gazette on the day before the offering by 1.02 or the rate obtained at the last auction. If dollars were allocated on the following day, for a second consecutive time, the minimum allocation exchange rate would be the average allocation rate taken from the previous auction multiplied by 1.02.

¹The Exchange Rate Commission comprises the Secretary and two Under-Secretaries of the Secretariat for the Treasury and Public Credit, and the Governor and two Vice-Governors of the Banco de México. They are in charge of determining the country's exchange rate policy. However, the casting vote is held by the Secretary for the Treasury and Public Credit.

In light of the 2008 crisis, this mechanism was reinstated in October 2008. The daily amount was set at 400 million USD, which decreased to 300 million USD in March 2009 and to 250 million USD in June 2009.

General advantages:

- The exchange market was afforded liquidity during periods of jitters and without running the risk of losing excessive amounts of international reserves
- Defence of specific exchange rate levels was avoided
- Equilibrium between supply and demand of dollars was rapidly reached
- Exchange rate volatility was reined in

b) U.S. Dollar sell Auctions (mechanism for slowing reserve accumulation)

In 2003, the Exchange Rate Commission set up a mechanism to channel part of the foreign currency flows which would have increase reserves into the foreign exchange market in order to slow the accumulation thereof. This decision was made since the tendency to build up international reserves looked set to continue, something which would have caused maintenance costs to increase to the contrary of net profits. As soon as authorities revealed their plans to analyse the new mechanism, the USD/MXN exchange rate dramatically appreciated. Still, the mechanism was suspended in August 2008 in response to that year's global markets crisis.

The mechanism consisted of daily dollar sells directly in the foreign exchange market. A quarterly schedule of the amounts available for auction was used (the amount was calculated depending on the level of reserves accumulated in previous quarters; the minimum being USD2million) which was independent of exchange rate dynamics and market conditions.

General advantages:

- Transparent rules, which made an effect on MXN performance possible since risks of inflationary deterioration existed.
- Ease of stabilizing the currency given the negative correlation between oil prices, capital flows and growth in U.S. dollars.
- Reduction in the cost of international reserve accumulation due to the interest rate differential between the United States and Mexico.
- Progress towards a more flexible exchange rate system.

c) Dollar put options

Description:

These options auctioned a banking institution's right to sell dollars to the Central Bank when there was an offering of dollars so international reserves could be accumulated. A second auction could be called if 80% of the options in a particular month were exercised before the 15th of that month. The latter would only be valid for the rest of that given month. The first auction was held on February 21st 1997 for a total of USD300million. Auctions took place until June 2001.

The dollar put options were reinstated in February 2010 when Banco de México began to auction MXN puts that exercised in whenever the daily fixing falls below the 20-day moving average. If the options are in the money, the daily fixing in question is the strike. An option can be exercised on the following day. Banco de México has auctioned USD600million the last day of every month. Options expire and are rendered worthless on the last day of each month.

General advantages:

- USD put auctions lead to a gradual increase in international reserves without affecting foreign exchange rate trends.

Conclusions:

- The aforementioned measures did not change the peso's free-floating system. No bands were set for the sell and purchase of dollars by the Central Bank.
- In the short term, these measures had the greatest impact on foreign investors. In the past, the only way to make adjustments when pressure was placed on the peso was via pricing or a potential intervention by the Central Bank in the foreign exchange market (offering dollars). Neither of these situations was predictable. For the above reasons, these mechanisms established clear rules for market participants.

Reference: FIX exchange rate

Since April 22nd 1996, the Banco de México has set the applicable exchange rate to settle liabilities denominated in foreign currency payable within Mexican territory. This is currently the most representative currency exchange rate in the wholesell market. Banxico obtains U.S. dollar sell and purchase exchange rates every banking day for operations payable on two bank business days later from credit institutions whose operations, in its view, reflect the prevailing conditions of the wholesell foreign exchange market.

Particularly, the FIX exchange rate is computed daily by Banco de México as an average of quotes in the wholesell foreign exchange market. These quotes are gathered from electronic transaction platforms three times a day from 9:00 am to 12:00 pm; and the sample average, or FIX, is representative of the market conditions and released by Banco de México from 12 o'clock onwards each banking day.

2.1. Swaps, Futures and Forwards

2.1.1. Cash-Tom and Tom-Next swaps (OTC)

Definition

Exchange operations which enable customers to obtain short-term financing or make investments in either MXN or USD by simultaneously buying and selling the same amount of one currency with different maturity dates.

The main advantages are permitting synthetic investment in USD or MXN in line with customer requirements; and permitting synthetic funding of a position in dollars or pesos.

General characteristics

Amount:	Variable, agreed by the parties concerned
Hours:	6:30 to 13:30 (GMT -06:00)
Currency:	USD/MXN
Period:	The maximum period is 48 business hours
Swap points:	The difference between the exchange rates of the currencies involved in the operation. This is determined by the interest rate differential between the two currencies and the currency's recent performance. Swap or basis points are the daily interbank trading reference rate. It is worth noting that calendar days must be taken into account to obtain the final exchange rate
Settlement:	Physical delivery. There are two settlement times: At inception, the purchase/sell of a reference currency At maturity, the sell/purchase of said currency

Classification

- Cash-Tom: sell/purchase of currency today and purchase/sell in 24 hours (Tom = tomorrow)
- Cash-Spot: sell/purchase of currency today and purchase/sell in 48 hours
- Tom-Next: sell/purchase of currency in 24 hours and purchase/sell in 48 hours

Formula

$$R_{MEX} = \left[\left[\left(\frac{F}{S} \right) * \left(1 + \left(R_{USD} * \frac{D}{360} \right) \right) \right] - 1 \right] * \frac{360}{D}$$

$$R_{USD} = \left[\left[\left(\frac{S}{F} \right) * \left(1 + \left(R_{MEX} * \frac{D}{360} \right) \right) \right] - 1 \right] * \frac{360}{D}$$

Implicit interest rates in pesos and dollars:

Where:

R_{MEX} = Interest rate in Mexico

F = Final exchange rate = Initial exchange rate plus swap points.

S = Initial exchange rate.

R_{USD} = Interest rate in USD.

D = Contract period in days

Examples

1. Sell-purchase SWAP CASH-SPOT Type: USD liability

Due to an unforeseen event, a customer must pay USD1million to a supplier on the second day of the month. The customer also has an investment in USD which matures on the fourth day of the same month, meaning he therefore requires 2 days funding in dollars. He decides to use a USDMXN swap.

Procedure

1. On the 2nd of the month, the customer performs a swap with the bank via which he receives USD1million and agrees to return the amount in 2 days at a specified forward exchange rate.
2. On this date, the customer receives USD1million from the bank, an amount which he immediately sends to his supplier to meet his liability.
3. Also on the 2nd, the customer must pay the bank MXN\$12.12 million for the dollar swap at the spot exchange rate of USD12.12.
4. On the 4th, the product of the customer's USD1million investment is wired into his account. On this same date, the customer must pay the bank USD1mn for which he receives MXN\$12,122,600, i.e. the amount obtained from the following formula:

$$(T.C. + (bp \times d)) * \text{Amount} = \text{Settlement}$$

where:

T.C. = is the exchange rate at inception of the transaction (12.12 in this case)

bp = basis points per day agreed (e.g.: 0.0013 per day)

d = number of days in the contract (e.g.: 2 days)

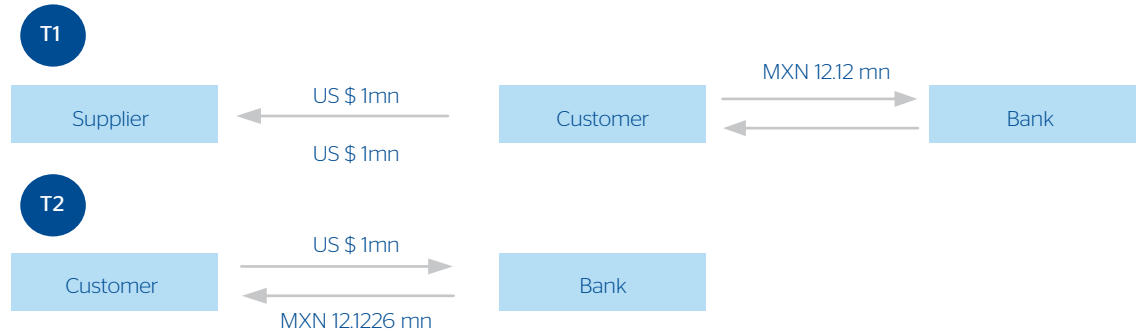
Amount = amount in dollars object of the swap (USD1million)

Substituting

$$(\$ 12.12 + (0.0013 \times 2)) \times 1,000,000 \text{ USD} = \text{MXN } \$ 12,122,600$$

Assuming that the funding rate in pesos in Mexico for 2 days is 6% and using the aforementioned formula, we can say that the implicit interest rate in dollars which the company had to pay was 2.13% at two days in annual terms.

SWAP CASH-SPOT: USD liability



Source: BBVA Research México

2. Sell-purchase SWAP CASH-SPOT Type: USD asset

A customer has a surplus of USD1million on the 2nd of the month, which he must pay to a supplier on the 4th day of the same month, he therefore decides to perform a dollar lending operation lasting 2 days in the USDMXN FX swap market.

Procedure

1. On the 2nd of the month, the customer performs a sell-purchase swap with the bank in which he sells USD1million at an exchange rate of \$12.12. The bank agrees to return this amount in 2 days at a specified forward exchange rate.
2. On the 2nd, the customer settles the operation for USD1million and receives MXN \$ 12.12 million, an amount which he invests for 2 days.
3. On the 4th, the customer receives USD1mn from the bank, for which he pays MXN \$ 12,122,400. The amount is obtained from applying the following formula:

$$(T.C. + (bp * d)) * Amount = settlement$$

where:

T.C. = is the exchange rate at inception (12.12 USD in this case)

bp = basis points per day agreed (eg: 0.0012 bp per day)

d = number of days in contract (eg: 2 days)

Amount = amount in dollars object of the swap (USD1million)

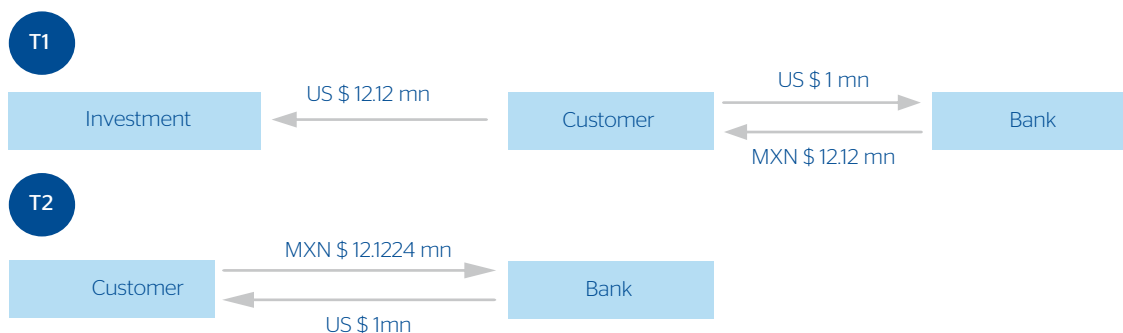
Substituting

$$(12.12 \text{ USD} + (0.0012 \text{ bp} * 2)) * 1,000,000 \text{ USD} = \text{MXN} \$12,122,400$$

Assuming that the investment rate in Mexico for 2 days is 5.50% and using the aforementioned formula, we can say that the implicit return in dollars obtained by the company was 1.94% at two days in annual terms.

$$R_{USD} = \left[\left[\left(\frac{12.1200}{12.1224} \right) * \left(1 + \left(5.50 \% * \frac{2}{360} \right) \right) \right] - 1 \right] * \frac{360}{2} = 1.94 \%$$

SWAP CASH-SPOT Type: USD asset



Source: BBVA Research México

2.1.2. FX Futures (MEXDER and CME)

Description

These derivative instruments are used for protection against exchange rate devaluation or appreciation. These standard contracts are listed on either MEXDER or the Chicago Mercantile Exchange (CME), subject to ongoing market valuation, which entails possible “margin calls” to cover guarantees.

One advantage of using this type of contract on MEXDER is that minimum notionals are lower than on the CME, which can attract a broader base of investors. Another advantage is that accounts may be held in Mexico in MXN, whereas with the CME, accounts must be held abroad in USD.

Characteristics

	MEXDER	CME
Participants:	Mexican or foreign nationals	Mexican or foreign nationals.
Contract size:	USD10,000	MXN500,000
Maturity period or date:	The maturity dates of futures contracts in pesos are the third Wednesday of the month. On MEXDER, they are traded in a monthly and quarterly cycle for up to three years. When the maturity date falls on a bank holiday, it is transferred to the bank business day immediately prior thereto (Preceding Business Day convention). The last trading date is on the Monday of the week in which the maturity date falls, or the preceding business day in the event of a bank holiday.	
Settlement date:	The second business day following the maturity date (T+2). The settlement date must be a working day in both Mexico and the United States.	
Agreed exchange rate:	The applicable exchange rate as agreed by the parties concerned, traded in pesos per U.S. dollar on MEXDER.	
Ticker symbol:	DA followed by two numbers to identify the specific date of maturity, the first letter and the following consonant of the maturity month, and the last two digits of the maturity year (e.g. DAMR10 (March 2010)). Contracts quoted with a monthly series will appear as DEUA and those with a daily series as DA	MP (Mexican Peso) plus code for the month (e.g. F: January, G: February, H: March, etc.) and year of maturity: MPM10 (June 2010).
Minimum price fluctuation (Tick):	MXN0.0001 per USD	USD0.000025 per MXN increment (12.50 USD per contract)
Trading hours:	Business days from 7:30 a.m. to 2:00 p.m. Bids and offers for trading at daily settlement price are submitted between 2:25 p.m. to 2:35 p.m.	Business days from 7:20 a.m. to 2:00 p.m. Last trade is at 9:16 a.m.

Continued on next page

Characteristics (continues)

Initial margin:	The amount in dollars that must be deposited by the customer with the clearing house, ASIGNA, when the first order is executed. The aim is to guarantee coverage of the variation margins or daily settlement amounts while positions are open.
Maintenance margin:	The minimum amount per contract that the customer must keep in the account with the clearing house (clearing broker) to cover his open positions.
Variation margins:	Debits and credits that the clearing house applies to the customer's account in order to reflect the daily gain and/or loss resulting from the revaluation of the contracts. If the maintenance margin is lower than required, the clearing house will ask the customer to deposit the remainder (margin calls). If it is higher than required, however, the customer will withdraw the amount over the maintenance margin (margin withdrawals) from his account.

Formula

The theoretical dollar futures exchange rate is calculated as the interest rate differential between Mexico and the United States, using the following formula:

$$A. \text{ Future} = \text{Spot} \left[\frac{1 + \frac{R_{Mex} * t}{360}}{1 + \frac{R_{USA} * t}{360}} \right]$$

Where:
 Spot = Pesos per dollar exchange rate value date 48 hours.
 R_{USA} = U.S. interest rate.
 R_{Mex} = Mexican interest rate.
 t = period in days.

To determine the variation margins applicable to the accounts of each customer, the "clearing broker" on the Chicago Mercantile Exchange applies debits or credits based on the result of the following formula:

$$B. M_{t+1} = 500,000 * \{S(T) * [b_{t+1}(T) - b_t(T)] - L(T) * [f_{t+1}(T) - f_t(T)]\}$$

Where:
 M_{t+1} = Variation margin in day t+1 (expressed in U.S. dollars).
 $S(T)$ = Number of short contracts (Sell) for maturity in month T.
 $b_t(T)$ = Purchase price (bid price) for the contract in Mexican pesos on day t.
 $b_{t+1}(T)$ = Purchase price (bid price) for the contract in Mexican pesos on day t +1.
 $L(T)$ = Number of long contracts (purchase) for maturity in month T.
 $f_t(T)$ = Sell price (offer price) for the contract in Mexican pesos on day t.
 $f_{t+1}(T)$ = Sell price (offer price) for the contract in Mexican pesos on day t +1.

When M_{t+1} is greater than zero at closing on day t+1, a debit is applied for the amount in the customer's account with the clearing house (or clearing broker), reflecting the gain obtained.

Otherwise, the loss will be valued via a credit in the same account.

Examples

"Purchase" of dollar futures on MEXDER

A company purchases imported goods payable after 180 days worth USD1,000,000.

The company expects the peso to depreciate against the dollar, and is therefore interested in hedging against the exchange risk. Consequently, it purchases dollar futures on MEXDER that will mature in December (180 days).

The customer is short a futures contract maturing in December at 12.6480 pesos per dollar, while the spot

exchange rate is 12.3050 pesos to the dollar. When the contract matures, the importer will receive the dollars agreed in exchange for the equivalent amount in pesos. If on maturity the exchange rate has depreciated to 12.85, as the customer expects, the savings would be:

Exercise of future

1,000,000.00 USD*12.6480 MXN/USD= MXN \$ 12,648,000.00

(-) Amount without future:

1,000,000.00 USD*12.8500 MXN/USD= MXN \$ 12,850,000.00

(=) Saving/expense: MXN \$ 202,000.00

The importer sets the global cost of the imports in advance. "If the hedging transaction had not been carried out, the imports would have cost MXN 12,850,000."

However, the opposite could have occurred, where the peso could have appreciated. In this case, there would be no surprises since the cost had been set in advance via the futures contract, thus reducing volatility in the company's financial results.

"Purchase" of peso futures on the CME

In 180 days, a company will receive USD104,000.00 for exports. It wishes to ensure today the amount in pesos that it will receive on the exports, and it does so by purchasing a peso futures contract. In other words, it wishes to sell its dollars and buy pesos.

The company purchases two peso futures contracts for December (180 days) at 0.103093 dollars per peso, and must therefore pay a commission of USD5.00 and deposit USD1,000.00 for each of the contracts as the initial guarantee margin.

Consequently, the exporter requests a loan of USD2,010.00 (commission + initial margin) at 180 days and 1.90% annually. At maturity, he must therefore pay capital plus interest equivalent to:

$$\$2,010\text{usd} * \left[1 + \frac{1.9\% * 180}{360} \right] = \$2,029.1\text{usd} \quad (2)$$

When the contract matures, the importer will receive the initial margin plus a return of 1.5% annually at 180 days, equivalent to: 2,015.00 USD. (3)

$$\$2,000\text{usd} * \left[1 + \frac{1.5\% * 180}{360} \right] = \$2,015.00\text{usd} \quad (3)$$

The importer is implicitly ensuring an exchange rate of 9.7013 pesos per dollar, resulting from the pesos he will receive from the futures contract among the dollars available, which in terms of cash flows is as follows:

Futures exercise

1,000,000.00*0.103093 = 103,093.00 USD

(+) Withdrawal of initial margin + interest (3): 2,015.00 USD

(-) Loan repayment (2): 2,029.10 USD

(=) Dollars available: 103,078.90 USD

Implicit exchange rate: 1,000,000 pesos/103,078.90 USD = 9.7013 pesos per dollar

When the contract matured, the peso appreciated, trading on the cash market at 9.60 pesos per dollar (higher-than-expected). However, the exporter had hedged against the exchange risk by contracting peso futures, setting his export revenues at 1,000,000 pesos. "Had it not been for the hedge transaction, the revenues on exports would have been 998,400.00 pesos (104,000.00 * 9.60), i.e. lower than the result using peso futures."

In short, in any of the aforementioned alternatives, the exporter sets the global revenues on the exports in pesos in advance, thus eliminating exchange rate uncertainty.

2.1.3. MXN Forwards and NDF`s (OTC)

Description

This derivative instrument eliminates exchange risk by protecting against the peso's devaluation or appreciation against the usd. Deliverable forwards guarantee physical delivery of foreign currency. Non-deliverable forwards are cash-settled.

Advantages for customers in using dollar forwards are:

1) Eliminates uncertainty regarding the cost/revenues of imports/exports and/or operations in dollars; 2) Hedges against exchange risk; 3) Possibility of arbitrage, obtaining funding (or investing) rates in pesos at more attractive interest rates than domestic ones; 4) Settlement at maturity: does not involve a disbursement of funds at inception; and 5) Flexibility regarding notionals and maturity dates, as opposed to futures contracts.

General characteristics

Participants:	Mexican or foreign persons or entities.
Reference amount:	Variable. The hedged amount is established in line with the customer's needs.
Period:	Agreed upon freely by the customer and bank, from 1 day to 5 years. The most liquid periods are up to 3 years.
Exchange rate:	The forward exchange rate is calculated based on the spot date exchange rate (48 hours value) of the peso against the dollar plus some basis points (forward points). The following factors determine how many basis points are added: <ul style="list-style-type: none"> a. Difference between the interest rates in pesos and in dollars - Formula (1). b. Market expectations with respect to prevailing cash exchange rates in the future.
Settlement:	On maturity, both parties deliver the total amount of the currencies involved in the contract to each other. In the case of an NDF, there is a cash settlement at maturity, either in USD or MXN.
Average daily volume:	USD5.8billion
Bid/Ask spread:	1M - 12M 5 pips 1Y - 10Y 44 pips
Bloomberg ticker:	"BCMR 6 <GO>"

Formula 1

$$\text{Fwd exchange rate} = \frac{1 + \frac{T\$ * \text{plazo}}{360}}{1 + \frac{T\text{usd} * \text{plazo}}{360}} * TC_{\text{spot}}$$

Where:
 T\$ = Interest rate in pesos.
 TUSD = Interest rate in dollars.
 Plazo = Period of reference interest rate and forward contract.
 TCspot = Spot exchange rate (48 hours value date).

Example

“Purchase” of dollar forwards

A company purchases imported goods on credit at 91 days paying 1.31% annual interest in USD, in the amount of USD100,000.00. In 90 days' time, it will have to pay the capital plus interest, equivalent to:

$$100,000.00 \text{ usd} * \left[1 + \frac{0.0131 * 91}{360} \right] = 100,331.14 \text{ usd}$$

This is the amount subject to exchange risk.

The company thinks that the peso is likely to depreciate against the dollar, and is therefore interested in hedging against exchange rate risk. Consequently, it purchases USD forwards at 91 days.

The bank quotes a forward exchange rate of 12.35 (ask price) pesos per dollar, therefore at maturity the customer is obliged to buy from the bank the amount in dollars that is the object of the contract (USD 100,331.14) at the agreed exchange rate.

When the contract matures, as the customer assumed, the peso has devalued and is now trading in the foreign exchange market at 12.45 pesos per dollar. However, the importer hedged against exchange rate risk by contracting dollar forwards at a lower rate (12.35), thereby saving MXN \$ 10,033.11, obtained as follows:

Purchase of dollars in 91 days without forward contract:

$$\text{USD } 100,331.14 * 12.45 = \text{MXN } \$ 1,249,122.68$$

(-) future dollar purchase with forward contract:

$$\text{USD } 100,331.14 * 12.35 = \text{MXN } \$ 1,239,089.57$$

(=) Saving obtained: MXN \$ 10,033.11

The importer guaranteed in advance the global cost of the imports at \$ 1,249,122.68, regardless of the future dollar exchange rate, helping the company's financial planning.

Clearly, contrary to the customer's expectations, the opposite might have happened, namely that the peso might have appreciated. In this regard, there are no surprises. The cost of imports remains the same despite the appreciation in the exchange rate, since it was fixed in advance, and the company's financial results are therefore unaffected.

If this example were an NDF, then the settlement would have been in USD at the prevailing FIX at time of expiration.

2.2. FX volatilities

2.2.1. FX Options (OTC)

Description

This derivative instrument protects against currency (i.e., USDMXN going forward) appreciation/depreciation in which, a buyer acquires the right, but not the obligation, to purchase (call option) or sell (put option) USD on a future date(s), at a price specified in advance (strike) in return for the payment of a premium. When the option is exercised, the notional may be full delivered or cash settled in either USD or MXN.

The advantages of options are: exchange risk is hedged; liquidity is saved since there is no need to purchase the dollars subject to the operation in advance; and the amount and term are established based on the customer's requirements. In addition to hedging and eliminating exchange risk, another benefit is that cash flows in pesos can be anticipated at the start of the operation regardless of the future performance of the exchange rate.

General characteristics

Participants:	Mexican and foreign nationals.
Reference amount:	Variable. Based on the customer's needs. Must not be less than 100,000 USD.
Period:	Up to 3 years
Types of option:	This is depends on the day on which or the period of time within which the option buyer's right is exercised. They may be: <ul style="list-style-type: none"> - European: The buyer may only exercise the option at maturity. - American: The buyer may exercise the option on any bank business day between the outset of the operation (premium payment) and the date the option matures.
FIX reference exchange rate:	Exchange rate published by the Banco de México in the Official Gazette, and www.banxico.org.mx .
Strike:	Exchange rate agreed on by the parties that will be used on the maturity or exercise date in the event of a cash settle.
Trade date:	Date on which the parties close the transaction.
Option premium:	Amount in pesos or dollars that the buyer must pay the seller at the start of the operation to acquire the operation's underlying right. It is paid on the second business day following the date of arrangement of the operation.
Exercise date:	Date on which the buyer exercises his right, assuming he decides to do so.
Settlement date:	The option will be settled on the second bank business day immediately following the exercise date and may be performed in two ways: <ul style="list-style-type: none"> a. Physical delivery of the currencies (payment in kind) b. Cash settlement in either USD or MXN
Maturity date:	Date on which the buyer's right to exercise a sell or purchase option expires.

Types of operation

a. Call options

- **Purchase of a call:** The customer buys the right to buy USDMXN at an agreed strike price on a specified date in exchange for an option price (premium).
- **Sell of a call:** The customer sells the right to buy USDMXN at an agreed strike price on a specified date in exchange for an option price (premium). Thus, he receives the premium but he is obliged to sell USDMXN in the event the option holder decides to exercise it.

b. Put options

- **Purchase of a put:** The customer buys the right to sell USDMXN at an agreed strike price on a specified date in exchange for an option price (premium).
- **Sell of a put:** The customer sells the right to sell USDMXN at an agreed strike price on a specified date in exchange for an option price (premium). Thus, he receives the premium but he is obliged to buy USDMXN in the event the option holder decides to exercise it.

Examples

Purchase of call option

An importer wishes to hedge against the risk of a possible depreciation of the peso before purchasing goods worth 1,000,000 USD payable in 6 months. The current spot exchange rate is 12.65 pesos per dollar.

The importer decides to purchase a European-style dollar call option from the bank, at an exercise price of 13.00 pesos per dollar. The price (premium) of the option which the bank must pay is 0.3474 pesos per dollar, and the total amount payable is therefore:

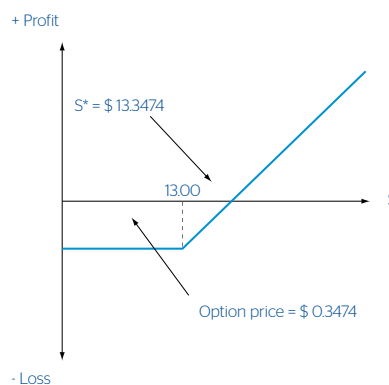
$$\text{USD } * 1,000,000 * 0.3474 \text{ MXN} = \text{MXN } \$ 347,400.00$$

This amount is the cost of hedging the imports against a possible depreciation. If the importer exercises the option, he is implicitly acquiring an exchange rate of 13.3474 pesos per dollar, obtained from the following:

$$13.00 \text{ pesos} + 0.3474 \text{ pesos} = \text{MXN } \$ 13.3474$$

This is the price of the underlying security (S^*), applicable on the exercise date, from which the option generates a profit. If the spot exchange rate in 180 days is higher than 13.3474 pesos per dollar, the importer will benefit from exercising the call option.

Risk profile in the purchase of a call in the line with the price of the underlying security



Source: BBVA Research México

When the contract matures, the exchange rate depreciates as the customer expected, trading at 13.43 pesos per dollar, and the importer therefore exercises the right to purchase 1,000,000 USD at the exercise exchange rate of 13.00 pesos per dollar.

Consequently, the total amount payable in pesos on maturity of the option to purchase 1,000,000 USD is 13,347,400 MXN, calculated as follows:

Exercise of the option

(1,000,000 USD * 13.00 pesos per dollar):	MXN \$ 13,000,000.00
+ cost of the option's premium:	MXN \$ 347,400.00
= total cost in pesos of the import:	MXN \$ 13,347,400.00

This figure is lower than the amount payable if he had not hedged against the devaluation risk determined by the exchange rate at the time (13.43 MXN per USD * 1,000,000 USD) = 13,430,000 MXN, saving = 82,600 MXN.

However, the market exchange rate applicable on the day the contract matures might be lower than the exchange rate implicit in the option, in which case the importer would not exercise the option since it would be cheaper for him to acquire the dollars in the spot market. In this case, the loss is limited to the option's premium (347,400 MXN).

Purchase of USD Puts

In 3 months, a company will receive 1,000,000 USD from exports. It wishes to today fix the amount in pesos from its exports, in view of the possibility that the peso may appreciate, and consequently decides to purchase dollar put options.

The exporter decides to purchase a European-style dollar put option at an exercise price of 12.60 pesos per dollar. The price (premium) of the option is 0.3474 pesos per dollar, and the total amount payable is therefore:

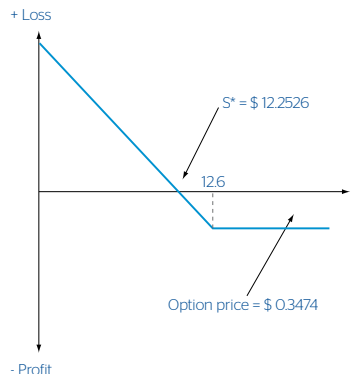
$$1,000,000 \text{ USD} * 0.3474 \text{ MXN per USD} = 347,400 \text{ MXN}$$

This amount is the cost of hedging the exports against a possible appreciation. If the exporter exercises the option, he will implicitly be acquiring an exchange rate of 12.2526 pesos per dollar obtained by:

$$12.60 \text{ MXN} - 0.3474 \text{ MXN} = 12.2526 \text{ MXN}$$

This is the price of the underlying security (S^*), applicable on the date of exercise, from which the option generates a profit. In other words, if the exchange rate in 90 days is lower than 12.2526 pesos per dollar, the exporter will benefit from exercising the dollar sell option.

Risk profile in the purchase of a put option according to the price of the underlying security



Source: BBVA Research México

When the option matured, the exchange rate had appreciated as the customer expected, and stood at 12.20 pesos per dollar. The exporter therefore exercised the right to sell 1,000,000 USD at the agreed exchange rate of 12.60 pesos per dollar.

Consequently, the total net amount receivable in pesos on the option's maturity, for selling 1,000,000 USD, is 12,600,000.00 MXN, which, after discounting payment of the option premium, leaves 12,252,600.00 MXN. In other words:

Option exercise

(100,000 USD * 12.60 pesos per dollar):	MXN \$ 12,600,000.00
- Cost of option premium:	MXN \$ 347,400.00
= Revenues in pesos of the export:	MXN \$ 12,252,600.00

This figure is higher than the one the customer would have received if he had not hedged against the risk of appreciation determined by the exchange rate at the time (12.20 MXN * 1,000,000 USD = \$ MXN 12,200,000.00). Saving: \$ MXN52,600.00.

However, the market exchange rate applicable on the contract's maturity might be higher than the exchange rate implicit in the option. In this case, the exporter would not exercise his right to sell. Thus, the cost of hedging will be limited to the option's premium.

2.2.2. FX Options (MEXDER)

Description

These derivative contracts are used for hedging against (or speculating on) USD/MXN fluctuations and are traded on MEXDER, the standardised market. The buyer acquires the right, but not the obligation, to purchase (call option) or sell (put option) USD on a future date, at a strike price agreed in advance. The contract style used on MEXDER is European. When the option is exercised at maturity, the operation is physically settled.

Contract characteristics

Face value:	10,000.00 USD (ten thousand dollars 00/100).
Contract kind:	Call and Put
Contract style:	European
Delivery months:	Quarterly cycle for up to one year (for both call and put options): March, June, September, and December.
Strike price:	It will be expressed in Mexican pesos in accordance with the spot price of the USD and in multiples of 0.05 MXN. For each maturity, MEXDER will list one strike price (ATM) equivalent to the USDMXN spot value of the previous day, and two higher and two lower strike prices.
Trading symbols:	“DA” plus 5 digits to specify the strike price and another digit to specify the contract type and maturity month (Call: March, “C”; June, “F”; September, “I”; December, “L”. Put: March, “O”; June, “R”; September, “U”; December, “X”). For example, “DA 13850C” = call option maturing March with a strike price of 13.850 and “DA 13100X” = put option maturing December with a strike price of 13.100.
Unit quoted:	Pesos to three decimals per linked unit.
Minimum fluctuation (Tick):	0.001 MXN (one thousandth of a Mexican peso).
Trading hours:	07:30 a.m. to 2:00 p.m. (GMT -06:00)
Last day of trading and maturity date:	The maturity date of the monthly USDMXN futures contract listed on MEXDER.
Settlement day:	Second business day following maturity date.
Settlement at maturity:	Performed by the automatic exercise of all positions with a positive intrinsic value equal to or greater than the self-exercise threshold established by the clearing house (ASIGNA).
Intrinsic value at maturity:	A call option has a positive intrinsic value when the strike price is lower than the closing spot value of USDMXN published by MEXDER. A put option has a positive intrinsic value when the strike price is higher than the closing spot value of USDMXN published by MEXDER. Otherwise, the intrinsic value on the maturity date shall be zero.
Daily settlement:	ASIGNA will carry out the daily settlement of investor obligations including all premiums agreed upon negotiation, the maintenance margin, accrued interest, and corresponding fees. The daily price settlement is calculated by MEXDER for each series.
Initial margin:	Amount needed to start the contract in order to guarantee obligations.
Maintenance margin:	Margin “calls” or margin “withdrawals” as a function of open positions.

3. Fixed Income (Government)

3.1. Auctions and Market Makers

The Banco de México, as the financial agent of the Mexican Federal Government has the mandate to carry out weekly primary auctions of its securities according to a predetermined calendar as well as an issuance strategy released by the Secretariat of Finance and Public Credit each quarter.

The competitive bidding process can be summarised in four steps:

Auctions of CETES, BONDES, UDIBONOS and fixed-rate MBONOS

- Offering (previous Friday at 12:00 p.m.)
- Bidding (Tuesday 10:00 to 11:00 a.m.)
- Result Disclosure (Tuesday 11:30 a.m.)
- Settlement (Thursday)

Auctions of Savings Protection Bonds (BPAs)

- Offering (previous Friday at 12:00 p.m.)
- Bidding (Wednesday 9:30 a.m. to 10:00 a.m.)
- Result Disclosure (Wednesday 10:30 p.m.)
- Settlement (Thursday)

Offering

Every Friday at 12:00 pm (GMT - 06:00), Banco de México specifies the exact instrument, maturity, and amount to be issued the following week. Additionally, Banco de México provides the type of auction mechanism (single price or multiple prices). The main mechanism follows the principles of a Dutch price auction¹.

Bidding

The authorised participants in primary auctions are mainly commercial banks, brokerage houses, and mutual funds. Each institution submits its bids (both amounts and prices) either in a sealed envelope or through encrypted electronic file. The sum of all the amounts submitted by a single investor in a primary auction must not exceed 60% of the total amount of securities offered in the auction. The price is a function of net supply of bonds (amount offered less redemptions in the week), liquidity preferences, risk appetite, and inflation expectations.

Allocation

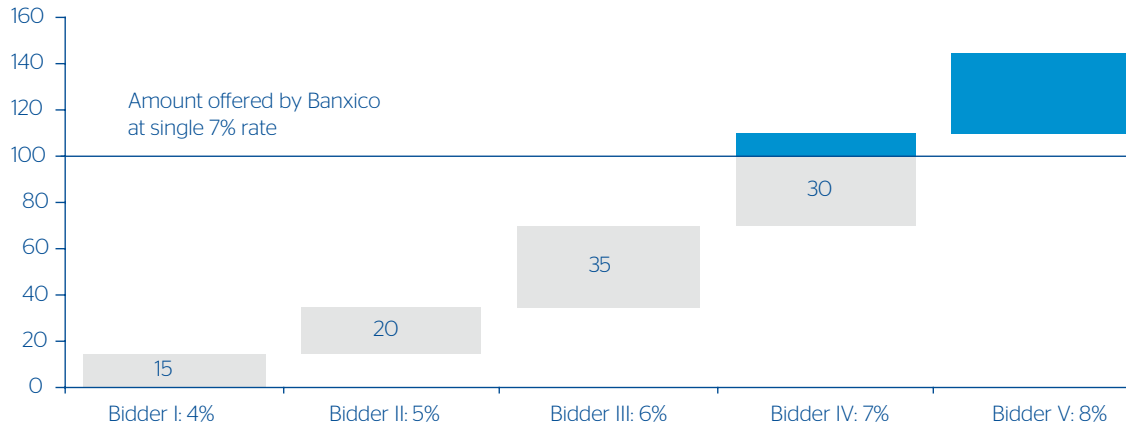
As in any Dutch auction, where there are multiple winning bidders, securities are allocated in line with the ascending order of the corresponding discount rates, without exceeding the maximum amount indicated in the offering. The allocated interest rate or price could be either the same for all participants (single price), or the rate requested for each winner participant (multiple price).

In the case of MBONOS and UDIBONOS, bids are allocated in line with the descending order of the unit prices, without exceeding the maximum amount indicated in the offering. The single price is the one corresponding to the last bid allocated.

This type of auction encourages more aggressive bids from intermediaries, thus promoting lower interest rates. The above notwithstanding, the Banco de México has the right to either postpone any auction or to allocate a fraction of all securities offered if the prevailing market conditions do not meet its benchmarks.

¹ In a Dutch auction the auctioneer begins with a high asking price which is lowered until some participant is willing to accept the auctioneer's price, or the seller's minimum acceptable price (reserve price) is reached. This type of auction is also known as a "clock auction" or a descending-price auction.

Single Price allocation

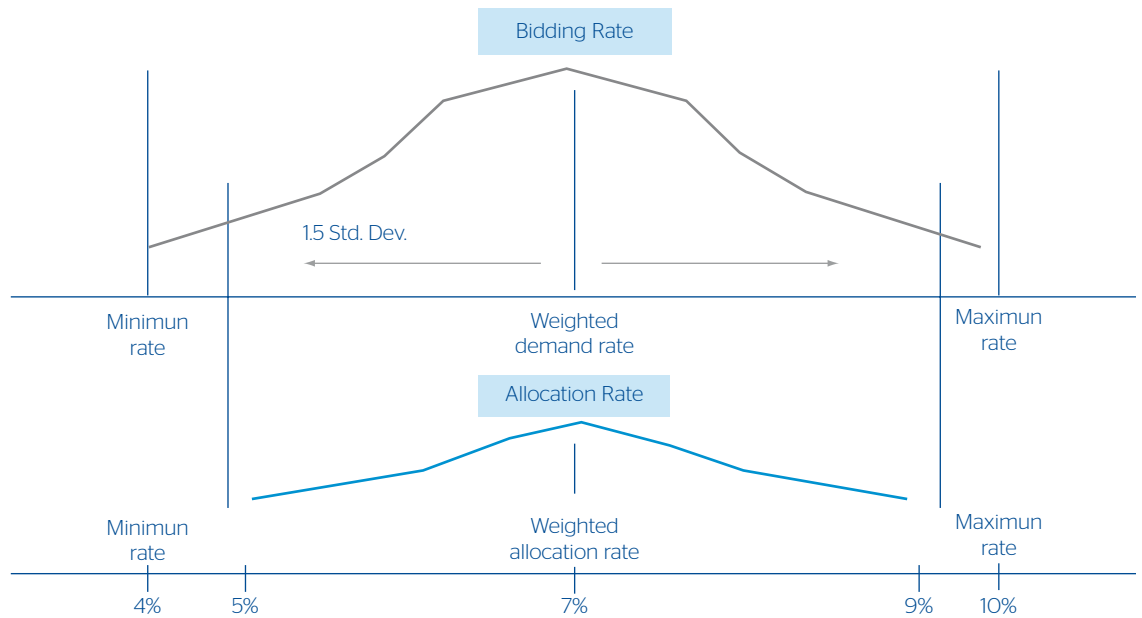


Source: BBVA Research México

In **multiple prices** auctions the allocation would be:

In the case, the securities are allocated in ascending order of the corresponding discount rates, without exceeding the maximum amount indicated in the offering. The rate allocated is the rate requested in each participant's bid. CETES, BONDES, BPAs and BPAT are allocated in descending order of unit prices, without exceeding the maximum amount indicated in the offering.

Single price allocation 2



Source: BBVA Research México

This type of auction encourages careful determination of bids, while seeking levels that are more representative of the market.

The average weighted rate or average weighted price of the auction is determined on the basis of the bids to which securities have been allocated.

Traditional auctions: Bidders have no information on other bidders' behavior until the results are published.

Interactive auctions: Securities are allocated at marginal rates requested by the intermediaries, until the amount up for auction has been fully allocated.

Syndicated Bond Auction (MBONOS and Udibonos; since February 2010). The bidders are only market makers and the public offer is released one day before the auction. The offer release includes a detailed list of instruments, amounts and a schedule for the auction. The bidding process is under Dutch auction rules, therefore a unique price is paid by all the winners and allocation is made to those offering a higher price.

Market makers

Objectives of market makers are to increase liquidity in the secondary government debt market and to encourage greater investment in government securities.

To guarantee investors' appetite for long-term fixed-rate instruments, there must be a deep and liquid secondary market. On such a market, these securities can be bought and sold at any time and at low transaction costs. Hence, the Secretariat of Finance and Public Credit, with the support of Banco de México, created the figure of market makers. On February 11th, 2001, the general rules for selecting market makers were unveiled, with operations starting in November 2001.

In order to achieve the objectives set by the authorities, market makers have the following obligations and rights:

Obligations:

- a. Significant participation in the primary fixed-rate government debt market. The minimum percentage of participation of each market maker is the lower of 20% and $1/n\%$ of the total amount auctioned for each fixed-rate security ("n" is the number of market makers).
- b. Significant participation in the secondary government debt market. Market makers must quote bid and ask prices daily, between 9:00 a.m. and 1 p.m., for all relevant ranges in which fixed-rate securities operate, for a minimum nominal amount of MXN \$ 20 million.
- c. Maintain adequate risk management, in line with Banco de México regulations.
- d. Report operations to authorities.

Rights:

- a. Public recognition of market maker status, through the Secretariat of Finance's quarterly list of recognized market maker institutions.
- b. The right to exercise an option to buy from the Banco de México. One day after the release of the primary auctions (from 8:45 am to 9:00 am), market makers are entitled to purchase an additional amount of securities to enable them to meet their clients' requirements.

The maximum amount exercisable is the lower of:

1. 25% of the total amount of government securities allocated for each period.
2. The total amount of computable bids presented by the market maker in question.

Computable bids are those whose yield is less than or equal to the highest yield allocated in each maturity multiplied by a factor of between 1.002 and 1.0035. This factor will depend on the activity index level of each market maker.

Securities lending

Market makers may request any issuance of CETES or fixed-rate BONOS in circulation from Banco de México as a loan, renewable on a daily basis. Each market maker may request up to 2% of the total of these government securities in circulation and up to 4% of the amount of each of the issuances.

The operations will be collateralised daily with CETES or fixed-rate BONOS, using the latest price vector published by Banco de México. The value of securities used as collateral is at least 102% of the value of the securities loaned, plus the agreed premium. The cost of each securities loan operation is equivalent to 5% of the government funding rate published daily by the Banco de México.

Every year, on the last trading day of January, April, July and October, the Secretariat of Finance and Public Credit's website will release the names of the financial institutions authorised as market makers. These names are placed in descending order of the activity index of each intermediary in the preceding brokerage period.

Financial intermediaries are appointed as market makers for an indefinite period of time, provided that they continue to meet all applicable regulations and requirements.

3.2. Money Market: Cetes (OTC)

Description

The Federal Treasury Bills (CETES) are one of the leading instruments in the Mexican money market and are commonly used as a benchmark for financial transactions. Since 1978, CETES have been the main source of federal government funding. CETES are zero-coupon bonds with flexible investment terms, immediate liquidity, and attractive yields.

Advantages:

- Investors can find various maturities in the CETES market, which allows them to construct portfolios that take liquidity constraints into account.
- Credit risk is low, as the securities are fully backed by the Mexican federal government.
- There is a broad and liquid secondary market where the securities can be sold (either through repurchase agreements, repos or Spot) prior to maturity. They can also be used in securities lending transactions.
- The return on CETES is used as a reference interest rate for a large number of financial transactions (s.a. futures and options).

Disadvantages:

- Like any money market instrument, CETES are subject to price fluctuations (market risk) when sold before maturity. Therefore, the return for investors may not be as initially planned. The longer the time remaining until maturity, the greater the price fluctuations.

Contract characteristics

Issuer:	Federal Government, via Banco de México
Guarantee:	Federal Government
Amount:	Variable
Face value:	MXN \$10 pesos
Maturity:	CETES are normally issued for 28, 91, 175-182, and 364 days. To enhance marketability, CETES are fungible; that is, the number of issuances is reduced while the volume of placement is increased. Consequently, in a single one-year issuance, CETES are placed in maturity periods of 335 and 364 days and, for six-month issues, between 153 and 182 days.
Yield:	As any zero-coupon bond, the yield comes from the price discount relative to par value. The return is obtained from the difference between the under-par purchase price and the redemption or sell price. The price is set freely in the market (OTC) in terms of interest rate or discount rate. However, CETES are normally quoted with yield rate.
Amortization:	Bullet payment on maturity

Continued on next page

Contract characteristics (Continues)

Placement:	Public auction, multiple-price
Deposits under management:	Banco de México is the custodian of the securities.
Intermediation:	Banks and brokerage houses
Ticker symbol:	"BI", year, month, and day (i.e. "B1100729" for a CETE to mature on July 29, 2010)
Bloomberg Ticker:	MPTBA BCMR <CURRENCY> for 1-month; MPTBB BCMR <CURRENCY> for 2-months; MPTBC BCMR <CURRENCY> for 3-months; MPTBF BCMR <CURRENCY> for 6-months; MPTBI BCMR <CURRENCY> for 9-months; MPTB1 BCMR <CURRENCY> for 12-months.
Official reference:	http://www.banxico.org.mx/sitioingles/portalesEspecializados/tasasInteres/auctplacesec.html

Main formulas

$$\begin{aligned}
 1) \quad TD &= \left(1 - \frac{P}{VN}\right) * 360 & 4) \quad P &= \frac{VN}{\left(1 + \frac{TR * n}{360}\right)} \\
 2) \quad TD &= \left(\frac{TR + 360}{360 + (TR * n)}\right) & 5) \quad P &= VN * \left(1 - \frac{TD * n}{360}\right) \\
 3) \quad TR &= \left(\frac{D}{P}\right) * \frac{360}{n} & 6) \quad P &= VN - D \\
 7) \quad D &= VN * \left(\frac{TR * n}{360 + TR * n}\right)
 \end{aligned}$$

Where:
P = CETES price (rounded to 10 decimal places)
D = Discount in pesos
VN = Face value of CETES
TR = Return rate in the period "n," as a percentage
TD = Discount rate in the period "n," as a percentage
n = Period in days

Examples

Spot trade

A company wishes to invest its surplus cash in a money market instrument and hold the instrument until maturity. Consequently, it acquires 28-day CETES with an annual discount rate of 6%. The CETES price is \$ 9.9533 pesos per security, i.e.

$$P = 10 * \left(1 - \frac{6\% * 28}{360}\right) = \$9.9533 \text{ pesos per security}$$

Within 28 days, the company receives \$10.00 pesos per security. The nominal return on the investment is therefore 6.0281% annually, i.e.

$$\text{Nominal rate of return} = \left(\frac{10.00}{9.9533} - 1\right) * \left(\frac{360}{28}\right) = 6.0281\%$$

Outright trade

An investor acquires 91-day CETES with an annual rate of return of 7%, at a price of \$9.8261 pesos per security, which is equivalent to the present face value, i.e.

$$P = \frac{10}{\left(1 + \frac{7\% * 91}{360}\right)} = \$9.8261 \text{ pesos per security}$$

After 28 days, the investor needs cash, and therefore decides to sell his CETES position 63 days prior to maturity. The market conditions are favourable since CETES are in demand, and he therefore manages to sell the position at 6.50% annually for 63 days, implying a price of \$9.8875 pesos per security.

$$P = \frac{10}{\left(1 + \frac{6.50\% * 63}{360}\right)} = \$9.8875 \text{ pesos per security}$$

Consequently, the annual yield generated is 8.0339% in 28 days. This is higher than the amount initially planned, and over a shorter investment period, i.e.

$$\text{Yield} = \left(\frac{\$9.8875}{\$9.8261} - 1\right) * \left(\frac{360}{28}\right) = 31.79\%$$

The yield generated in the above example primarily depends on the prevailing market conditions. Returns are higher when interest rates drop and lower when the rates increase.

3.3. Fixed-Rate: MBONOS, Udibonos and UMS

3.3.1. MBONOS (OTC)

Description

Mexican Federal Government Development Bonds with a Fixed-Interest Rate (MBONOS) are the latest set of government securities; they are issued and placed for periods of more than one year and pay fixed semi-annual coupons.

The placement of these bonds provides evidence of investor confidence both in the Mexican economy and of the federal government's commitment to reducing inflationary and sovereign risk through prudent monetary and fiscal policies.

Long-term Federal Government bonds have been issued with the aim of establishing a benchmark risk-free rate (credit risk) and developing a medium and long-term private debt market. MBONOS have a broad secondary market. It is now possible to undertake outright sells, repurchase agreements (repos) as well as securities' lending transactions on MBONOS. Direct transactions can be made by quoting their clean price, but market convention is to make quotations in terms of yield to maturity.

Contract characteristics

Name:	Mexican Federal Government Development Bonds with a Fixed Interest Rate (MBONOS)
Issuer:	Mexican Federal Government
Calendar:	This is released each quarter in advance and the Bank of Mexico notifies the auction of MBONOS (of each maturity) on the Friday prior to the placement date
Guarantee:	Mexican Federal Government
Amount:	Variable
Face value:	100 pesos
Maturity:	MBONOS may be issued for any maturity period provided that it is a multiple of 182 days, since they pay a fixed coupon every six months. However, to date they have been issued at periods of 3, 5, 10, 20 and 30 years. They are commonly known as BONOS M3, M5, M10, M20 and M30
Interest period:	The securities accrue interest in pesos every six months (182 days)
Interest rate:	The interest rate payable is determined at the auction of government securities in line with the single-rate procedure
Interest payment:	The interest rate is fixed throughout the period and interest is paid every 182 days on the face value
Payment of principal:	At maturity
Placement:	In a primary auction for the corresponding maturity period with the frequency indicated in the quarterly placement schedule released by the Secretariat of Finance and Public Credit
Ticker symbol:	"M" plus a space followed by six digits identifying the bond's maturity date (e.g. "M 130620" for the issue maturing June 20, 2013)
Fungibility:	Each issue's interest rate is fixed from issuance to maturity, so that the bonds may not be interchangeable unless exactly the same interest rate is paid
Bloomberg Tickers:	"BCMR1 <GO>" for BBVA Bancomer contributions; "MBONO <CORP>" for Mexican Fixed Rate page
Official reference:	http://www.banxico.org.mx/sitioingles/portalesEspecializados/tasasInteres/auctplacesec.html

Formulas:

Interest payment

Interest is calculated based on the number of effective days passed between settlement dates, based on years of 360 days and paid on completing each of the coupon series.

$$I_j = VN * \left[\frac{N_j * TC}{360} \right]$$

where:
 I_j= interest payable at the end of period j
 TC= annual interest rate on coupon
 VN= face value of the security in MXN
 N_j= maturity period of coupon j in days

Primary auctions often offer securities issued prior to their placement date. In these cases, the auctions are performed at their clean price, i.e. without interest accrued. To liquidate these securities, it is necessary to add the interest accrued on the current coupon to the allocation price of the auction, according to the following formula:

$$I_j^{dev} = VN * \left[\frac{d * TC}{360} \right]$$

where:

I_j^{dev} = interest accrued (rounded to 12 decimal places) during the period j

TC= annual interest rate on the coupon

VN= face value of the security in MXN

d= days passed between the issuance date or last interest payment (j-1), whichever is applicable, and the valuation date

The general formula for valuing these bonds is as follows:

$$P = \sum_{j=1}^K (C_j * F_j) + (F_k * VN) - \left(C_1 * \frac{d}{N_1} \right) \quad (1)$$

where:

P= clean price of the bond (rounded to 5 decimal places)

VN= face value of the security in pesos

K= number of coupons pending liquidation, including current coupon

d= number of days passed in the current coupon period

N_j = period in days of coupon j

C_j = coupon j, which is obtained as follows:

$$C_j = VN * \left[\frac{N_j * TC}{360} \right]$$

TC= annual coupon interest rate

F_j = discount factor for j cash flow. Obtained using the formula:

$$F_j = \frac{1}{\left[1 - r_j * \frac{N_j}{360} \right]^j * \frac{d}{N_1}}$$

r_j = relevant interest rate for discounting coupon j

Hence, MBONOS total (dirty) price is determined by three different elements: the present value of the coupons, the present value of the principal and the interest accrued on the current coupon. It is also observed that each of the coupons and the principal are discounted at a different interest rate for each discount factor, and it is therefore necessary to know or to assume a yield curve in order to discount each of them.

In many markets, securities with the characteristics of MBONOS are quoted by their yield to maturity (YTM). This can be defined as the return which the investor will obtain if he decides to hold the security until maturity. To determine the price of an MBONO, once its yield on maturity is known, it is necessary to discount at the same rate all the cash flows of the instrument (coupons and principal).

Knowing the security's YTM, formula (1) is simplified since the rates r_j used to discount the various cash flows become the same in all discount factors. Consequently, if YTM is known and the period in days of all coupons is assumed to be equal, the original formula may be expressed as follows:

$$P = \left(\frac{c + c * \left[\frac{1}{R} - \frac{1}{R * (1+R)^{K-1}} \right] + \frac{VN}{(1+R)^{K-1}}}{[1+R]^{\left(\frac{1-d}{182} \right)}} \right) - C * \frac{d}{182} \quad (2)$$

where:

r= return on annual maturity

$$C = VN * \left[\frac{182 * TC}{360} \right] \qquad R = r * \left[\frac{182}{360} \right]$$

Example

An investor wishes to purchase a long-term fixed-interest instrument and decides to invest in fixed-rate MBONOS. On June 20th, 2010, the federal government issues MBONOS with the following characteristics:

- Face value: MXN100
- Issuance date: June 20th, 2010
- Maturity date: June 16, 2013
- Maturity period: 1,092 days
- Coupon rate: 8.72%
- Coupon period: 182 days

On July 9, 2010, the federal government decides to auction MBONOS to be issued on June 20th, 2010. The liquidation date of the securities is July 11th. On that liquidation date, the securities will be 1,071 days short of maturity and 21 days will have passed in the first coupon period. The security will be auctioned in the same way as it was placed when issued, namely at its “clean price” (net of interest accrued), so that interest accrued on the first coupon must be added to the allocation price to calculate the liquidation of results.

Let us suppose that the investor wishes to participate in the auction of these securities presenting a bid which is equivalent to an annual return of 9%, to find the corresponding clean price formula (2) is applied.

$$P = \left[\frac{4.4084 + 4.084 \left(\frac{1}{0.0455} - \frac{1}{0.0455 * (1.0455)^5} \right) + \frac{VN}{(1.0455)^5}}{[1.0455]^{(161/182)}} \right] - 4.4084 * \frac{21}{182} = \$ 99.273359$$

The investor presents a bid of \$ 99.273359 in his application for each security which he is willing to purchase. Assuming that his bid is allocated, on 11 July the investor will have to pay for each security.

$$\$99.273359 + I^{dev} = \$ 99.273359 + 100 * \left(\frac{21 * 0.0872}{360} \right) = \$ 99.782026$$

In conclusion, it is of paramount importance to carefully consider in advance the price of MBONOS when purchased as long-term fixed-rate instruments, since a change in prevailing market conditions could result in significant losses.

3.3.2. UDIBONOS (OTC)

Description

UDIBONOS are Mexican Federal Government Development Bonds Denominated in Inflation Investment Units (Unidades de Inversión or UDI). These bonds offer a return which protects investors against inflation, paying a return in real terms each semester based on a real fixed interest rate which is determined on the issue date of each security. They are recommended as a medium and long-term asset investment.

UDIBONOS are ideal for institutional investors such as insurance companies, pension and retirement funds, since these securities allow savings growth in real terms for nationals. UDIBONOS are available in the secondary market, which enables their sell prior to maturity.

However, some drawbacks could be highlighted. The nominal return is seasonal, since it depends on non-seasonal adjusted CPI variations; when inflation diminishes, so does the return, therefore it could imply high opportunity costs. Also, as any other long-term instrument, liquidity problems may arise in case of sharp market corrections.

The Banco de México computes the UDI based on the bi-weekly inflation index (released twice a month with

15 days lag). On the 10th and 25th of each month, the Banco de México takes into account the prior 15-day CPI variation and uniformly projects the level of the UDI for the next 15 days (or until the next day of UDI computation).

Contract characteristics

Issuer:	Mexican Federal Government, via the Banco de México
Amount:	Variable issuance, according to a quarterly calendar
Face value:	100 UDIS
Maturity:	They can be issued for any tenor, provided it accounts for 182-day coupons. Current issuances are 3, 5, 10 and 30 years
Ticker symbol:	UDIBONOS are not fungible because they have a different fixed real interest rate. The identification code is a letter "S" followed by a space and then a six-figure maturity date (yy/mm/dd). E.g. a 10-year UDIBONO maturing on June 13, 2019 is: "S190613"
Placement:	Primary auction
Interest payment period:	UDIBONOS pay interest in MXN every six months (182 days)
Interest rate:	Fixed by the federal government upon issuance of the securities and is specified to investors in the primary auction
Return:	The return in domestic currency on the UDIBONOS depends on acquisition price, interest rate (coupon) corresponding to 182 days, value of UDIS and capital gains obtained on the difference between acquisition price and sell price
Amortization:	Single bullet payment on maturity, face value of the securities converted into domestic currency
Conversion to domestic currency:	Placement and payment is in MXN which is converted at the value of the UDI released on the day of payment
Secondary market:	UDIBONOS may be listed in the secondary market at Yield To Maturity (YTM). In trading, the amount is expressed in current pesos, but at settlement the amount is actualized through UDI exchange rate in relation to face value
Bloomberg Tickers:	"MUDI Govt"; "UDI Curncy"
Further references:	http://www.banxico.org.mx/sitioingles/portalesEspecializados/tasasInteres/auctplacesec.html http://www.banxico.org.mx/politica-monetaria-e-inflacion/estadisticas/inflacion/indices-precios.html (for UDI statistics)

Formula (clean price)

$$P = \left[\frac{\left(T_c * \frac{182}{360} \right) * \left(1 + \left(\frac{1}{T_r * \frac{182}{360}} \right) - \left(\frac{1}{(T_r * \frac{182}{360}) * (1 + T_r * \frac{182}{360})^{(c-1)}} \right) + \frac{1}{(1 + T_r * \frac{182}{360})^{(c-1)}} \right)}{\left(1 + T_r * \frac{182}{360} \right)^{\left(\frac{DCV}{PCV} \right)}} \right] * VN$$

where:
 P = price of one UDIBONO in UDIS.
 T_c = coupon rate expressed in annual terms.
 T_r = real YTM expressed in annual terms.
 C = number of coupons left to redeem.
 DCV = days to maturity in current coupon.
 PCV = period of current coupon.
 VN = face value of a UDIBONO.

$$VNA\$n = VN * UDIn$$

where:
 VNA\$_n = face value adjusted in pesos to day "n".
 VN = face value (100 UDIS).
 UDIn = value of the UDI at day "n".
 n = reference day.

Examples

An insurance company wants to purchase a security that provides a return above inflation, and therefore decides to acquire 1,000 UDIBONOS maturing in 1,060 days, with a coupon rate of 7.0%, 6 coupons for redemption, 150 days to redeem the current coupon and a real rate of 7.5%.

We replace the data in previous formula, to calculate the purchase price as follows:

$$P = \left[\frac{\left(7.0\% * \frac{182}{360} \right) * \left(1 + \left(\frac{1}{7.5\% * \frac{182}{360}} \right) - \left(\frac{1}{(7.5\% * \frac{182}{360}) * (1 + 7.5\% * \frac{182}{360})^{(6-1)}} \right) + \frac{1}{(1 + 7.5\% * \frac{182}{360})^{(6-1)}} \right)}{\left(1 + 7.5\% * \frac{182}{360} \right)^{\left(\frac{150}{182} \right)}} \right] * 100$$

Therefore, the price of the UDIBONO is 99.313595 UDIS. The value of the UDI on the date of purchasing the UDIBONO is MXN\$1.552272, so that the price per security is equal to the MXN\$ 154.161713 resulting from multiplying the price of UDIBONO by the value of the UDI (99.313595 UDIS * MXN\$1.552272 per UDI).

The company receives a coupon payment, 150 days later, equal to 5.934143 MXN per security, which is the result of multiplying the face value of the security (100 UDIS) by the 182-day reference rate (7.0%) and then by the value of the UDIS on the coupon redemption date (MXN\$1.676838),

$$(100 * 7.0\% * \frac{182}{360}) * MXN\$1.676838 = MXN\$5.934143$$

After 32 days (878 days prior to maturity of the UDIBONO) with 5 coupons until maturity and 150 days accrued interest on the current coupon, the investor decides to sell the securities at a real rate of 7.5%. Replacing the data in previous formula, the price is 99.517115 UDIS. The value of the UDIS on sell date is MXN\$1.697768, therefore the investor sells each security at MXN\$168.956973, which is the result of multiplying the sell price of the UDIBONO by the value of the UDIS, i.e.

$$P = \left[\frac{\left(7.0\% \cdot \frac{182}{360} \right) \cdot \left(1 + \left(\frac{1}{7.5\% \cdot \frac{182}{360}} - \frac{1}{\left(7.5\% \cdot \frac{182}{360} \right) \cdot \left(1 + 7.5\% \cdot \frac{182}{360} \right)^{(5-1)} + \frac{1}{\left(1 + 7.5\% \cdot \frac{182}{360} \right)^{(5-1)}} \right)}{\left(1 + 7.5\% \cdot \frac{182}{360} \right)^{\left(\frac{150}{182} \right)}} \right] \cdot 100$$

99.517115 * MXN \$ 1.697768 = MXN \$ 168.956973

Summarising, the cash flows are as follows:

1. Purchase of 1,000 UDIBONOS securities: MXN \$ 154.161713 * 1,000 = MXN \$ 154,161.713
2. Coupon payment: MXN \$ 5.934143 * 1,000 = MXN \$ 5,934.140
3. Sell of 1,000 UDIBONOS securities: MXN \$ 168.956973 * 1,000 = MXN \$ 168,956.973

To determine the nominal return on the investment, we need to calculate the internal rate of return (IRR) at 182 days using the flows in the above table. Thus,

$$0 = \text{MXN } \$ 154,161,713 + \frac{\$ 5,934.1}{\left(1 + \frac{TIR \cdot 182}{360} \right)^{\frac{150}{182}}} + \frac{\$ 168,956.973}{\left(1 + \frac{TIR \cdot 182}{360} \right)}$$

Solving for TIR, we obtain a nominal return of 26.76% for 182 days.

To verify that in effect the real rate obtained was 7.5%, we discounted the nominal return, effective inflation as follows:

$$T.\text{real} = \left[\frac{1 + \frac{26.76\% - 182}{360}}{\frac{1.697768}{1.552272}} - 1 \right] \cdot \frac{360}{182} = 7.5\%$$

As verified above, the investor obtained a real return of 7.5% on his investment, the main virtue of the UDIBONOS being that they ensure an above-inflation increase in the investment.

3.3.3. Sovereign Bonds: UMS (OTC)

Description

United Mexican States Sovereign Bonds (UMS) are fixed income instruments issued by the federal government in international capital markets. Each issuance has specific characteristics (term, currency coupons, etc). UMS bonds are preferred by foreign investors over other LatAm issuers due to their investment grade status and liquidity.

Like many countries in Latin America, Mexico issued a sizeable amount of external debt in the 1970s and 1980s. In the wake of the 1982 crisis, several debt restructuring programs had to be undertaken, first through bank loans with more favourable conditions for the country, but with limited access to debt capital markets. This background led to a novel program that replaced bank loans with bond issuances to facilitate the return of capital inflows towards Latin America. This initiative was the brainchild of the then U.S. Secretary of the Treasury, Nicholas Brady, and was widely accepted by debtors and creditors alike, since it generated mutual benefits. Thus began the era of the Brady Bonds. Against this backdrop, it was in March 1990 when Mexico implemented the restructuring agreement

of its external debt with banking creditors, through which a significant portion of the debt was converted into two different components:

1. "Discount" Brady Bonds which offered a 35% discount on their previous face value and a variable interest rate of 0.8125 basis points over LIBOR, revisable every six months and for an amount of USD11,500 million.
2. "Par" Brady Bonds without discount but at a fixed interest rate of 6.25% and for an amount of USD17,900 million.

Both bonds were issued for a 30-year period, maturing on December 31st, 2019. There were two types of guarantee: one on 18 months of interest payments (three coupons), and another guaranteeing the principal covered with USD7,100 million in zero-coupon U.S. Treasury Bonds, also maturing after 30 years. These bonds also provided their holders with "value recovery rights," acting as warrants on the price of Mexican oil in the event that certain levels were exceeded, thus allowing holders to benefit from the increase in oil prices.

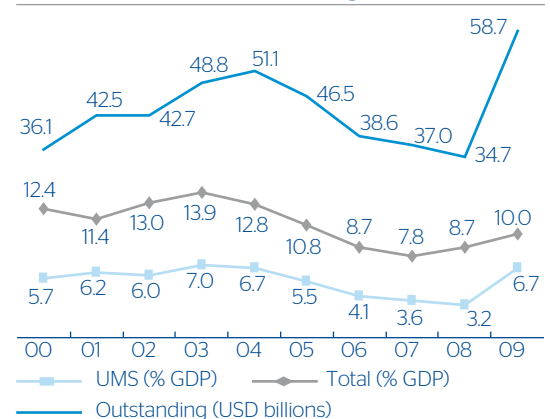
In April 1996, the federal government offered Brady Bond holders the opportunity to exchange these instruments for a new Global Bond maturing in 2026 (known as UMS 26). The UMS bond did not include the collateral guarantee of U.S. treasury bonds, and the Mexican Government assumed all the risk. Therefore, UMS bonds pay a larger coupon than Brady Bonds.

Mexico: Long-Term Foreign Currency Debt

S&P's		Fitch		Moody's	
BBB	dic-09	BBB	nov-09	Baa1	ene-05
BBB+	oct-07	BBB+	sep-07	Baa2	feb-02
BBB	ene-05	BBB	dic-05	Baa3	mar-00
BBB-	feb-02	BBB-	ene-02	Ba1	feb-00
BB+	mar-00	BB+	may-00	Ba1	ago-99
BB	feb-95	BB	abr-00	Ba2	jun-99
BB+	jul-92	BB	ago-95	Ba2	feb-99

Notes: dark blue=down; gray=up; and black=neutral
Source: BBVA Research with Bloomberg

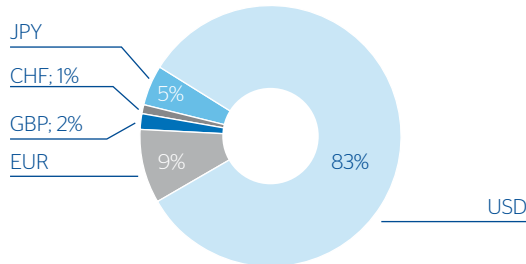
Foreign Public Debt: UMS and Total (% GDP and outstanding)



Source: BBVA Research with SHCP data

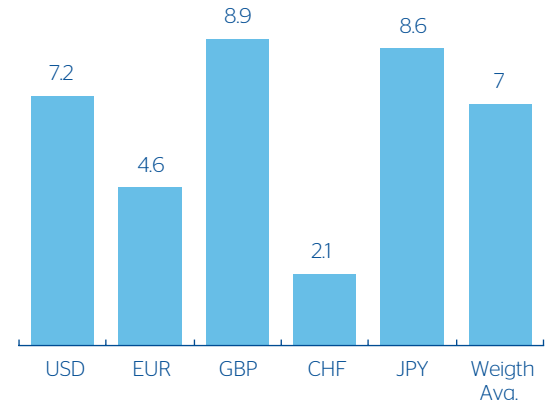
In May and June 2003, the government announced the early amortization of Brady Bonds (USD5 billion), through which the government completely settled its foreign public debt associated with the renegotiation of the 1980s. To finance part of the operation, the federal government placed two global bonds with maturities of 5.5 and 30 years totalling USD2.5 billion and paying coupons of 4.625% and 7.5%, respectively. Furthermore, these issuances included the Collective Action Clauses (CAC), which facilitate the renegotiation process, if necessary.

UMS: Portfolio Diversification by Currency (% total)



Source: BBVA Research with SHCP data

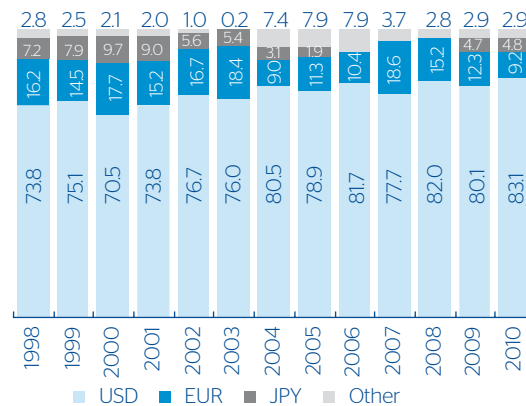
UMS: Portfolio Duration (years)



Source: BBVA Research with SHCP data

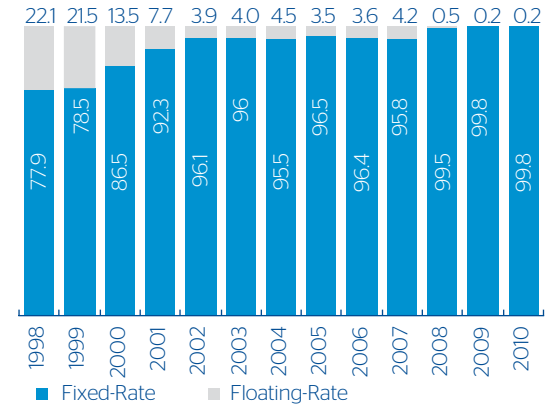
The federal government has changed the profile and composition of its external debt considerably, and has even reduced its total amount via various operations that have enabled the maturity period to be extended, guarantees to be reduced and financing costs to diminish. Consequently, total foreign public debt has been significantly reduced: from 94.8% of GDP in 1980 to 12.2% of GDP (USD78.8 billion) in 2002 and 10% in 2009 (USD96.4 billion). Total outstanding UMS debt stood at 60% of total foreign public debt by the end of 2009.

UMS: Portfolio Diversification by Currency (% total)



Source: BBVA Research with SHCP data

UMS: Portfolio Diversification by Rate (% total)



Source: BBVA Research with SHCP data

UMS characteristics

Guarantee:	Federal government
Amount & currencies:	Variable in US dollars (mainly), Euro, JPY, and other currencies
Placement:	Global markets
Guarantee:	Mexican Federal Government
Maturity:	The yield curve is complete, with maturity periods ranging from six months to 30 years, and they are among the most liquid emerging bonds while their financial characteristics have made it a reference for private debt issuances in foreign currency
Issue price:	The notes may be issued at par, or at a premium over, or discount to, par and either on a fully paid or partially paid basis
Coupon:	Half-yearly or yearly payments based on the US Treasury Bond yield plus a Mexican sovereign risk premium
Yield:	UMS could pay a fixed or floating coupon rate. In the latter case, the base rate could be the CD Rate, Commercial Paper Rate, EURIBOR, LIBOR, Federal Funds Rate, Treasury Rate, or any other
Redemption, repurchase and early repayment:	In some cases, Mexico has the option to redeem or discretionarily repurchase in whole or in part any note under contract terms
Taxes:	Subject to exceptions, Mexico makes all payments on the notes without withholding or deducting any Mexican taxes

Here follows a summary of the UMS issuances outstanding up to July 2010:

Bloomberg Ticker	ISIN	Maturity	Amount Outstanding	Issue date	Year to Maturity	Duration	Coupon
EC503543 Corp	US91086QAH11	14-Jan-12	864,137,000	14-Jan-02	1.49	1.41	7.500
EC816262 Corp	US91086QAK40	16-Jan-13	1,191,414,000	16-Jan-03	2.50	2.33	6.375
EF285422 Corp	US9108M0AB33	15-Feb-13	3,030,000	24-Feb-06	2.58	2.38	5.100
ED177627 Corp	US91086QAQ10	15-Jan-14	1,291,108,000	14-Oct-03	3.50	3.20	5.875
EH722075 Corp	US91086QAX60	17-Feb-14	1,500,000,000	17-Feb-09	3.59	3.20	5.875
EC880518 Corp	US91086QAL23	3-Mar-15	1,343,649,000	3-Mar-03	4.63	3.99	6.625
TT330484 Corp	US593048BA88	15-Sep-16	1,681,197,000	24-Sep-96	6.17	4.72	11.375
EF312914 Corp	US91086QAU22	15-Jan-17	3,500,000,000	10-Mar-06	6.51	5.56	5.625
EH664032 Corp	US91086QAW87	19-Mar-19	3,000,000,000	23-Dec-08	8.69	6.87	5.950
EC366269 Corp	US593048BN00	30-Dec-19	1,352,366,000	30-Mar-01	9.47	7.09	8.125
EI 106006 Corp	US91086QAY44	15-Jan-20	2,000,000,000	15-Jan-10	9.52	7.67	5.125
EC 690671 Corp	US91086QAJ76	24-Sep-22	714,348,000	24-Sep-02	12.22	8.43	8.000
ED301508 Corp	XS0184889490	6-Feb-24	476,526,000	9-Feb-04	13.59	9.12	6.750
TT325005 Corp	US593048AX90	15-May-26	338,580,000	7-May-96	15.87	9.37	11.500
EC434486 Corp	US91086QAG38	15-Aug-31	1,641,047,000	13-Aug-01	21.14	11.48	8.300
EC933575 Corp	US91086QAN88	8-Apr-33	1,105,207,000	11-Apr-03	22.79	12.28	7.500
ED626293 Corp	US91086QAS75	27-Sep-34	3,333,444,000	27-Sep-04	24.27	12.92	6.750
EH154466 Corp	US91086QAV05	11-Jan-40	3,250,000,000	11-Jan-08	29.57	14.65	6.060

3.4. Floating-Rate-Notes (FRN): IPAB Bonds (BPA, BPAT, BPA182)

Description

Bank deposit protection bonds are long-term credit securities paying interest every 28 days (BPAs), 91 days (BPATs) or 182 days (BPA182s). The interest rate for these securities can be adjusted within the same period.

The Institute for Bank Deposit Insurance (IPAB) issues these bonds in order to meet its payment obligations, provide liquidity to its securities, and improve its debt maturity profile. There is a broad-based secondary market for these securities. Today, it is possible to carry out outright sells, repurchase agreements (repos) and securities lending transactions.

Contract characteristics

Issuer:	Institute for Bank Deposit Insurance (IPAB)
Calendar:	The IPAB provides advance notice of its calendar of issuances on a quarterly basis. The Bank of Mexico issues notification of the auction of BPAs and BPATs on the Friday preceding the placement date
Guarantee:	Federal government
Placing agent:	Banco de México
Amount:	Variable
Face value:	MXN100
Maturity:	<ul style="list-style-type: none"> - BPAs can be issued for any term multiple of 28 days (28-day CETES as the coupon reference). So far, only 1- to 3-year maturities have been issued. - BPATs can be issued for any term multiple of 91 days (91-day CETES as the coupon reference). So far, only 5-year (1820-day) maturities have been issued. - BPA182s can be issued for any term multiple of 182 days (182-day CETES as the coupon reference). So far, only 7-year (2548-day) maturities have been issued
Interest rate:	<ul style="list-style-type: none"> - For BPAs, the interest rate is the rate of return on 28-day CETES as determined in a primary auction. - For BPATs, the interest rate is the rate of return on 91-day CETES as determined in a primary auction. Interest is payable every 91 days or during an alternate period in the event of any non-trading days. - For BPA182s, the interest rate is composed of a market reference rate determined at the beginning of each interest period, and an option for protection against inflation
Reference rate:	- The reference rate is the rate of return on 28, 91, and 182-day CETES issue in a primary auction.
Inflation protection:	- Whenever the percentage increase of an inflation-indexed investment unit (UDI) over the interest period is greater than the 182-day CETE return, the security pays the holder the reference rate, plus an inflationary premium (difference between the percentage increase in the UDI value and the reference return).

Continued on next page

Contract characteristics (Continues)

Yield:	The yield is referenced to the face value of the securities and the interest rate accrued on the acquisition value of the securities. When an issuance is purchased at maturity, the return is a capital gain, plus the net interest paid while the security was held. When a transaction is performed prior at maturity, the return is the capital gain between the acquisition price and the sell price, plus the net interest for each of the monthly periods
Interest payment:	<ul style="list-style-type: none"> - BPAs: every 28 days on face value - BPATs: every 91 days on face value - BPA182s: every 182 days on face value
Payment of principal:	At maturity
Placement:	In primary auction (these securities are currently auctioned on Wednesdays)
Deposits under management:	Custody is performed by Indeval, which in turn deposits the securities in the central deposits of the Banco de México
Intermediation:	Banks and brokerage houses
Secondary market:	IPAB bonds may be traded on the secondary market based on their clean price or their yield at maturity
Ticker symbol:	<ul style="list-style-type: none"> - BPAs: "IP" plus six digits for the maturity date: year, month, and day (i.e. "IP110804" for a BPA maturing on 4 August 2011) - BPATs: "IT" plus six digits for the maturity date: year, month, and day (i.e. "IT150702" for a BPAT maturing on 2 July 2015) - BPA182: "IS" plus six digits for the maturity date: year, month, and day (i.e. "IS170629" for a BPA182 maturing on 29 June 2017)
Official reference:	http://www.banxico.org.mx/sitioingles/portalesEspecializados/tasasInteres/auctplacesec.html

Formula for BPAs

$$P=100* \left[\frac{1 - \frac{CT}{CT+ST}}{\left(\frac{(CT+ST)*28}{360} + 1\right)^{(N-1)} + \frac{CT}{CT+ST} + \frac{Tcup*28}{360}} - \frac{Tcup * DTRANcup}{360} \right] \frac{\left(\frac{DFcup}{28}\right)}{\left(\frac{CT+ST*28}{360} + 1\right)}$$

Where:
P= Price of IPAB bond
DFcup= Days left on current coupon
DTRANcup=Days elapsed in coupon period
Tcup= Coupon rate
ST= Premium
CT= Last known rate (CETES 28)
N= Number of coupons to be redeemed

Formula for BPATs

$$P = 100 * \left[\frac{1 - \frac{CT}{CT + ST}}{\left(\frac{(CT + ST) * 91}{360} + 1\right)^{(N-1)} + \frac{CT}{CT + ST} + \frac{Tcup * 91}{360}} - \frac{Tcup * DTRANcup}{360} \right] \frac{\left(\frac{DFcup}{91}\right)}{\left(\frac{CT + ST * 91}{360} + 1\right)}$$

Where:
 P= Price of IPAB bond
 DFcup= Days left on current coupon
 DTRANcup= Days elapsed in coupon period
 Tcup= Coupon rate defined at a weekly auction
 ST= Premium
 CT= Last known rate in the market (91-day CETES)
 N= Number of coupons to be redeemed

Formulas for BPA182s

Protection against Inflation (Pal)

$$Pal = \left[\left(\frac{UDI_{J_{N_j}}}{UDI_{J_1}} - 1 \right) - (CT182_j) \left(\frac{N_j}{360} \right) \right] \frac{360}{N_j}$$

Where:
 UDI_{J_{N_j}}= UDI value corresponding to the payment day of coupon J
 UDI_{J₁}= UDI value corresponding to the first day of coupon J
 N_j= UDI Term of coupon J in days
 CT182_j= 182-day CETE interest rate issued in the primary auction at the beginning of coupon J

$$P = 100 * \left[\frac{1 - \frac{CT}{CT + ST}}{\left(\frac{(CT + ST) * 182}{360} + 1\right)^{(N-1)} + \frac{CT}{CT + ST} + \frac{Tcup * 182}{360}} - \frac{Tcup * DTRANcup}{360} \right] \frac{\left(\frac{DFcup}{182}\right)}{\left(\frac{CT + ST * 182}{360} + 1\right)}$$

Where:
 P= Price of IPAB bond
 DFcup= Days left on current coupon
 DTRANcup= Days elapsed in coupon period
 Tcup= Coupon rate defined at a weekly auction
 ST= Premium
 N= Number of coupons to be redeemed.

$$CT = \max \left\{ CT182_j, \left(\frac{UDI_{J_{N_j}}}{UDI_{J_1}} - 1 \right) \frac{360}{N_j} \right\}$$

Example of BPAs

An investor interested in obtaining a good return without making a directional bet on interest rates wishes to purchase a long-term instrument offering a floating interest rate. The investor therefore decides to invest in BPAs.

The investor decides to acquire, on the secondary market, 1,500 BPA securities with 1,050 days to maturity, trading at a premium of 0.78 percentage points, with coupon revision every 28 days (similar to the way BPATs are calculated, with repricing every 91 days). There are 38 coupons left to redeem and 14 days have elapsed in the current coupon period. There are 14 days to maturity and the rate paid is 6.89% (coupon rate). The last known reference rate is 8.06% (28-day CETES in the primary auction).

Applying the clean price formula, the unit price of the IPAB bonds is obtained as follows:

$$P = 100 * \left[\frac{1 - \frac{8.06\%}{8.06\% + 0.78\%}}{\left(\frac{(8.06\% + 0.78\%) * 28}{360} + 1\right)^{(38-1)} + \frac{8.06\%}{8.06\% + 0.78\%} + \frac{6.89\% * 28}{360}}{\left(\frac{(8.06\% + 0.78\%) * 28}{360} + 1\right)^{\left(\frac{14}{28}\right)}} - \frac{6.89\% * 14}{360} \right]$$

The clean price of each security is as follows:

$$P = 97.9549164 \text{ MXN}$$

This is the price of each IPAB bond, without interest.

This price must be increased by the interest the investor will receive on the next coupon amortization corresponding to the days in which he did not own the securities (accrued interest). The interest on the 14 days is:

$$\text{interest} \left(\frac{6.89\% * 14}{360} \right) * 100 = \$0.267944$$

Consequently, the investor will have to pay, per security:

$$\text{Dirty price} = \text{MXN } \$ 97.9549164 + \text{MXN } \$ 0.267944$$

$$\text{Dirty price} = \text{MXN } \$ 98.222861$$

This is the price payable for each security. Consequently, the total amount payable by the investor for the 1,500 securities is:

$$\text{Total amount payable} = \text{MXN } \$ 98.222861 * 1,500$$

$$\text{Total amount payable} = \text{MXN } \$ 147,334.29$$

This is the amount the investor would pay to acquire 1,500 IPAB bond securities on the secondary market.

Now imagine that 21 days after acquiring the securities, the investor decides to sell 1,000 securities on the secondary market to cover his cash needs. The securities are trading at a premium of 0.67%, and they are due to mature in 1,029 days, with 37 coupons pending amortization. Seven days have elapsed in the current coupon period, and 21 days remain to maturity. The last known reference rate is 8.15% and the current coupon rate is 6.80%. The clean unit sell price of the securities is calculated as follows:

$$P = 100 * \left[\frac{1 - \frac{8.15\%}{8.15\% + 0.67\%}}{\left(\frac{(8.15\% + 0.67\%) * 28}{360} + 1\right)^{(37-1)} + \frac{8.15\%}{8.15\% + 0.67\%} + \frac{6.80\% * 28}{360}}{\left(\frac{(8.15\% + 0.67\%) * 28}{360} + 1\right)^{\left(\frac{21}{28}\right)}} - \frac{6.80\% * 7}{360} \right]$$

The clean unit sell price for each security is = MXN \$ 98.2337132

This price must be increased by the interest from the 7 days of the current coupon during which the investor owned the securities:

$$\text{interest} = \frac{6.80\% * 7}{360} * 100 = \$0.132222$$

Consequently, for each security the investor will receive:

Dirty price = MXN \$ 98.2337132 + MXN \$ 0.132222

Dirty price = MXN \$ 98.3659354

This is the price the investor will receive for each security he sells.

If the investor sells 1,000 of the 1,500 securities owned, he will receive a total of MXN 98,365.93.

This yields a capital gain of MXN \$ 143.074397.

In this case, because of the market conditions, the investor obtained a capital gain. However, depending on the prevailing conditions in the secondary market, there is a risk that investors may either gain or lose on these investments.

4. Interest Rate Derivatives

General Background

The most used derivative instruments in the Mexican money market are Forward Rate agreements (FRA), Interest Rate Swaps (IRS), Futures and Swap Futures referenced to the 28-day Interbank Equilibrium Interest Rate (TIIE), Inflation (UDI), 91-day CETES rate, and MBONOS rates. There are also Cross Currency Basis Swaps (CCBS) which involve the exchange of principal and coupons denominated in different currencies.

The TIIE is the main reference rate in the interbank market. It was introduced in March 1995 with a 28-day tenor and has been computed on a daily basis since March 1996. In January 1997, the 91-day TIIE was introduced and calculated on a daily basis. The 28 and 91-day TIIE are computed using commercial bank quotes for Central Bank resources.

In addition to the TIIE, bank and government funding rates can be used as representative rates for wholesale operations carried out by banks and brokerage firms.

- The Bank funding rate is a weighted-average for one-day repo and one-day outright transactions with bank promissory notes, certificates of deposit, and banker's acceptances settled through the Mexican delivery-versus-payment (DVP) system INDEVAL (securities clearing house).
- The Government funding is a representative interest rate on one day repo transactions with government securities settled through INDEVAL. In a separate calculation, the funding rate for securities with sovereign risk is computed including government securities and BPAs.

For inflation reference instruments, the Unidad de Inversión (Investment Unit) or UDI is used. UDI was introduced in Mexico in 1995 as a price-level-adjusting unit of account of real constant value (which eliminates the inflation effect). UDIs are numerical units of measurement for credit instruments, trading contracts, and other financial operations. The value of the UDI changes every day and is calculated based on the inflation information from the previous two weeks, which is calculated and published by the Banco de México (see chapter 3.3.2 for details).

4.1. Interest Rate Swaps: TIIE IRS (OTC)

An Interest Rate Swap (IRS) is the agreement between two parties to exchange the cash flows of fixed-interest payments for floating interest rate related to a notional amount. IRS hedges against uncertain movements in interest rates in order to fix the cost of funding, to guarantee a portfolio return, or to speculate on interest rate trends. Mexican IRS trade according to the number of coupons or interest rate revisions every 28 days during 3, 6, and 9 month, as well as 1, 2 and up to 20 years. The nomenclature commonly used is the number of coupons followed by "x1" ("times one"). Thus, in the market they range from 3x1, 6x1, 9x1, 13x1, and so on until 260x1. The stream exchange is the payment of a fixed interest rate for floating rate referenced to the 28-day TIIE.

Two types of operation may be performed in this market:

- "Pay" fixed interest rate and "Receive" floating interest rate (buy the Swap).
- "Pay" floating interest rate and "Receive" fixed interest rate (sell the Swap).

Analysis

"Pay Fixed", "receive floating"

Materialises the view that rates will rise, and the floating rate will therefore exceed the current fixed rate in the future.

"Pay Floating", "Receive Fixed"

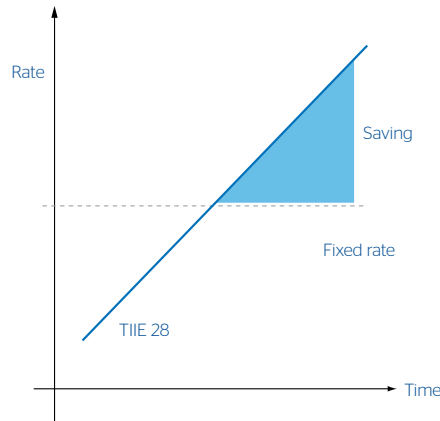
Materialises the view that interest rates will fall, and the floating rate will therefore fall short of the current fixed rate in the future.

Example

Floating for Fixed IRS

A company pays 28-day TIIE on a loan, for a period of 1 year (i.e. 13 coupons, each 28 days). The customer expects 28-day TIIE to rise, and decides to hedge this risk by entering into a 13X1 IRS (thirteen coupons: approximately 12 months).

Customer Expectations



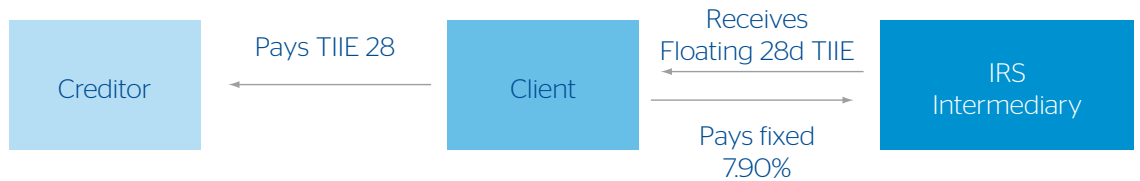
Source: BBVA Research México

Customer Expectations

- Notional: We assume that it is equal to the loan amount.
- The current 28 days TIIE is 7.55%
- The purchase and sale of an IRS 13x1 in the market is: BID (pays) 7.50% - OFFER (receives) 7.90%, i.e., the market is willing to pay 7.50% every 28 days in exchange for receiving 28 days TIIE with the same frequency, or, in the event, to receive flows calculated at a rate of 7.90% in exchange for paying at the rate of 28 days TIIE.

In line with its expectations and preferences, the company prefers to pay 7.90% in a fixed stream rather than the 28 days TIIE rate, so that in each and every one of the 13 coupons of 28 days, he will pay 7.90% and receive the 28 days TIIE. For the first coupon, the customer will receive the current day's TIIE of 7.55% in 28 days (which will offset the loan payments) and in turn the customer will pay the Swap seller 7.90%.

Floating for Fixed IRS



Source: BBVA Research México

Without this agreement, the client would have paid 28-day TIIE:	7.5500%
With this hedge, the client pays:	7.9000%
Additional payment:	-0.3500%

After 28 days, in the revision of the 28d TIIE rate, the latter increased as the company had expected and is at levels

of 9.3650%. However, due to the hedging, the customer will only have to pay what he originally envisaged (7.90%) and there will therefore be a difference in his favour:

Without coverage, the client would have paid 28 days TIIE:	9.3650%
With coverage, the client is paying	7.9000%
Saving (+) or additional payment (-) (difference):	+ 1.4650%

On this occasion, the 28 days TIIE performed in line with the client's expectations; hence he is saving 1.4650% of annual interest rate for a period of 28 days on the amount contracted. In the opposite scenario (a decline of 28d TIIE over time), the client has the advantage of dispelling the uncertainty on his future interest payments and cash flow budget.

Following the example, a hypothetical performance of the 28 days TIIE agreement is detailed below. Let us assume that the customer agrees the IRS rate on January 22, when the 28 days TIIE was at 7.55% and agrees to a level of 7.90%, so that as the 28-day periods elapse the 28 days TIIE level is recorded.

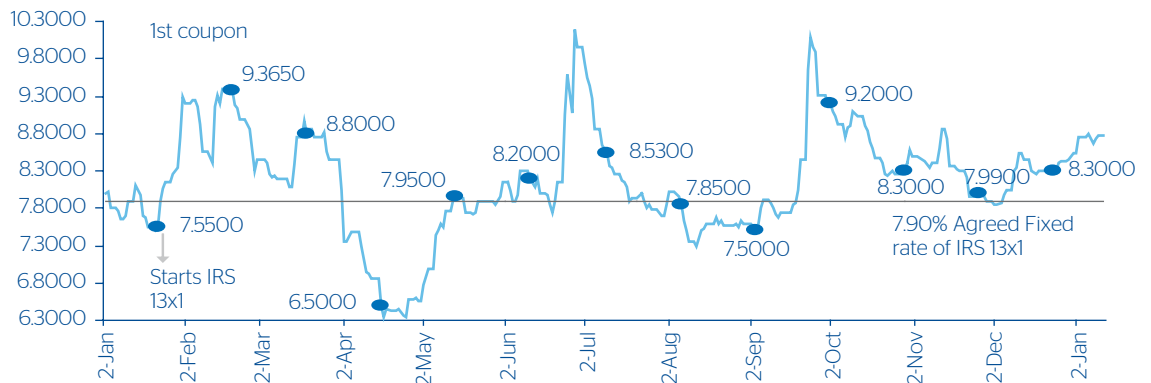
Savings or Payments of the 28 days TIIE agreement

	1st coupon	2nd coupon	3rd coupon	4th coupon
TIIE 28:	7.55%	9.3650%	8.80%	6.50%
With coverage	7.90%	7.90%	7.90%	7.90%
Saving (+) or additional payment (-):	-0.35%	1.4650%	0.90%	-1.40%
	5th coupon	6th coupon	7th coupon	8th coupon
TIIE 28:	7.95%	8.20%	8.53%	7.85%
With coverage	7.90%	7.90%	7.90%	7.90%
Saving (+) or additional payment (-):	0.05%	0.30%	0.63%	-0.05%
	9th coupon	10th coupon	11th coupon	12th coupon
TIIE 28:	7.50%	9.20%	8.30%	7.99%
With coverage	7.90%	7.90%	7.90%	7.90%
Saving (+) or additional payment (-):	-0.40%	1.30%	0.40%	0.09%
	13th coupon			
TIIE 28:	8.30%			
With coverage	7.90%			
Saving (+) or additional payment (-):	0.40%			

Source: BBVA Research México

In this example, customer expectations were met on 9 out of 13 revisions, and they therefore would have obtained profits by using interest rate swaps.

28d TIIE performance over agreement life



Source: BBVA Research México and BBVA Bancomer

4.2. Cross Currency Swaps (OTC): TIE-Libor, UDI-TIE, and UDI-Libor

Definition

Cross currency swaps (CCS) involve the exchange of a series of cash flows in one currency, for a series of payments in another currency. The conditions and frequency of swap payments are agreed in advance by the parties. The CCS may be set at a fixed rate for fixed rate, fixed for floating (and vice-versa) or floating for floating. In recent years, there has been increasing demand for this type of operation. They allow the substitution of debt flows (principal and/or interest payments) from one currency to another and even from one interest rate type to another (fixed for floating and vice-versa). This type of swaps are generally transacted OTC (over the counter), i.e. between counterparties, since they are contracts tailored to customers' requirements. When CCS are traded, the buyer and seller agree on the "reference amount", the "number of coupons", the "maturity date" of the operation, Notional amounts, exchanges of the principal, amortizations (where applicable), etc.

There is a relatively standardized OTC market for USD/MXN cross currency swaps. There is high liquidity and fairly competitive quotes for constant maturities that range from 3months to 30yrs.

General characteristics

Participants:	Mexicans or foreign nationals
Reference amount:	Variable, agreed by the parties
Trading hours:	07:30 AM to 2 PM (GMT -6:00)
Period:	Variable, established in line with customer needs.
	Principal is usually exchanged at inception and at maturity at spot rate
Exchange rate	USD and MXN
Rate:	Fixed and/or floating, any combination

The most liquid maturities

Instrument	TERM	Days to maturity	Instrument details:	MXN leg	USD leg
3x1	3 Month	84		TIIE28	LIBOR1M
6x1	6 Month	168	Index	28 day roll	28 day roll
9x1	9 Month	252	Coupon	ACT/360	ACT/360
13x1	1 Year	364	Rate convention	MEX + NY	MEX + NY
26x1	2 Year	728	Holidays	Following	Following
39x1	3 Year	1092	Holiday convention	YES	YES
52x1	4 Year	1456	Initial & Final exchange		
65x1	5 Year	1820			
91x1	7 Year	2548			
130x1	10 Year	3640			
195x1	15 Year	5460			
260x1	20 Year	7280			
360x1	30 Year	36400			

Source: BBVA Research

Types of operation

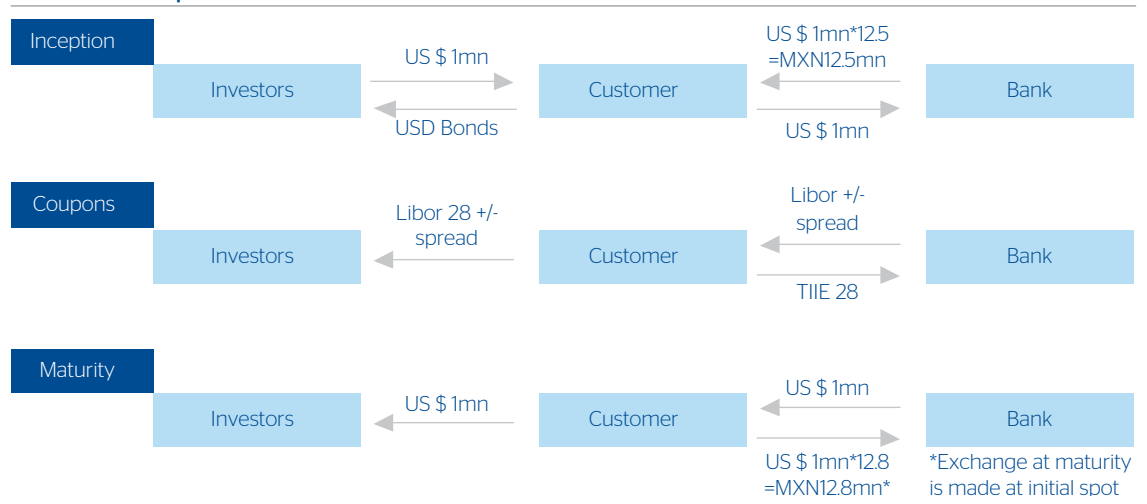
a) TIIE - Libor Swaps

A cross currency basis swap involves an exchange of floating rates in both USD (Libor) and MXN (TIIE). The quotation represents the basis points that are used as spread over Libor as equivalent to TIIE. Coupons are paid every 28 days, ACT/360, and are physically exchanged. Maturities go up to 30 years.

Example:

A customer issues 1Y debt denominated in USD at Libor. The customer's functional currency is the MXN, and he therefore wishes to transform this liability into MXN, thus hedging against exchange risk. The operation is structured as follows:

TIIE-Libor Swaps



Source: BBVA Research México

b) Inflation Swaps

The Mexican inflation swap market offers two types of instruments: first inflation index swapped for 28-day TIIE; and second, inflation index swapped for Libor6m. These instruments offer great opportunities to engage in Mexican inflation bets, breakeven inflation bets, arbitrage between funding sources (issuing inflation indexed debt and swapping it to nominal rate debt), and a hedge for UDIBONOS. For a detailed determination of the UDI see chapter 3.3.2.

UDI - Libor Swaps

This structure involves an exchange of USD floating rates for MXN real rates (fixed rate plus inflation). The quotation represents the fixed rate that is paid in MXN adjusted for UDI. Coupons are paid semi-annually, convention is ACT/360 for both legs, and payments are physically exchanged. Maturities go up to 20 years.

The Most Liquid Maturities

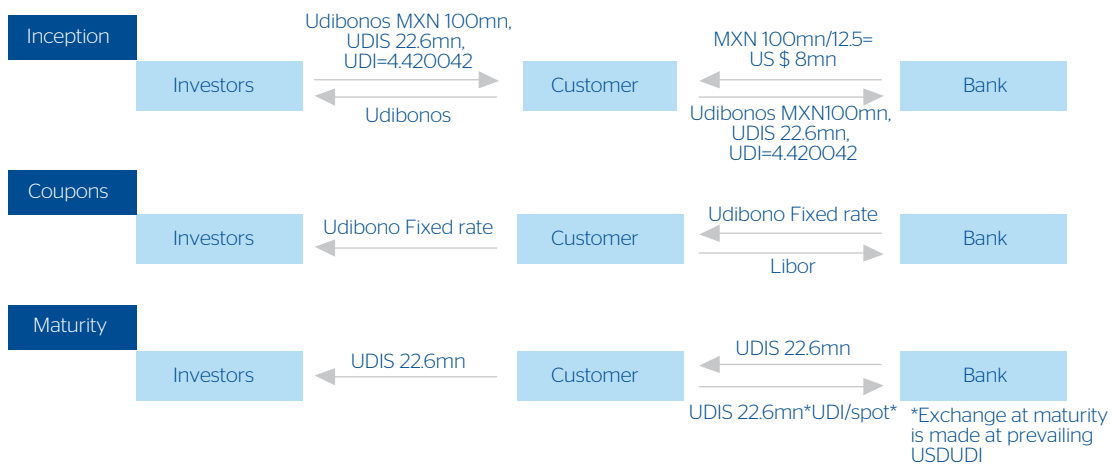
UDI/LIBOR				
Term	Days to Maturity	Instruments details:		
1 Year	360		UDI leg	USD leg
3 Year	1080	Index	Fixed real rate	LIBOR 6M
5 Year	1800	Fixing date	N/A	T-2
7 Year	2520	Coupon	SEMI ANNUAL	SEMI ANNUAL
10 Year	3600	Rate Convention	ACT/360	ACT/360
15 Year	5400	Holiday	MEX DF + NY	MEX DF + NY
20 Year	7200	Holiday convention	Modfol	Modfol
		Initial exchange	YES	YES
		Final exchange	YES	YES

Source: BBVA Research México

Example:

A multinational corporate issues real rate bonds in Mexico (Udibonos), however, given that most of its revenues are denominated in USD, management decides to swap into USD. The operation is structured as follows.

UDI-Libor Swaps



Source: BBVA Research México

UDI - TIIE Swaps

UDI-TIIE involves an exchange of MXN for UDI denominated debt (i.e. nominal floating rate for real fixed rate). The quotation represents the fixed rate that is paid in MXN adjusted for UDI for nominal floating TIIE. Coupons are paid semi-annually, convention is ACT/360 for both legs, and payments are physically exchanged. Maturity period is up to 20 years.

The Most Liquid Maturities

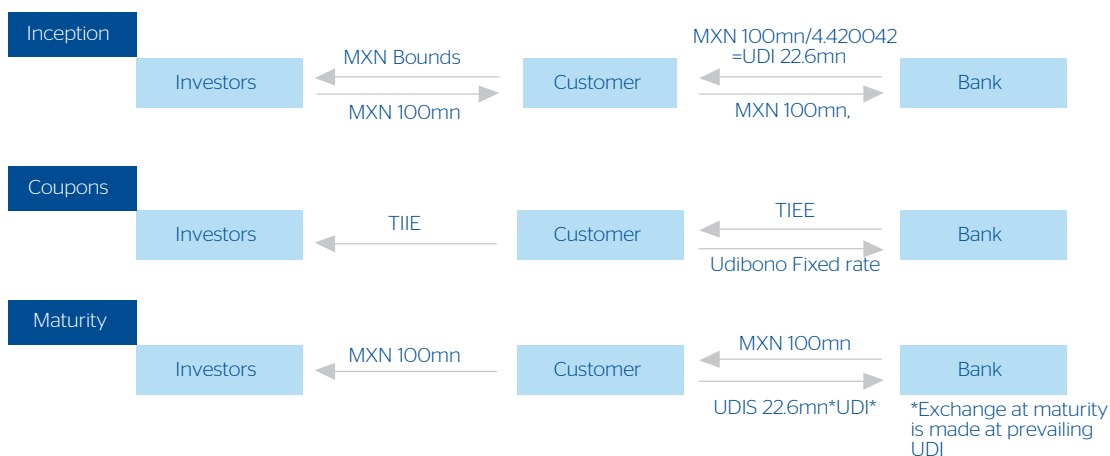
UDI/TIIE				
Term	Days to Maturity	Instruments details:		
1 Year	364		UDI leg	MXN leg
3 Year	728	Index	Fixed real rate	TIIE
5 Year	1820	Fixing date	N/A	T-1
7 Year	2548	Coupon	182 day roll	28 dat roll
10 Year	3640	Rate Convention	ACT/360	ACT/360
15 Year	5460	Holiday	MEX DF	MEX DF
20 Year	7280	Holiday convention	Following	Following
		Initial exchange	NO	NO
		Final exchange	YES	YES

Source: BBVA Research México

Example:

A customer wishes to exchange his nominal debt to real rates as his inflation expectations are lower than those implied in the UDIBONOS curve. The operation is structured as follows.

UDI-TIIE Swaps



Source: BBVA Research México

c) Asset Swap (combination of instruments)

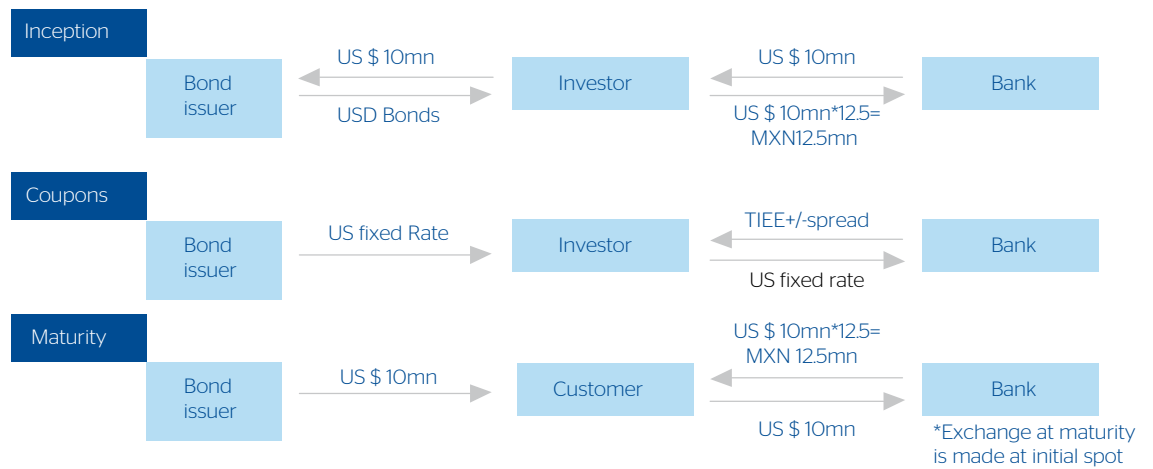
An asset swap involves the same mechanic of a plain vanilla swap with the difference that the underlying of the contract is an asset rather than a liability. In this sense, a buyer of a debt security could exchange it for a synthetic one with different characteristics (i.e. fixed for floating rate and/or USD for MXN) with the objective of

either enhancing yield (i.e. by taking advantage of an arbitrage opportunity) or creating a set of cash flows that could be unavailable directly in local markets. In Mexico, investors usually buy USD bonds and exchange them for MXN securities.

Example:

A customer owns a bond in USD at a fixed interest rate and he expects the peso to appreciate, thus decreasing his return. The customer might make the strategic decision to hedge the exchange risk by swapping his dollar-denominated debt into pesos either at a fixed or floating interest rate.

Asset Swap



Source: BBVA Research México

4.3. Interest Rate Futures and Bond Futures

Description

Interest Rate Futures are instruments traded on the Mexican Derivatives Exchange (MEXDER) to hedge against adverse variations in the money and bond market. This is done to protect investments, to set a debt cost, or to dispel uncertainty. Currently, interest rate futures operated on the MEXDER are the 91-day CETES, 28-day TIEE and the 3, 10 and 20-year fixed-rate MBONOS (called M3, M10 and M20).

MEXDER is the local derivatives exchange, where standardised contracts are negotiated. However, derivatives may be traded outside this market, in "Over-The-Counter" (OTC) operations, under more flexible terms of volume and maturity in order to fulfil the needs of each customer. It is worth noting that "tailor-made contracts" have higher credit risk, since compliance largely depends on the counterparty's solvency. This is one of the main differences with organised markets, such as the MEXDER, which employ the services of a clearing house (ASIGNA in the case of MEXDER), thus minimising credit risk.

Types of operation: When performing futures operations on 91-day CETES, 28 day TIEE or 3, 10 and 20-year MBONOS, the buyer and seller will swap whole multiples of standardised contracts in terms of amount, currency, maturity date and interest rate when payment is performed in kind or by differences in market price and the agreed price.

4.3.1. 91-day CETES Futures (MEXDER)

Contract characteristics

MEXDER	
Underlying security:	91-day CETES
Contract size:	1,000,000 MXN (10,000 CETES)
Delivery months:	Monthly cycle for up to twelve months and quarterly cycle for up to 24 cycles (seven years). MEXDER is able to open different series in line with market demand.
Ticker symbol:	CE91 plus two letters for the month and two numbers for year of maturity (i.e. CE91 JN10, June 2010)
Quotation:	Rate of annualized yield expressed to two decimal places.
Minimum fluctuation (Tick):	One basis point (0.01%) also called PUJA
Trading hours:	07:30 to 14:15 hours Mexico City time (GMT -06:00)
Last trading day and maturity date:	The day of the primary auction of the week of the third Wednesday of the month of maturity.
Settlement date:	Next business day after maturity date.
Interest rate or price agreed:	Agreed by the parties. Said interest rate of return must be expressed as an annual percentage on the basis of 360 days.
Delivery Method:	By cash differences between the primary CETES 91 rate on the last day of trading and the price agreed.
Daily Settlement:	
Initial margin:	It is the amount deposited by the customer in the clearing house (ASIGNA) at the time of executing the first order. The aim is to guarantee coverage of the variation margins while positions remain open.
Maintenance margin:	It is the minimum amount per contract which the customer must keep in the clearing house for open positions. MXN and CETES are accepted as collateral (ensuring a maturity of less than one year).
Variation margins:	These are the debits and credits which the clearing house applies to the customer's account in order to reflect the daily gain and/or loss resulting from revaluing his contracts. Where the maintenance margin is lower than the required amount, the clearing house will "call for margin" to the investor. The customer may withdraw any surplus in the opposite situation ("margin withdrawals").
Bloomberg Tickers:	"MMDD <GO>" for MEXDER page, "MMDF <GO>" for MEXDER Future Contracts.
Further references:	http://www.mexder.com.mx/MEX/home_ingles.html

Source: BBVA Research México

Formula and examples (See section 4.3.2.)

4.3.2. 28-day TIIE Futures (MEXDER)

Contract characteristics

MEXDER	
Underlying security:	28-day TIIE calculated by Banco de México
Contract size:	MXN \$ 100,000
Delivery months:	Monthly cycle for up to five years (120 months). MEXDER is able to open different series for negotiation in line with market demand.
Ticker symbol:	"TE28" plus two letters for the maturity month (EN, FB, MR, AB, MY, JN, JL, AG, SP, OC, NV, DC) and two last digits of the maturity year (i.e.: "TE28 JN06" for June 2006).
Quotation:	The future rate is the annualized percentage rate of return, expressed in two decimals.
Minimum fluctuation (Tick):	One basis point (0.01%) also called PUJA
Trading hours:	07:30 to 14:15 hours Mexico City time (GMT -06:00)
Last trading day and maturity date:	The next business day before the primary auction on the third Wednesday of the maturity month.
Settlement day:	Next business day after maturity date.
Interest rate or price agreed:	Agreed by the parties. Said interest rate of return must be expressed as an annual percentage on the basis of 360 days.
Delivery Method:	By cash differences between the TIIE rate on the last trading day and the price agreed.
Daily Settlement:	
Initial margin:	It is the amount deposited by the customer in the Clearing House (ASIGNA) at the time of executing the first order. The aim is to guarantee coverage of the variation margins while positions remain open.
Maintenance margin:	It is the minimum amount per contract which the customer must keep in the Clearing House for open positions. MXN pesos and CETES are accepted as collateral (ensuring a maturity less than one year).
Variation margins:	These are the debits and credits which the Clearing House applies to the customer's account in order to reflect the daily gain and/or loss resulting from revaluing his contracts. Where the maintenance margin is lower than the required amount, the Clearing House will "call for margin" to the investor. The customer may withdraw any surplus in the opposite situation ("margin withdrawals").
Bloomberg Tickers:	"MMDD <GO>" for MEXDER page, "MMDF <GO>" for MEXDER Future Contracts.
Further references:	http://www.mexder.com.mx/MEX/home_ingles.html

Source: BBVA Research México

Formula and examples (91-day CETES and 28-day TIIE futures)

Interest rate futures contracts are classified based on the rights and obligations conferred upon participants in:

a. Buying interest rate futures

- The buyer will be entitled to receive from the seller, in the event that the “current” interest rate on that day is lower than the “agreed” interest rate, an amount in Mexican pesos for the contract equal to the amount resulting from multiplying the “reference amount” by formula (1).
- The buyer will be obliged to pay the seller, in the event that the “current” interest rate on that day is higher than the “agreed” interest rate, an amount in Mexican pesos by contract equal to the amount resulting from multiplying the “reference amount” by formula (2).

b. Selling interest rate futures

- The buyer will be entitled to receive from the seller, in the event that the “current” interest rate on that day is higher than the “agreed” interest rate, an amount in Mexican pesos by contract equal to the amount resulting from multiplying the “reference amount” by formula (2)
- The buyer will be obliged to pay the seller, in the event that the “actual” interest rate on that day is lower than the “agreed” interest rate, an amount in Mexican pesos for the contract equal to the amount resulting from multiplying the “reference amount” by formula (1)

To reduce risk over time, derivatives exchanges (MEXDER) perform daily settlement (“margin calls”) where the comparison is made between the closing rate on a particular day and the closing rate on the previous day, while the customer maintains his futures contract.

The sum of these daily margins is equal to the amount of settlement on maturity calculated based on the following formula:

$$\left[\frac{(r^a - r^{fix}) * n / 36000}{1 + r^{fix} * n / 36000} \right] \quad (1) \qquad \left[\frac{(r^{fix} - r^a) * n / 36000}{1 + r^{fix} * n / 36000} \right] \quad (2)$$

Where:
 r^a = agreed interest rate.
 r^{fix} = actual interest rate of 91-day CETES or 28-day TIIE, where applicable.
 n = period of CETES (91 days) or TIIE (28 days), where applicable.

Examples

These examples are used in the OTC interest rate futures market and may also be applicable conceptually for MEXDER contracts. Clearing is performed daily.

Buying interest rate futures

An investor is uncertain about how to reinvest a surplus of MXN\$2,000,000, in view of the possibility of an interest rate cut. He therefore decides to acquire a futures purchase contract for 91-day CETES in the MEXDER, maturing in 25 days at an interest rate of 7.80%.

The bank charges the investor a commission for entering into the futures contract. The clearing house (ASIGNA) asks the investor to deposit MXN\$10,000.00 as an initial margin, in order to guarantee coverage of the variation margins¹.

As the customer expected, when the contract matured, interest rates had been cut. The weighted interest rate on 91-day CETES in primary auction was 7.50%, so the investor receives compensation for the reduction in return.

¹ These figures assume that there is no great volatility in interest rates and therefore additional margin calls are not required during the operation, which would imply higher cost or higher profit.

The present difference between the interest generated by MXN\$2,000,000 at the agreed rate of 7.80% and the published 91-day CETES rate of 7.50% is calculated as follows:

$$2,000,000 * \left[\frac{(7.80 - 7.50) * \frac{91}{36000}}{1 + 7.50 * \frac{91}{3600}} \right] = \text{MXN\$1,488.45pesos}$$

The customer will therefore purchase CETES at 7.50% but will obtain the hedged interest rate of 7.80% as follows:

Desired initial investment:	MXN\$ 2,000,000.00
(+) Compensation received in futures contract:	MXN\$ 1,488.44
(=) Total to be invested in 91-day CETES at 7.50%	MXN\$ 2,001,448.45

$$2'001,448.44 * \left(1 + \frac{7.50 * 91}{36000} \right) =$$

Future value of the investment:	MXN\$ 2,039,392.56
----------------------------------------	---------------------------

$$\left(\frac{2,039,392.56}{2'000,000} - 1 \right) * \left(\frac{360}{91} \right) =$$

Rate of return	7.8%
-----------------------	-------------

The customer receives the initial margin (MXN\$ 10,000.00), which he deposited at the outset of the contract in order to guarantee coverage of variation margins, plus the interest generated from the clearing house (ASIGNA) when the contract matures. The interest rate paid by the clearing house (ASIGNA) was 4% annually for the 25 days of the contract's duration, so that the investor receives on maturity:

$$10,000 * \left(1 + \frac{4% * 25}{360} \right) = \text{MXN\$10,027.78}$$

As shown previously, the customer ensured in advance an interest rate of 7.80% at 91 days. However, the opposite could happen: namely an increase in interest rates. In this case the investor will receive a higher-than-expected rate of return on his savings, but he will have to pay the difference for purchasing the future option to obtain the agreed interest rate of 7.80%. He will thus obtain the return initially envisaged and will not receive any surprises with respect to his original plans.

Selling interest rate futures

A company expects interest rates to rise, and therefore decides to determine in advance the cost of a loan amounting to MXN\$ 6,000,000 for a period of 28 days which it will request in 25 days. It therefore sells 28-day TIE futures on the MEXDER, which mature in 25 days at an interest rate of 8.14%.

The clearing house (ASIGNA) asks the company to deposit MXN\$ 10,000.00 as an initial margin, in order to guarantee coverage of variation margins².

As the customer expected, when the contract matured interest rates had risen. The TIE interest rate at 28 days published by Bank of Mexico on the contract's maturity date was 8.40%, and the company therefore receives compensation for the increase in return. The present difference between the interest generated by MXN\$ 6,000,000 at the published TIE of 8.40% and the agreed rate of 8.14% is calculated as follows:

$$6,000,000 * \left[\frac{(8.40 - 8.14) * \frac{28}{3600}}{1 + 8.40 * \frac{28}{3600}} \right] = \text{MXN\$1,205.45pesos}$$

That is to say, the company will pay its loan at the new current interest rate (8.40%) but will receive the

² These figures assume that there is no great volatility in interest rates and therefore additional margin calls are not required during the operation, which would imply higher cost or higher profit.

aforementioned compensation, enabling it to reduce the cost of its financing and only disburse the amount initially agreed. In other words, its cost will be only the hedged interest rate of 8.14%, which was the rate initially envisaged.

Capital + interest payable on loan maturity at market rate (8.40%):

$$6,000,000.00 * \left(\frac{1 + 8.40 * 28}{36000} \right) = \text{MXN\$}6'039,199.99$$

(-) compensation received on futures contract: -MXN\$6,039,199.99

(=) Total amount payable: MXN\$6,037,994.54

Cost of financing using ensured rate (TIIE 28 future):

$$\left(\frac{6,037,994.54}{6,000,000.00} - 1 \right) * \left(\frac{360}{28} \right) = 8.14\%$$

The company receives, the initial margin (MXN\$10,000.00) which it deposited at the outset of the contract in order to guarantee coverage of the variation margins, plus the interest generated, from the clearing house (ASIGNA) when the contract matures. The interest rate paid by ASIGNA was 4% for the 25 days of the contract's duration, and on maturity the company therefore receives:

$$10,000 * \left(1 + \frac{4\% * 25}{360} \right) = \text{MXN\$}10,027.77$$

As shown previously, the company ensured in advance an interest rate of 8.14% at 28 days. However, the opposite might have happened: namely a fall in interest rates. In this case, the company would pay off the loan at a lower-than-expected rate, but would have to pay the difference for the future's purchase in order to obtain the 8.14% rate originally agreed. There are therefore no surprises with respect to what was initially envisaged.

4.3.3. MBONO Futures: 3, 10 and 20-year (MEXDER)

Contract characteristics

Underlying security:	<ul style="list-style-type: none"> - M3: 3-Year Fixed Interest Rate Government Development Bonds (3-year Bond) - M10: 10-Year Fixed Interest Rate Government Development Bonds (10-year Bond) - M20: 20-Year Fixed Interest Rate Government Development Bonds (20-year Bond)
Deliverable BONDS:	<p>Fixed Interest Rate Government Development Bonds, which throughout the delivery period have a term of maturity of:</p> <ul style="list-style-type: none"> - M3: No less than 2 years (728 days) and no more than 3 years six months (1,274 days). - M10: No less than 7 years (2,730 days) and no more than 12 years (4,550 days). - M20: No less than 17 years (6,188 days) and no more than 22 years (8,008 days). - Physical delivery. Cheapest to deliver.
Contract size:	1,000 Bonds, equivalent to 100,000.00 MXN (one hundred thousand Mexican pesos 00/100)

Continued on next page

Contract characteristics (Continues)

Delivery months:	Quarterly cycle for up to 12 cycles (3 years)
Ticker symbol:	<ul style="list-style-type: none"> - “M3” plus two letters for the maturity month and two last digits of the maturity year; e.g., “M3 DC10” (for December 2010). - “M10” plus two letters for the maturity month and two last digits of the maturity year; e.g., “M10 JN10” (for June 2010). - “M20” plus two letters for the maturity month and two last digits of the maturity year; e.g., “M20 SP10” (for September 2010).
Quotation:	Mexican pesos.
Minimum fluctuation (Tick):	0.025 MXN
Trading hours:	7:30 a.m. to 2:15 p.m. Mexico City time (GMT -06:00)
Last day of trading and maturity date:	The last trading day will be the third business day before the date of maturity of the series. The maturity date will be the last business day of the month of maturity of the series.
Settlement day:	In kind settlement according to the General Conditions for Futures Contracts.
Daily Settlement:	
Initial margin:	Amount that the customer must deposit with ASIGNA when executing the first order. The aim is to guarantee coverage of variation margins while positions are open.
Maintenance margin:	The minimum amount per contract that the customer must keep in the account with ASIGNA for open positions.
Variation margins:	Refers to the debits and credits that ASIGNA applies to the customer’s account to reflect the daily gain and/or loss resulting from the daily revaluation of contracts. “Margin calls” and “margin withdrawals” will take place relative to maintenance margin.
Bloomberg Tickers:	“MMDD <GO>” for MEXDER page, “MMDF <GO>” for MEXDER Future Contracts “MAA <CMDTY> CT” for 3-year MBONO; “DWA <CMDTY> CT” for 10-year MBONO; and “VYBA <CMDTY> CT” for 20-year MBONO
Further references:	http://www.mexder.com.mx/MEX/home_ingles.html

Formula

The daily settlement price is estimated with the CETES yield curve using the following formulas:

$$F(t) = P(t) \left[1 + r_M \left(\frac{M-t}{360} \right) \right]$$

Where:

F(t): Price of the bond future contract.

P(t): Price of the bond on day t.

r_M: Rate of yield on Mexican Treasury Bills (CETES) observed on day t, for the maturity term of the futures, derived from the CETES yield curve supplied by the price vendor.

M-t: Number of days to maturity of the future contract.

Settlement price at maturity = daily settlement price X conversion factor + accrued interest

$$Conversion\ factor = \left[\frac{\left[C + C \left(\frac{1}{r} - \frac{1}{r(1+r)^{(s-1)}} \right) + \frac{VN}{(1+r)^{(s-1)}} \right]}{(1+r)^{\left(1 - \frac{d}{182}\right)}} \right] - C \left(\frac{d}{182} \right) / 100$$

Where:
 VN= Face value of the bond.
 S= Number of coupons to be settled.
 C= Coupon value.
 r= Interest rate used to discount the flows that must be settled
 d= Number of days elapsed on current coupon

Examples

An investor decides to purchase 1,000 M3 BONO futures contracts (1,000 MBONOS per contract) on MEXDER that will mature in 71 days. The minimum initial contribution deposited by the investor in ASIGNA is MXN\$2,200,000 (MXN\$2,200 per contract). Given this situation, there are 4 bonds on the market that meet the bond basket conditions (bonds with maturities between 728 and 1,274 days). The market data is as follows:

MBono Futures

	BOND 1	BOND 2	BOND 3	BOND 4	
Coupon rate		9%	13.50%	10.50%	9.50%
Days to maturity		800	863	1038	1234
Return rate		6.80%	6.37%	6.53%	6.61%
Clean price	MXN\$104.4483	MXN\$115.5989	MXN\$110.2624	MXN\$108.7214	
Clean price at maturity	MXN\$103.76	MXN\$114.1261	MXN\$109.3253	MXN\$107.9606	
Conversion factor	0.947455	1.027802	0.966075	0.93432	
Settlement price at maturity	MXN\$109.5145	MXN\$111.0390	MXN\$113.1644	MXN\$115.5500	

Source: BBVA Research México

The funding rate in the market is 5%. Given these market conditions, the future price is 109.5145 MXN for Bond 1, which is the cheapest to deliver. The following are two contract maturity rate scenarios:

Scenario 1

The bond's return rate increases by 100 basis points. The calculations would be as follows:

MBono Futures

	BOND 1	BOND 2	BOND 3	BOND 4	
Coupon rate		9%	13.50%	10.50%	9.50%
Days to maturity		729	792	967	1,163
Yield		7.80%	7.37%	7.53%	7.61%
Clean price	MXN\$102.2074	MXN\$112.2122	MXN\$107.0801	MXN\$105.3018	
Clean price on maturity	MXN\$102.1878	MXN\$112.1961	MXN\$107.0630	MXN\$105.2840	
Conversion factor	0.947455	1.027802	0.966075	0.93432	
Settlement price on maturity	MXN\$107.8551	MXN\$109.1612	MXN\$110.8227	MXN\$112.6852	

Source: BBVA Research México

The funding rate in the market is 6%. Given these final conditions, the investor receives Bond 1 (cheapest to deliver), and will therefore incur a loss. The results are as follows: 1,000,000*(107.8551-109.5145)=MXN\$1,659,400.

Scenario 2

The bond's return rate decreases by 100 basis points. The calculations would be as follows:

MBono Futures

	BOND 1	BOND 2	BOND 3	BOND 4	
Coupon rate		9%	13.50%	10.50%	9.50%
Days to maturity		729	792	967	1,163
Yield		5.80%	5.37%	5.53%	5.61%
Clean price	MXN\$106.0306	MXN\$116.6369	MXN\$112.2319	MXN\$111.3318	
Clean price on maturity	MXN\$106.0043	MXN\$116.6151	MXN\$112.2085	MXN\$111.3075	
Conversion factor	0.947455	1.027802	0.966075	0.93432	
Settlement price on maturity	MXN\$111.8832	MXN\$113.4607	MXN\$116.1489	MXN\$119.1321	

Source: BBVA Research México

The funding rate in the market is 4%. Given these final conditions, the investor receives Bond 1 (cheapest to deliver), and will therefore post a gain. The results are as follows: $1,000,000 * (111.8832 - 109.5145) = \text{MXN}\$2,368,700$.

4.4. Interest Rate Swap Futures

Description

These are futures contracts on MXN that provide users with a standardised vehicle (in MEXDER) for hedging financial costs.

The underlying asset of the contract is the interest rate swap that exchanges fixed-rate payments for floating-rate payments at tenors of 2 or 10 years at the 28-day TIIE calculated by Banco de México. The contract is settled through delivery.

The TIIE is quoted by the Banco de México in accordance with a predetermined mechanism to reflect Mexican money market conditions (see Bulletin 2019/95). The 28-day TIIE is the domestic short-term interbank reference rate in Mexico.

The sell of TIIE swap futures entails a gain/loss to the issuer if swap rates rise/fall. The hedge position is designed to offset issuer's financing costs in debt at maturity of each contract



Source: BBVA Research México

The benefits of these contracts for the investor are: 1) Standardisation which increases liquidity; 2) The Electronic Trading System guarantees transparency 3) The clearing house (ASIGNA) –with the highest rating by the leading rating agencies– virtually eliminates counterparty risk.

4.4.1. 2-year and 10-year TIIE Swap Future (Exchange Mexder)

Contract characteristics

Contract size:	1,000,000 MXN (One million Mexican pesos 00/100)
Delivery Months:	Monthly or quarterly cycle for up to one year
Ticker symbol (Swap settlement):	Two digits for the year ("02"/"10" for 2/10-year TIIE) plus two digits for the exact maturity day of the month (e.g. "27"); plus two letters for the maturity month (EN, FB, MR, AB, MY, JN, JL, AG, SP, OC, NV, DC) and the last two digits of the maturity year (e.g. 1027FBO9 for 10-year TIIE Swap Future with a maturity date of February 27, 2009)
Quotation:	Future Rate of annualised Swap level, expressed in percentage points to three decimal places
Minimum price fluctuation (Tick):	One half of a basis point, i.e. 0.005 of the annual percentage rate
Futures Contract Tick Value:	The tick value of the Swap Futures Contract is calculated as the change in the price of the 2 or 10-year Swap Futures Contract
Trading Platform:	MEXDER's Electronic Trading System
Trading Hours:	Trading hours between 7:30 am - 2:15 p.m., Mexico City time (GMT -06:00)
Last day of trading and maturity date:	The next business day before the primary auction of government securities on the third Wednesday of the maturity month
Settlement day:	Next business day after maturity date
Delivery Method:	Cash settlement // Centrally Cleared Swaps
Daily Settlement:	Clearing member and clearing house (ASIGNA) must carry out the daily settlement of their clients' obligations and this settlement shall incorporate, profits and losses, update of Margins (Clearing Fund), accrued interests, and any fees incurred
Position limits:	The maximum number of Open Contracts in one Class that a Client may hold is established by MEXDER and the clearing house, and published through the Derivatives Market Indicators Bulletin. Clients may open new positions in excess, in order to hedge risks The maximum number of Open Contracts in one Class that a Client may hold is established by MEXDER and the clearing house, and published through the Derivatives Market Indicators Bulletin. Clients may open new positions in excess, in order to hedge risks
Bloomberg Tickers:	"MMDD <GO>" for MEXDER page, "MMDF <GO>" for MEXDER Future Contracts.
Further references:	http://www.mexder.com.mx/MEX/home_ingles.html

Formulas

$$V_p = P_2 - P_1$$

Where:

V_p = Value of the tick, rounded to two decimal points. Variable dependant on the annual yield rate of the Swap Futures traded on MEXDER.
P₂ y P₁ = The prices of Swap Futures Contracts calculated with a half-basis-point interval in the rate.

The Price of the Swap Future Contract is calculated using the following formula:

$$P_n = VN * \left[\frac{T_f}{r} + \left(1 - \frac{T_f}{r} \right) * \left(1 + r * \frac{28}{36000} \right)^{-\delta} \right]$$

Where:

δ = 26 for 2-year Swap and 130 for 10-year Swap.

PN = Price of the Swap Futures Contract rounded to 2 decimal places.

VN = Face Value of the Swap Futures Contract.

Tf= Fixed Rate published by MEXDER in its bulletin, to 2 decimal places.

r = Future Rate of annualised yield of the 2-year or 10-year Swap depending on the contract, at the maturity term of the Futures contract, expressed in percentage terms and rounded to the nearest tick. (Trade Rate, Daily Settlement Rate, or Settlement Rate at Maturity, as the case may be).

The fraction T_f/r is truncated to 8 decimal places.

The time factor (FT) obtained from 28/36000, to make the rate a percentage, is truncated to 8 decimal places (FT = 0.00077777).

The expression $(1 + r * FT)^{-26} = A$, is truncated to 8 decimal places.

Similarly, the expression $(1 - T_f/r) = B$, is truncated to 8 decimal places.

The product of A x B is truncated to 8 decimal places.

4.5. Interest rate volatilities

4.5.1. Swaption TIIE (OTC)

Description:

A European swaption is an option on a TIIE swap which grants the buyer (long position) the right but not the obligation to enter into a TIIE swap at a future date (exercise date) in exchange for the payment of a premium to the seller (short position). This kind of option is traded OTC (over the counter), i.e. directly between counterparties, since they are contracts tailored to customers' requirements.

There are two main kinds of swaptions:

- Payer swaptions, which give the buyer the right to enter into an interest rate swap where they pay the fixed rate payer and receive the floating rate. Holders of payer swaptions enter into the underlying swap when the prevailing par swap rate at the maturity of the option is above the predefined rate (strike).
- Receiver swaptions, which allow the buyer to enter into an interest rate swap where they receive the fixed rate and pay the floating rate. Holders of receiver swaptions enter into the underlying swap if the prevailing par swap rate at the maturity of the option is lower than the predefined rate (strike).

General Characteristics

Payer swaption

Swaption seller	BBVA or the client
Swaption Buyer	The client or BBVA
Option Style	European
Premium	% of the notional amount expressed in basis points
Premium Payment Date	To Be Defined
Swaption Exercise Date	To Be Defined

Continued on next page

Contract characteristics (Continues)

Settlement	<p>Swap delivery: If the buyer exercises their option, both parties enter into the underlying swap.</p> <p>Cash: If the buyer exercises their option, two business days after the exercise date, they will receive the market price of the underlying swap on the exercise date.</p>
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Underlying Swap

Notional Amount	To Be Defined
Swap Effective Date	To Be Defined
Swap Maturity Date	To Be Defined
Business Day Convention	Modified following
Short position pays	28-day TIE
Short position Payment Dates	28 days
Short position Daycount	Act/360
Long position pays	MXN Fixed rate (strike) To Be Defined
Long position Payment Dates	28 days
Long position Day Count	Act/360
Calculation Agent	BBVA

Receiver swaption

Swaption seller	BBVA or the client
Swaption Buyer	The client or BBVA
Option Style	European
Premium	% of the notional amount expressed in basis points
Premium Payment Date	To Be Defined
Swaption Exercise Date	To Be Defined
Settlement	<p>Swap Delivery: If the buyer exercises their option, both parties enter into the underlying swap.</p> <p>Cash: If the buyer exercises their option, two business days after the exercise date they will receive the market value of the underlying swap on the exercise date.</p>

Underlying Swap

Notional Amount	To Be Defined
Effective Date	To Be Defined
Maturity Date	To Be Defined
Business Day Convention	Modified following
Short position pays	MXN Fixed rate (strike) To Be Defined
Short position Payment Dates	28 days
Short position Day Count	Act/360
Long position pays	28d TIE
Long position Payment Dates	28 days
Long position Day Count	Act/360
Calculation Agent	BBVA

Example

A client who pays 28d TIIE on a loan wants to swap this liability for a fixed rate instrument. However, the client is worried that in the next month the TIIE will fall. Therefore, the client can buy a payer swaption that would give them the right to swap to a fixed rate in a month's time. In a month, if the TIIE has risen in the market, the client will exercise the swaption, otherwise, they will not exercise the swaption.

4.5.2. Caps/Floors TIIE (OTC)

Caps (call options) are contracts between two parties whereby the seller (short position) agrees to pay the buyer (long position), at specific time periods, the difference between the 28d TIIE and a specified level (strike rate, over the outstanding notional for the corresponding year fraction related to the period), in exchange for an upfront premium.

Cap TIIE Flows



Source: BBVA Research México

Floors (put option) are agreements whereby the seller agrees to pay the buyer when the reference rate falls below the strike rate. A buyer floor hedges against a fall in the reference rate for a specified period.

Floor TIIE Flows



Source: BBVA Research México

Caps and floors are transacted OTC and can be combined to create collars: simultaneously buying a TIIE cap and selling a TIIE floor (i.e. buying a collar) or selling a TIIE cap and buying a TIIE floor (i.e. selling a collar). Another popular combination is a straddle (long straddle: buy cap and floor with the same strike; short straddle: sell cap and floor with the same strike).

General Characteristics

Notional Amount	To Be Defined	
Effective Date	To Be Defined	
Maturity Date	To Be Defined	
Business Day Convention	Modified following	
Option	Cap	Floor
Premium Payer	Cap buyer	Floor buyer
Premium	% of the notional amount expressed in basis points	% of the notional amount expressed in basis points
Floating Amounts		
Premium Payment Date	Effective Date	Effective Date
Payoff	Max(0%, Index-Cap Strike) *Notional*(# of days/360)	Max(Floor Strike - Index, 0%) *Notional*(# of days/360)
Strike	X% To Be Defined	
Index	28d TIIE	
Payment Dates	28 days	
Day Count	Act/360	
Calculation Agent	BBVA	

Example

Client "C" buys a Cap from BBVA based on the 28-day TIIE with a strike of 5%, on a notional amount of MXN100mn. The contract is for five years. Under this agreement, every 28 days for the next five years, BBVA will pay C whenever the 28d TIIE exceeds 5%. For instance, if 28 days from now the 28 days TIIE is 7%, BBVA will pay C:

$$(7\% - 5\%) \cdot 100,000,000 \cdot \frac{28}{360} = 155,555.56$$

However, if the 28 days TIIE is 5% or lower, BBVA does not have to pay anything to C.

For floor contracts, assuming the same terms as those for the cap contract, if the 28d TIIE is 7%, BBVA does not have to pay anything to C. However, assuming the 28 days TIIE is 4%, C will receive the following:

$$(5\% - 4\%) \cdot 100,000,000 \cdot \frac{28}{360} = 77,777.78$$

5. Equity (Mexican Stock Exchange)

Shares are listed on the Bolsa Mexicana de Valores (BMV), or Mexican Stock Exchange. The Mexican equity market is composed of local shares, foreign listed shares, stocks traded on the SIC (International Quoting System), and 14 trackers with equity and fixed income underlying assets.

Mexican Stock Exchange

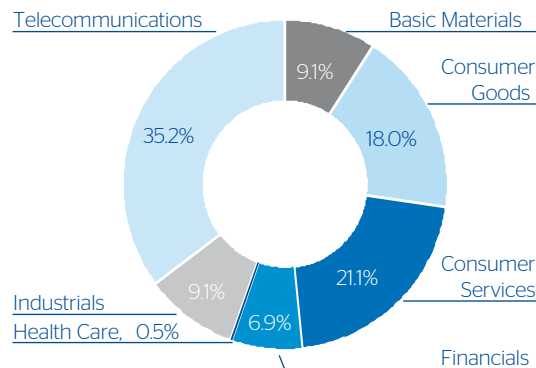
Issuers

Domestic (Fully Listed)	134
“Sociedad Anónima Promotora de Inversión Bursátil” (SAPIB)	2
Foreign	5
SIC	572
Trackers	14

Source: BBVA Research México

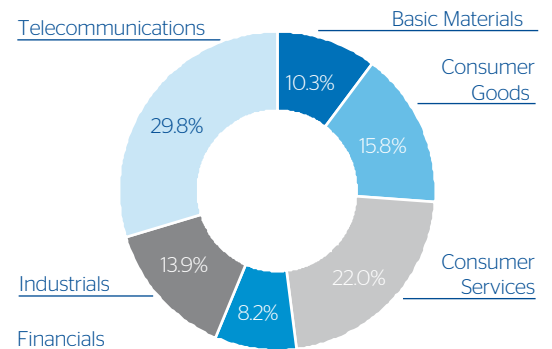
The sector breakdowns for the domestic market and the IPC, the most representative index, are the following:

Domestic market breakdowns (% of market capitalization)



Source: BBVA Research México

Most representative index, IPC breakdown (% of market capitalization)



Source: BBVA Research México

The BMV has a market capitalization of around 425.5 billion USD, while the IPC's market capitalization is around a third of this figure. Whereas the market capitalization of the shares listed on the IPC accounts for a bit more than 77% of the Mexican market, the index includes only the floated shares of the series listed on the index.

5.1. Customer Execution Services and Market-Making

The main services available in the Mexico equity market are (i) in terms of stocks listed on the BMV, customer execution and market-making services for the most liquid stocks; (ii) in terms of shares listed on the SIC, customer execution services; and (iii) in terms of Exchange-Traded Funds (ETF) for Naftrac, Mextrac, and Brtrac. BBVA Bancomer is the sponsor of the latter two ETFs, for which it provides market-making services.

5.1.1. Stocks Highlights (MSE)

Stocks: Brief description

Name	Generals	Company Description
ALFA, S.A.B. DE C.V.	Ticker BMV: ALFA Bloomberg: ALFAA MM Reuters: ALFAA.MX Web: www.alfa.com.mx	ALFA is a Mexican company made up of four business groups: Alpek (petrochemicals), Nemark (aluminium auto parts), Sigma (refrigerated foods), and Alestra (telecommunications). Internationally, Alfa is a leading manufacturer of aluminium engine heads and monoblocks. It is one of the world's leading producers of PTA, a petrochemical product, and has a privileged market position in other petrochemicals in Mexico.
ALSEA, S.A.B. DE C.V.	Ticker BMV: ALSEA Bloomberg: ALSEA* MM Reuters: ALSEA.MX Web: www.alsea.com.mx	ALSEA is a leading developer and operator of fast-food restaurants, with brands of proven success. In Mexico and Brazil, it operates Domino's Pizza, and in Mexico, Starbucks Coffee, El Pan Caliente, and Burger King.
AMERICA MOVIL, S.A.B. DE C.V.	Ticker BMV: AMX Bloomberg: AMXL MM Reuters: AMXL.MX Web: www.americamovil.com	AMX provides national and international telecommunication services to residential and commercial customers, through a wide range of activities.
CONSORCIO ARA, S.A.B. DE C.V.	Ticker BMV: ARA Bloomberg: ARA* MM Reuters: ARA.MX Web: www.consortioara.com.mx	ARA has extensive experience in the construction of entry-level, middle-income, upper-income and tourist homes, and continues to position itself as a leading firm, with enviable financial strength. It has been recognised by the Mexican Stock Exchange and has built more than 150,000 homes to date.
EMBOTELLADORAS ARCA, S.A.B. DE C.V.	Ticker BMV: ARCA Bloomberg: ARCA* MM Reuters: ARCA.MX Web: www.e-arca.com.mx	ARCA is a holding company whose main subsidiaries are engaged in the production and sale of carbonated and non-carbonated soft drinks. Arca was created in 2001 through the integration of three of Mexico's oldest bottling groups, and has become the second largest bottler of Coca-Cola Products in Mexico and Latin America.
GRUPO AEROPORTUARIO DEL SURESTE, S.A.B. DE C.V.	Ticker BMV: ASUR Bloomberg: ASURB MM Reuters: ASURB.MX Web: www.asur.com.mx	Manages and operates airports and supplies airports with complementary and commercial services, and builds and/or exploits civil air landing fields under the terms of the Airport Law.
COMPAÑIA MINERA AUTLAN, S.A.B. DE C.V.	Ticker BMV: AUTLAN Bloomberg: AUTLANB MM Reuters: AUTLANB.MX Web: www.autlan.com.mx	AUTLAN produces and sells various kinds of manganese minerals and ferroalloys.
AXTEL, S.A.B. DE C.V.	Ticker BMV: AXTEL Bloomberg: AXTELCPO MM Reuters: AXTELCPO.MX Web: www.axtel.com.mx	AXTEL is a company that supplies telecommunication services.
GRUPO BIMBO, S.A.B. DE C.V.	Ticker BMV: BIMBO Bloomberg: BIMBOA MM Reuters: BIMBOA.MX Web: www.grupobimbo.com	BIMBO owns companies engaged in the preparation and distribution of food products.
CEMEX, S.A.B. DE C.V.	Ticker BMV: CEMEX Bloomberg: CEMEXCP MM Reuters: CEMEXCPO.MX Web: www.cemex.com	CEMEX is a global construction industry solutions provider that offers high-quality products and reliable services to clients and communities in four continents.

Continued on next page

Stocks: Brief description (Continues)

Name	Generals	Company Description
CORPORACION MOCTEZUMA, S.A.B. DE C.V.	Ticker BMV: CMOCTEZ Bloomberg: Reuters: CMOCTEZ.MX Web: www.cmoctezuma.com.mx	CMOCTEZ is a controlling company whose subsidiaries specialise in the production, transportation and pumping of read-mix concrete.
CONTROLADORA COMERCIAL MEXICANA, S.A.B. DE C.V.	Ticker BMV: COMERCI Bloomberg: COMERUBC MM Reuters: COMERCIUBC.MX Web: www.comerci.com.mx	COMERCI is a holding company of firms engaged primarily in the operation of supermarkets selling a wide variety of merchandise, and in restaurant operations.
GRUPO CONTINENTAL, S.A.B.	Ticker BMV: CONTAL Bloomberg: CONTAL* MM Reuters: CONTAL.MX Web: www.contal.com	CONTAL is a holding company of subsidiaries involved in a variety of areas, primarily the bottling of Coca-Cola products.
CYDSA, S.A.B. DE C.V.	Ticker BMV: CYDSASA Bloomberg: CYDSASAA MM Reuters: CYDSASAA.MX Web: www.cydsa.com.mx	CYDSASA, a holding company of industrial, commercial and service companies operating in a variety of areas.
GRUPO ELEKTRA, S.A. DE C.V.	Ticker BMV: ELEKTRA Bloomberg: ELEKTRA* MM Reuters: ELEKTRA.MX Web: www.elektra.com.mx	ELEKTRA is a holding and real-estate company engaged in the acquisition, management, and leasing of property to Salinas y Rocha, S.A., for its commercial operation.
FOMENTO ECONOMICO MEXICANO, S.A.B. DE C.V.	Ticker BMV: FEMSA Bloomberg: FEMSAUBD MM Reuters: FEMSAUBD.MX Web: www.femsa.com	FEMSA makes, distributes, and sells soft drinks and beer, and also owns the largest convenience store chain in Mexico.
GRUPO AEROPORTUARIO DEL PACIFICO, S.A.B. DE C.V.	Ticker BMV: GAP Bloomberg: GAPB MM Reuters: GAPB.MX Web: www.aeropuertosgap.com.mx	GAP supplies airport services through the twelve airports the company operates in the Pacific region.
GRUPO CARSO, S.A.B. DE C.V.	Ticker BMV: GCARSO Bloomberg: GCARSOA1 MM Reuters: GCARSOA1.MX Web: www.gcarso.com.mx	GCARSO is a conglomerate that owns subsidiaries engaged in various areas of economic activity.
GRUPO CEMENTOS DE CHIHUAHUA, S.A.B. DE C.V.	Ticker BMV: GCC Bloomberg: GCC* MM Reuters: GCC.MX Web: www.gcc.com	GCC is a leading producer and seller of cement, ready-mix, aggregates, and services relating to the construction industry in Mexico and the United States, and it has a significant stake in the Bolivian cement market leader.
CORPORACION GEO, S.A.B. DE C.V.	Ticker BMV: GEO Bloomberg: GEOB MM Reuters: GEOB.MX Web: www.casasgeo.com	GEO designs, develops, builds, and sells housing units.
GRUPO FAMSA, S.A.B. DE C.V.	Ticker BMV: GFAMSA Bloomberg: GFAMSAA MM Reuters: GFAMSAA.MX Web: www.grupofamsa.com	GFAMSA sells domestic and imported household appliances, furniture, and clothing, in Mexico.

Continued on next page

Stocks: Brief description (Continues)

Name	Generals	Company Description
GRUPO FINANCIERO INBURSA, S.A.B. DE C.V.	Ticker BMV: GFINBUR Bloomberg: GFINBURO MM Reuters: GFINBURO.MX Web: www.inbursa.com	GFINBUR is a pure holding company of stock in companies that supply financial services.
GRUPO FINANCIERO BANORTE, S.A.B. DE C.V.	Ticker BMV: GFNORTE Bloomberg: GFNORTEO MM Reuters: GFNORTEO.MX Web: www.banorte.com	GFNORTE is a holding company of firms that provide financial services.
GRUPO MEXICO, S.A.B. DE C.V.	Ticker BMV: GMEXICO Bloomberg: GMEXICOB MM Reuters: GMEXICOB.MX Web: www.gmexico.com	GMEXICO is a mining company engaged in the processing of copper, zinc, silver, gold, lead, and molybdenum.
GRUPO MODELO, S.A.B. DE C.V.	Ticker BMV: GMODELO Bloomberg: GMODELOC MM Reuters: GMODELOC.MX Web: www.gmodelo.com.mx	GMODELO is a leader in the production, distribution, and sale of beer in Mexico.
GRUMA, S.A.B. DE C.V.	Ticker BMV: GRUMA Bloomberg: GRUMAB MM Reuters: GRUMAB.MX Web: www.gruma.com	GRUMA, S.A. de C.V., is the world's largest producer of corn and flour tortillas.
GRUPO HERDEZ, S.A.B. DE C.V.	Ticker BMV: HERDEZ Bloomberg: Reuters: HERDEZ.MX Web: www.grupoherdez.com.mx	Herdez is a company that processes food products
CONSORCIO HOGAR, S.A.B. DE C.V.	Ticker BMV: HOGAR Bloomberg: HOGARB MM Reuters: HOGARB.MX Web: www.hogar.com.mx	HOGAR is a company that develops and promotes real-estate projects, with more than 13 years of experience in the industry. Hogar's objective is to create highly competitive real-estate investment alternatives for its clients.
DESARROLLADORA HOMEX, S.A.B. DE C.V.	Ticker BMV: HOMEX Bloomberg: HOMEX* MM Reuters: HOMEX.MX Web: www.homex.com.mx	HOMEX is a housing developer.
EMPRESAS ICA, S.A.B. DE C.V.	Ticker BMV: ICA Bloomberg: ICA* MM Reuters: ICA.MX Web: www.ica.com.mx	ICA is a holding company of firms engaged in heavy construction, industrial and urban construction, and various engineering and service projects.
INDUSTRIAS CH, S.A.B. DE C.V.	Ticker BMV: ICH Bloomberg: ICHB MM Reuters: ICHB.MX Web: www.industriasch.com.mx	ICH is a Mexican company engaged in the production of steel, with plants in Mexico, the United States, and Canada. Its main product lines are specialty steels, welded pipe, commercial profiles, structural profiles, and rebar.
KIMBERLY - CLARK DE MEXICO, S.A.B. DE C.V.	Ticker BMV: KIMBER Bloomberg: KIMBERA MM Reuters: KIMBERA.MX Web: www.kimberly-clark.com.mx	KIMBER is engaged in the manufacturing and marketing of consumer products for personal health care and institutions.

Continued on next page

Stocks: Brief description (Continues)

Name	Generals	Company Description
COCA-COLA FEMSA, S.A.B. DE C.V.	Ticker BMV: KOF Bloomberg: KOFL MM Reuters: KOFL.MX Web: www.coca-cola-femsa.com.mx	KOF is a holding company that owns shares in the operating companies of Grupo Femsa's soft drink division.
MAXCOM TELECOMUNICACIONES, S.A.B. DE C.V.	Ticker BMV: MAXCOM Bloomberg: MAXCOMCPO MM Reuters: MXCMCPO.MX Web: http://www.maxcom.com/	Maxcom is a telecommunication firm that supplies local, long- distance, voice over IP, public telephone, data, Internet, pay TV over IP, administrative, and mobile telephony services, through state-of- the-art technology to create solutions designed to exceed the specific needs of its customers and provide them greater benefits.
MEGACABLE HOLDINGS, S.A.B. DE C.V.	Ticker BMV: MEGA Bloomberg: MEGACPO MM Reuters: MEGACPO.MX Web: www.megacable.com.mx	Mega is a holding company that controls companies engaged in activities relating to cable television services.
MEXICHEM, S.A.B. DE C.V.	Ticker BMV: MEXCHEM Bloomberg: MEXCHEM* MM Reuters: MEXCHEM.MX Web: www.mexichem.com.mx	MEXICHEM is a company engaged in the production of chemical products, petrochemicals, and hydrofluoric acid and the extraction of fluorite.
GRUPO AEROPORTUARIO DEL CENTRO NORTE, SAB DE CV	Ticker BMV: OMA Bloomberg: OMAB MM Reuters: OMAB.MX Web: www.oma.aero	OMA operates and administers 13 international airports in nine states of central and northern Mexico, located in the cities of Monterrey (Mexico's third largest metropolitan area); Acapulco, Mazatlan, and Zihuatanejo, which are major tourist destinations, and nine other regional centres and border cities.
INDUSTRIAS PEÑOLES, S.A.B. DE C.V.	Ticker BMV: PE&OLES Bloomberg: PE&OLES* MM Reuters: PENOLES.MX Web: www.penoles.com.mx	PEÑOLES is a holding company of subsidiaries engaged in the mining, foundry, refinery, and manufacture of non-ferrous metals and the manufacture of chemical products and refractory products.
SARE HOLDING, S.A.B. DE C.V.	Ticker BMV: SARE Bloomberg: SARE MM Reuters: SAREB.MX Web: www.sare.com.mx	SARE is engaged in the development, promotion, design, construction, and sale of entry-level, low-, middle-, upper-income and tourist homes, and also supplies other real-estate services. The company has a leadership position in market niches like middle- and upper-income housing in Mexico City. It currently has a presence in 10 states of Mexico. SARE owns capital stock in subsidiaries that promote housing for entry-level, middle- and upper-income homes, as well as the provision of real-estate services.
GRUPO SIMEC, S.A.B. DE C.V.	Ticker BMV: SIMEC Bloomberg: SIMECB MM Reuters: SIMECB.MX Web: www.simec.com.mx	SIMEC is a Mexican company engaged in the production of steel, with plants in Mexico, the United States, and Canada.
ORGANIZACION SORIANA, S.A.B. DE C.V.	Ticker BMV: SORIANA Bloomberg: SORIANAB MM Reuters: SORIANAB.MX Web: www.soriana.com	SORIANA is a company engaged in the sale of basic articles like groceries, clothing, and house wares, through supermarket formats.
CARSO GLOBAL TELECOM, S.A.B. DE C.V.	Ticker BMV: TELECOM Bloomberg: TELECOA1 MM Reuters: TELECOMA1.MX Web: www.cgtelecom.com.mx	TELECOM is a holding company of firms whose economic activities are related to the telecommunication industry.

Continued on next page

Stocks: Brief description (Continues)

Name	Generals	Company Description
TELEFONOS DE MEXICO, S.A.B. DE C.V.	Ticker BMV: TELMEX Bloomberg: TELMEXL MM Reuters: TELMEXL.MX Web: www.telmex.com.mx	TELMEX is a leader in the Mexican telecommunication industry. Telmex and its subsidiaries offer a wide range of communication, data and video transmission, and Internet services, and comprehensive telecommunication services to corporate clients.
GRUPO TELEVISIA, S.A.	Ticker BMV: TLEVISA Bloomberg: TLEVICPO MM Reuters: TLEVISACPO.MX Web: www.televisa.com.mx	TLEVISA is the world's largest Spanish-speaking media company. Through its subsidiaries and joint ventures, it produces and transmits television programs for the domestic and international market, and develops and operates direct-to-home television services via satellite.
TV AZTECA, S.A. DE C.V.	Ticker BMV: TVAZTCA Bloomberg: TVAZTCPO MM Reuters: TVAZTCACPO.MX Web: www.tvazteca.com.mx	TVAZTCA is a company engaged in the production of programming for transmission through its own networks, as well as its sale on the domestic market, and the sale of advertising time.
URBI DESARROLLOS URBANOS, S.A.B. DE C.V.	Ticker BMV: URBI Bloomberg: URBI* MM Reuters: URBI.MX Web: www.urbi.com	URBI is a company engaged in the construction, promotion, and sale of housing.
VITRO, S.A.B. DE C.V.	Ticker BMV: VITRO Bloomberg: VITROA MM Reuters: VITROA.MX Web: www.vitro.com	VITRO is a holding company of firms in a variety of areas, primarily the glass business.
WAL-MART DE MEXICO, S.A.B. DE C.V.	Ticker BMV: WALMEX Bloomberg: WALMEXV MM Reuters: WALMEXV.MX Web: www.walmartmexico.com.mx	WALMEX is a company that controls discount and clothing stores chains and restaurants.

Source: BBVA Research México with Company Data

5.1.2. Exchange-Traded Fund, ETF: Naftrac, Mextrac, and Brtrac

Exchange-Traded Funds (ETFs) are investment funds traded on the stock exchange in Mexico and/or Spain. ETFs are index funds that hold stocks from Mexico and/or Brazil. The advantages of investing in ETFs are: diversification of a fund with lower transaction costs compared to mutual funds, immediate liquidity, and the ability to sell short, as well as buy on margin and purchase as little as one share.

Naftrac

The Naftrac is the largest tracker of the Mexican market. This tracker replicates the composition of the IPC's 35 company mix, broken down as follows: Telecommunications (31.2%), Retailers (18%), Mining (9.3%), Construction materials (8%), Banks (7.7%), and Beverages (6.1%). Naftrac is listed on the BMV and Latibex in Spain

Mextrac

BBVA-Bancomer is the sponsor of Mextrac ETFs.

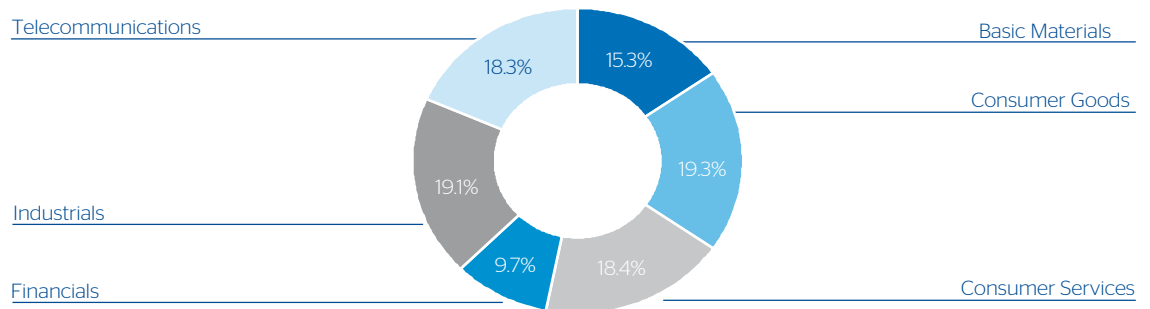
MEXTRAC: General Characteristics

BMV Ticker	MEXTRAC
First Day of Trading	Dec-29-09
Expense (%)	0.25%
ISIN	MX1BMEOF008
Bloomberg Ticker for ETF	MEXTRAC
Bloomberg Ticker for Underlying Index	RENTABLE
Reuters Ticker for ETF	MEXTRAC09.MX
Reuters Ticker for Underlying Index	.DT

Source: BBVA Research México

The breakdown of the underlying index for the MEXTRAC by sector is as follows:

Sector Breakdown MEXTRAC, %



Source: BBVA Research México

Company Weightings

Index Composition

Short Name	Weight
AMERICA MOVIL SAB DE C-SER L	10
FOMENTO ECONOMICO MEXICA-UBD	10
GRUPO MEXICO SAB DE CV-SER B	10
GRUPO TELEVISA SA-SER CPO	10
WALMART DE MEXICO-SER V	10
CEMEX SAB-CPO	9.79
GRUPO FINANCIERO BANORTE-O	6.32
ALFA S.A.B.-A	4.38
GRUPO FINANCIERO INBURSA-O	3.92
TELEFONOS DE MEXICO SAB SER	3.88
KIMBERLY-CLARK DE MEXICO-A	3.72

Continued on next page

Company Weightings (Continues)
Index Composition

Short Name	Weight
GRUPO BIMBO SAB- SERIES A	3.69
GRUPO MODELO S.A.B.-SER C	3.56
GRUPO CARSO SAB DE CV-SER A1	2.86
INDUSTRIAS PENOLES SAB DE CV	2.78
MEXICHEM SAB DE CV*	2.17
GRUPO AEROPORTUARIO DEL-B SH	1.2
CONSORCIO ARA S.A.B.-SER *	0.68
GRUPO AEROPORTUARIO DE SUR-B	0.6
EMBOTELLADORAS ARCA SAB-NOM	0.45

Source: BBVA Research México

MEXTRAC's objective is to replicate the BMV's Rentable® Index before commissions and costs. Each MEXTRAC minimum conversion unit is composed of the same proportion of each stock within the BMV's Rentable® Index.

The Rentable® Index is composed of 20 companies selected from the IPC sample based on recurring dividend yields. This is a total return index, as it includes the dividends paid by constituents.

The criteria used to select the 20 company samples is: 1) that the stock was traded at at least 95% of the sessions in the last year; 2) the companies have the 20 highest constant dividend yield rates within the IPC®; and 3) the stocks have the 20 highest turnover and marketability ratios.

The index weightings are determined on a market capitalisation basis, with each stock weighting no more than 10% at the beginning of each rebalancing and the weight of the top 5 stocks is not allowed to account for more than 60% of the index, in order to comply with limits imposed by regulation.

The excess weight should be distributed proportionately among the remaining stocks.

The index is reshuffled on an annual basis, with the new sample starting trading as of the 1st day of September, for as long as there are no extraordinary events that require immediate attention such as corporate activity.

BRTRAC

BBVA-Bancomer is the sponsor of BRTRAC ETFs.

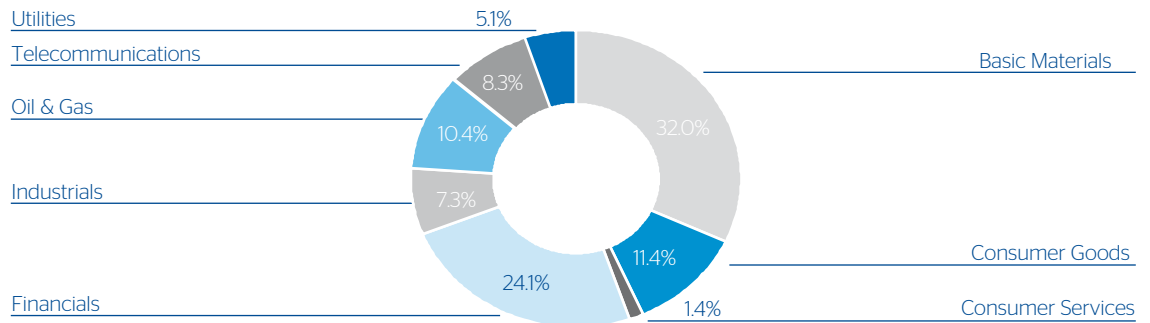
BRTRAC: General Characteristics

BMV Ticker	BRTRAC
First Day of Trading	Mar-04-10
Expense (%)	0.50%
ISIN	MX1BBRO60001
Bloomberg Ticker for ETF	BRTRAC
Bloomberg Ticker for Underlying Index	BMBRATM
Reuters Ticker for ETF	BRTRAC10.MX
Reuters Ticker for Underlying Index	.BMB

Source: BBVA Research México

The breakdown of the underlying index for the BRTAC by sector is as follows:

Sector Breakdown BRTRAC, %



Source: BBVA Research México

Company Weightings

Index Composition

Short Name	Weight
PETROLEO BRASILEIRO S.A.-ADR	10.42
GERDAU SA -SPON ADR	10.3
VALE SA-SP ADR	10.2
CIA SIDERURGICA NAACL-SP ADR	10.15
BANCO BRADESCO-ADR	9.74
COMPANHIA DE BEBIDAS-PRF ADR	9.64
ITAU UNIBANCO HLDNG-PREF ADR	9.53
EMPRESA BRASILEIRA DE AE-ADR	7.34
CEMIG SA -SPONS ADR	5.08
VIVO PARTICIPACOES SA-ADR	4.98
BANCO SANTANDER BRASIL-ADS	4.84
TELE NORTE LESTE PART-ADR	3.31
GAFISA SA-ADR	1.77
TAM SA-SPONSORED ADR	1.38
FIBRIA CELULOSE SA-SPON ADR	1.32

Source: BBVA Research México

BRTRAC's objective is to replicate the BMV's Brasil 15® Index before commissions and costs. Each BRTRAC minimum conversion unit is composed of the same proportion of each stock within the BMV's Brasil 15® Index.

The Brasil 15® Index is composed of the 15 most liquid Brazilian stocks listed on the Mexican market, through the SIC, with ADR programs. The selection methodology is the following: 1) The 15 most liquid stocks, based on 6M monthly data of the marketability index of the BMV; 2) There are no companies for which a holding or subsidiary is also a part of the index.

The index weightings are determined on a market capitalisation basis, with each stock weighting no more than 10% at the beginning of each rebalancing, in order to comply with limits imposed by regulation.

The excess weight should be distributed proportionately among the remaining stocks.

The BMV has special considerations to take into account to ensure the continuity and viability of the index replication. If any corporate activity affects the stocks in the sample, the BMV will adjust accordingly to maintain liquidity and replication characteristics. If for any reason a company listed in the index is a target for acquisition, merger or delisting, the BMV will replace it with the shares of the next company that meets the initial requirements.

5.2. Equity Futures and Options (MEXDER)

5.2.1. IPC and Single Stocks Futures

Definition

These derivative instruments are used for hedging against fluctuations on the BMV, stock portfolios with similar volatility, or single stocks on the BMV. The main users of IPC futures are institutional investors who hedge their open positions in stock portfolios. Speculators also participate in order to take advantage of perceived arbitrage opportunities or to achieve higher returns in line with their expectations.

The underlying asset is the IPC, the most important Mexican Index, which tracks a weighted and representative sample of 35 stocks on the BMV. The IPC sample is reviewed on a yearly basis.

A futures contract on stock market indices is a contract whereby the buyer (seller) undertakes the obligation to pay (receive) the difference between the final value of the index that is the subject of the contract, less the agreed value (forward), multiplied by the notional. This multiple is the price of one index point.

MEXDER also lists futures whose underlying assets are individual stocks such as América Móvil L; Cemex CPO; GMéxico B; FEMSA UBD; GCARSO A1; TELMEX L; and Walmex V. When the future matures, the operation is settled by physical delivery.

IPC Futures

Contract characteristics

Face value:	10.00 MXN (ten pesos 00/100) multiplied by IPC value
Delivery months:	Quarterly cycle for up to one year: March, June, September, and December. Contracts are permanently available for trading. Open interest indicates the number of contracts outstanding.
Ticker symbol:	1,000 Bonds, equivalent to 100,000.00 MXN (one hundred thousand Mexican pesos 00/100)
Delivery months:	Quarterly cycle for up to 12 cycles (3 years)
Ticker symbol:	IPC plus month and year of maturity, i.e. IPCDC03 (December 03)
Price units:	Absolute value of IPC
Minimum fluctuation (Tick):	5.00 points of the IPC is worth 10.00 pesos per contract
Maximum daily fluctuation:	There is no maximum fluctuation of the future price during a single trading session
Trading hours:	7:30 a.m. to 3:00 p.m. (GMT -06:00)
Last day of trading:	Third Friday of the maturity month
Settlement on maturity:	First business day following the maturity date.

Continued on next page

Contract characteristics (Continues)

Settlement:	Settlement is in cash and determined by the difference between the purchase price and the IPC price at maturity
Daily settlement:	ASIGNA will carry out the daily settlement of investor positions, including all profits and losses, the maintenance margin, and accrued interest, etc. The daily price settlement is calculated by MEXDER for each series
Initial margin:	Amount needed to start the contract in order to guarantee obligations. Deposit could be in cash or liquid securities in pesos (CETES, MBONOS, etc.)
Maintenance margin:	Margin “calls” for the buyer’s account or margin “withdraws” for the seller’s account must be done if the price agreed in the contract is higher than the daily settled price or vice versa.

Types of operation

IPC futures are classified based on the rights and obligations that they confer upon participants, as follows:

- a. **Buying IPC futures** The buyer will be entitled to receive the settlement at maturity in MXN (formula B) if the “current IPC level” is higher than the “agreed IPC level”; otherwise he must pay the settlement (formula A).
- b. **Selling IPC futures** The seller will be entitled to receive the notional amount in MXN (formula A) if the “current IPC level” is lower than the “agreed IPC level”; otherwise he must pay the notional (formula B).

Formula

<p>A) Settlement on maturity $MXN\\$10.00 * (IPC_A - IPC_t)$</p> <p>B) Settlement on maturity $MXN\\$10.00 * (IPC_t - IPC_A)$</p>

Where:
 IPC_t = Closing level of IPC on day “t”
 IPC_A = Agreed level of IPC
 t = Contract maturity day

Examples

1. “Sell” IPC futures

An institutional investor would like to hedge a return on his portfolio for December 2010, and therefore he sells an IPC futures instrument. If the IPC on the maturity date is lower than expected, the investor will receive a settlement that guarantees a minimum portfolio return. If the IPC rises above the price agreed on maturity date, the investor must pay the difference but generates a surplus in his long position in stocks.

In any case, the final outcome is that the investor has a hedged stock position and sets a floor on the portfolio return regardless of the BMV’s performance.

- **Initial data:**
 - Number of contracts purchased by the investor: 100 IPCDC10 futures
 - Level agreed for the futures at December 2010: 32,100 pts

Scenario 1) the stock market declines:

Actual level at maturity of the future in December 2010: 31,800 pts

Amount payable: 100 securities * \$10 * (32,100- 31,800) = MXN\$300,000.00

In this example, the investor receives a surplus by using IPC futures on the MEXDER since the agreed level was higher than the actual level.

Scenario 2) the stock market outperforms expectations:

Actual level on the future’s maturity in December 2010: 32,500 pts

Amount of settlement against: $100 \text{ securities} * \$10 * (32,500 - 32,100) = \text{MXN}\$400,000.00$

The IPC exceeded the minimum level projected. The customer therefore paid the difference and obtained the return estimated initially.

2. “Buy” IPC futures

In the opposite case, an investor needs to ensure purchase of a stock portfolio in December 2010; hence, he decides to buy an IPC futures instrument.

• **Initial data:**

- Number of contracts purchased by the investor: 100 futures IPC DC10
- Level agreed for the futures at December 2010: 32,100 pts

Scenario 1) the stock market outperforms the futures

Actual level on the future’s maturity in December 2010: 32,500 pts

Amount payable: $100 \text{ securities} * \$10 * (32,500 - 32,100) = \text{MXN}\$400,000.00$

In this case, the investor receives a surplus as long as the current level was higher than the price of the future.

Scenario 2) The stock market underperforms the futures:

Actual level on the future’s maturity in December 2010: 31,800 pts

Amount of settlement against: $100 \text{ securities} * \$10 * (32,100 - 31,800) = \text{MXN}\$300,000.00$

If the IPC underperforms the agreed level, the customer would have to pay the difference.

Single Stocks Futures

Contract characteristics

Face value:	100 shares of the underlying stock and its price
Delivery months:	Maturity months in March, June, September, and December will be available at all times for call (buy) and put (sell) options.
Ticker symbol:	Maturity months in March, June, September, and December will be available at all times for call (buy) and put (sell) options.
Unit of price:	Pesos and cents of peso per share
Minimum fluctuation (Tick):	The bid size will be equal to the one used in the underlying negotiation on the BMV
Maximum daily fluctuation:	There is no maximum fluctuation of the future price during a single trading session
Trading hours:	7:30 a.m. to 3:00 p.m. (GMT -06:00)
Last day of trading:	Third Friday of the maturity month
Settlement on maturity:	Third bank business day after the maturity date.
Settlement:	Settlement is in cash and is based on the difference in the purchase price and the underlying stock price at maturity
Daily settlement:	ASIGNA will carry out the daily settlement of investor obligations, including all profits and losses, the maintenance margin, and accrued interest, etc. The daily price settlement is calculated by MEXDER for each series

5.2.2. IPC Options on Futures Contracts and Single Stock Options

Definition

Options on an IPC futures contract could be used as a hedging instrument or to increase stock portfolio exposure. The contract style used on MEXDER is European, the underlying asset of which is the BMV Index "IPC" futures contract.

Also, options for individual stocks are listed on MEXDER, the individual characteristics of which are published by MEXDER. The underlying stocks are América Móvil L; Cemex CPO; GMéxico B; Naftrac O2; Tlevisa CPO; Walmex V; Telmex L; and ETF's Specific Terms. When an option is exercised, the operation is settled by physical delivery.

IPC Options on Futures Contracts

Contract characteristics

Face value:	10.00 MXN multiplied by the premium of the option contract
Contract kind:	Call and put
Contract style:	European
Delivery months:	Quarterly cycle for up to one year (for both call and put options): March, June, September, and December
Strike price:	It is expressed in whole points of the IPC Index and multiples of 50 units.
Trading symbols:	IP plus 5 digits to specify the strike price and another digit to specify the contract type and maturity month (call: March, "C"; June, "F"; September, "I"; December, "L". put: March, "O"; June, "R"; September, "U"; December, "X"). For example, "IP 32100C" = call option March and "IP 31900X" = put option December
Unit quoted:	Absolute value of IPC
Minimum fluctuation (Tick):	One point of the IPC
Trading hours:	7:30 a.m. to 3:00 p.m. (GMT -06:00)
Last day of trading and maturity date:	Third Friday of the maturity month.
Settlement day:	First business day following maturity date
Intrinsic value at maturity:	A call option shall have a positive intrinsic value when the strike price is lower than the closing price of the IPC future with the same maturity date. A put option shall have a positive intrinsic value when the strike price is higher than the closing price of the IPC future with the same maturity date. Otherwise, the intrinsic value on the maturity date shall be zero.
Daily settlement:	ASIGNA will carry out the daily settlement of investor obligations, including all profits and losses, the maintenance margin, and accrued interest, etc. The daily price settlement is calculated by MEXDER for each series
Initial margin:	Amount needed to start the contract in order to guarantee obligations.
Maintenance margin:	Margin "calls" or margin "withdraws" as a function of open positions

Single Stocks Options

Contract characteristics

Face value:	100 shares of the underlying stock and its price														
Contract types:	Calls and Puts														
Contract style:	American (as a general rule)														
Delivery months:	Maturity months in March, June, September, and December will be available at all times for call (buy) and put (sell) options														
Strike price:	Each will vary depending on the price of the underlying stock. They will always be multiples of an interval defined by MEXDER														
Trading symbols:	<p>The first two digits for the underlying asset (“AX”; “CX”; “GM”; “NA”; “TV”; “WA”; and “TX”), plus 5 digits to specify the strike price (three whole digits and two decimals) and another digit to specify the contract type and maturity month (Call: March, “C”; June, “F”; September, “I”; December, “L”. Put: March, “O”; June, “R”; September, “U”; December, “X”). For example:</p> <table border="1"> <tr> <td>América Móvil L (“AX”)</td> <td>AX 2400L = Call option December</td> </tr> <tr> <td>Cemex CPO (“CX”)</td> <td>CX 2400X = Put option December</td> </tr> <tr> <td>GMéxico B (“GM”)</td> <td>GM 2400I = Call option September</td> </tr> <tr> <td>Naftrac O2 (“NA”)</td> <td>NA 1030C = Call option March</td> </tr> <tr> <td>Tlevisa CPO (“TV”)</td> <td>TV 2400O = Put option March</td> </tr> <tr> <td>Walmex V (“WA”)</td> <td>WA 2400U = Put option September</td> </tr> <tr> <td>Telmex L (“TX”)</td> <td>TX 2400F = Call option June</td> </tr> </table>	América Móvil L (“AX”)	AX 2400L = Call option December	Cemex CPO (“CX”)	CX 2400X = Put option December	GMéxico B (“GM”)	GM 2400I = Call option September	Naftrac O2 (“NA”)	NA 1030C = Call option March	Tlevisa CPO (“TV”)	TV 2400O = Put option March	Walmex V (“WA”)	WA 2400U = Put option September	Telmex L (“TX”)	TX 2400F = Call option June
América Móvil L (“AX”)	AX 2400L = Call option December														
Cemex CPO (“CX”)	CX 2400X = Put option December														
GMéxico B (“GM”)	GM 2400I = Call option September														
Naftrac O2 (“NA”)	NA 1030C = Call option March														
Tlevisa CPO (“TV”)	TV 2400O = Put option March														
Walmex V (“WA”)	WA 2400U = Put option September														
Telmex L (“TX”)	TX 2400F = Call option June														
Unit quoted:	Contracts quoted in pesos and hundredths of a peso (cents) per underlying asset														
Minimum fluctuation (Tick):	0.01 MXN (exceptions may apply)														
Trading hours:	7:30 a.m. to 3:00 p.m. (GMT -06:00)														
Last day of trading and maturity date:	Established by each underlying asset, but is usually the third Friday of the maturity month														
Settlement day:	Established by each underlying asset, but is usually the third business day following the maturity date														
Intrinsic value at maturity:	<p>A call option has a positive intrinsic value when the strike price is lower than the closing stock price on the maturity date.</p> <p>A put option has a positive intrinsic value when the strike price is higher than the closing stock price on the maturity date.</p> <p>Otherwise, the intrinsic value on the maturity date shall be zero.</p>														
Daily settlement:	ASIGNA will carry out the daily settlement of investor obligations, including all profits and losses, the maintenance margin, and accrued interest, etc. The daily price settlement is calculated by MEXDER for each series														

5.3. Equity Forwards, Options, and Swaps (OTC):

5.3.1. Equity Forwards

Description

Equity Forwards at BBVA Bancomer are lineal derivatives that can be used as a hedging instrument or to take leveraged bets on the stock market. Main advantages are that it accomplishes a synthetically long or short position on any stock, index or ADR, and is flexible in terms of size and tenor. As with any other OTC equity derivative, shortcomings are exposure to market risk, volatility and credit risk.

Contract characteristics

Issuer:	BBVA Bancomer
Guarantee	BBVA Bancomer
Nominal value:	Variable
Maturity:	Up to 5 years subject to underlying asset

Underlying assets are stocks listed on the BMV, according to the list below, which includes maximum tenors as well:

Index	Description	Max Tenor	Stock	
BMBBRART	Índice Brasil 15 RT BMV	1 year	AMX ADR	HOMEX ADR
BMBRA15	Índice Brasil 15 BMV	1 year	BBD ADR	ICA ADR
Construye	Índice BMV Construye RT	5 years	BVN ADR	NETC ADR
Consumo	Índice BMV Consumo frecuente RT	5 years	CAIGY ADR	OMA ADR
Enlace	Índice BMV Enlace RT	5 years	CEMEX ADR	PBR ADR
IPC	Índice de Precios y Cotizaciones BMV	5 years	CIG ADR	RIO ADR
Rentable	Índice BMV Rentable RT	5 years	ENI ADR	SDA ADR
			EOC ADR	SIMEC ADR
			FEMSA ADR	TELMEX ADR
			GAP ADR	TLEVISA ADR
			GGB ADR	USNZY ADR

Source: BBVA Research México

Formulas and Examples

$$F = (S - I) * e^{rt}$$

Where:
 F = Forward Level
 S = Spot
 I = Net Present Value of the Dividend
 r = Interest rate of the period
 t = Term (years)

$$\text{Open_Interest_Value} = (F - F_0) * N * e^{-rt}$$

Where:
 FO = Agreed Forward Price level
 F = Current Forward price level
 M = Notional
 r = Interest rate of the period
 t = Term (years)

Example

A company sells a forward with notional AMX to 3 months with notional of 10,000 shares and spot price of MXN\$30.05 and the forward price is MXN \$ 30.10 at maturity. Three months later:

- **Scenario 1:** Current price of AMX is 29.50 MXN with a forward price of MXN \$ 29.52. Hence, the open position value is: (29.52 - 30.10) * 10,000 * 1 = MXN \$ 5,800
- **Scenario 2:** Current price of AMX is 30.50 MXN with a forward price of MXN \$ 30.52. Hence, the open position value is: (30.52 - 30.10) * 10,000 * 1 = -MXN \$ 4,200

5.3.2. Equity Options

Description

Equity options in BBVA Bancomer could be used as a hedging instrument or to increase exposure to the stock market.

The main advantages are flexibility as regards size, tenor and currency (EURMXN or USDMXN); options can be European, American (plain vanilla) or European binary digitals (binary). As with any other OTC equity derivative, shortcomings are exposure to market risk, volatility and credit risk.

Contract characteristics

Issuer:	BBVA Bancomer
Guarantee	BBVA Bancomer
Nominal value:	Variable
Maturity:	Up to 5 years subject to underlying asset

Source: BBVA Research México

The underlying assets and maturities traded at BBVA Bancomer are:

Stock

	Description	Max. Term
AMXL	América Móvil SAB de CV	2 years
CEMEXCPO	Cemex SAB de CV	2 years
FEMSAUBD	Fomento Económico Mexicano SAB de CV	1 year
GAPB	Grupo Aeroportuario del Pacífico SAB de CV	1 year
GMEXICOB	Grupo México SAB de CV	1 year
HOMEX*	Desarrolladora Homex SA de CV	1 year
SIMEC	Grupo Simec SAB de CV	1 year
TELMEX	Teléfonos de México SAB de CV	1 year
TLEVICPO	Grupo Televisa SA	1 year
WALMEXV	Wal-Mart de México SAB de CV	1 year

Source: BBVA Research México

Index

BMBBRART	Índice Brasil 15 RT BMV	14 months
IPC	Índice de Precios y Cotizaciones BMV	4 years

*The term is up to 2 years.
Source: BBVA Research México

ADR

AMX ADR	ENI ADR	PBR ADR
BBD ADR	FEMSA ADR	SIMEC ADR
BVN ADR	GAP ADR	TELMEX ADR
CEMEX ADR	GGB ADR	TLEVISA ADR
CIG ADR	HOMEX ADR	

Source: BBVA Research México

5.3.3. Equity Swaps

Description

Equity swaps at BBVA Bancomer are instruments that synthetically replicate a long or short position on the underlying asset (individual stocks or stock indices) regarding the stream of payoffs (price, dividends, and financing). Therefore, cash flows swapped are usually the fluctuations in the stock price, the financing over the notional amount of the transaction, and the agreed dividend ratio. The equity swap buyer assumes a long position on a synthetic stock or index whereas the buyer takes the short side. Underlying assets are the same as forwards operated on the OTC market through BBVA Bancomer.

The advantages of equity swaps are their flexibility in size and maturity, a leveraged exposure to equity returns (stocks, indexes or ADRs), exposure to diverse yield curves (TIE, LIBOR, and EURIBOR), leveraged short and long positions, and hedging portfolio risks. The main drawback is counterparty risk (credit risk).

Contract characteristics

Issuer:	BBVA Bancomer
Guarantee	BBVA Bancomer
Nominal value:	Variable
Maturity:	Up to 5 years subject to underlying asset

Source: BBVA Research México

Formula

Every delivery day, flows are settled between buyer and seller in function of stock or index return as follows:

Payable: $(S - SO) / SO * M$
Receivable: $M * (1 + r * t / 360)$

Where:
SO = Spot price at the beginning of the period
S = Strike price (at the end of the period)
M = Notional
r = Interest rate
t = term (days)

Example

An investor buys an equity swap paying 28-day TIIE+1% and receiving the IPC return with flows settled each month during one year. The spot IPC is 32,000 and the notional is MXN \$ 100,000,000 MXN\$.

Equity Swap TIIE-IPC

	One month later	Two months later
TIIE28	4.90%	4.95%
IPC	32,500	32,400
Flows		
Payer	$100,000,000 * ((4.9\% + 1\%) * 30 / 360) = 491,667$	$100,000,000 * ((4.95\% + 1\%) * 30 / 360) = 495,833$
Receiver	$(32,500 - 32,000) / 32,000 * 100,000,000 = 1,562,500$	$(32,400 - 32,500) / 32,400 * 100,000,000 = -307,692$
Net		803,526

Source: BBVA Research México

Annex: BBVA Bancomer Securities Services

BBVA Bancomer is the leading provider of securities services at Mexico, with more than 17 years of commitment as a specialized area providing world class custody and clearing services to global custodians, fund managers, private treasuries, insurance companies, broker dealers world-wide.

Through BBVA's network and our sub-custodian relationships, Bancomer Custody and Clearing business scope reaches close to 100 markets worldwide, leveraging our operational expertise, commitment, and technology to deliver a value added service in our client's cross-border investments.

As a local industry leader, BBVA'S Bancomer Securities Services has received the distinction of being the best domestic custodian by the Global Custodian Magazine, winning the "Top Rated" accolade for tenth time in the last thirteen years, rated far above the local benchmark and competitors.

What do we offer

BBVA Bancomer offers a full range of settlement and custody services to investors for securities and fixed income securities

- Holding in safekeeping the customer's portfolio and arrange settlements of any purchases and sales of the assets under custody, concentrating in one place all the transactions our customer trade in the local and international markets, supporting the following operations:
 - Reception & delivery versus payment (RVP / DVP)
 - Reception & delivery free of payment (RFOP / DFOP)
 - Overnight operations
 - ADR's issue and canceling
 - Warranties management:
 - for collateralized overnight operation
 - for derivatives operations
- Periodic reporting: Portfolio distribution, cash incomes and outcomes; and transactions.
- Corporate action reporting and administration
- Dividend and income collection
- Proxy services
- Foreign exchange and cash management services
- Current news bulletins and market information
- Online system which allow our clients track their operations on a real time schedule

Benefits

We work with our customers in a way that suits their aims and operations. Providing them with tailored solutions based on their needs, offering the following benefits:

- Online system continuously enhanced which allow our clients track their operations on a real time schedule through a friendly interface.
- SWIFT messaging platform constantly updated with every year's SWIFT release.
- Customized client and regulatory reporting
- Direct relationship with authorities, CSD, stock market and issuers.

- Competitive and customized tariff for each customer based on asset sizes, volumes, markets, clients operational needs.
- Current news bulletins and market information.
- Omnibus account management
- Synergy with other areas of the bank in order to fulfill special client needs.

At BBVA Bancomer Securities Services we work under a rigorous confidentiality philosophy when managing the customer's operation and information, but giving all the transparency needed for the customer to keep track of all its operations.

For this reasons we comply with the "Chinese wall" policy, managing the customer's portfolio in segregated accounts from the rest of the bank and other area's position.

Our systems are hosted in a different physical location, with two backup sites located in strategic geographical positions, with an IT department ready to give technical support to the operation in order to guarantee the continuity of the service.

Any further information, do not hesitate on contact us.

Web Page:

http://www.bancomer.com/mercado/mercados.asp?mainf=merca_cusin.html&rightf=merca_acceso_subhome.html

Annex: BBVA Bancomer, The most reliable gateway to the Mexican Derivatives Market

Who is BBVA Bancomer Derivatives?

BBVA Bancomer Derivatives provides brokerage execution and clearing services for MexDer, the Mexican Derivatives Exchange and is one of the founding clearing members of Asigna Cámara de Compensación y Liquidación.

MexDer and Asigna are self regulatory institutions; they are supervised by financial authorities: CNBV (Mexican National Banking Commission), SHCP (Ministry of Finance and Public Credit) and BANXICO (Central Bank of Mexico).

Today BBVA Bancomer Derivatives offers:

- Advanced technological infrastructure with its proprietary Online Transaction System.
- Fast connectivity using the web FIX-Protocol
- Credit lines are available for local and international financial institutions
- Contingency processes that guarantee continuity to our client's operations.
- Daily trade confirmations and monthly account statements.
- Extreme confidentiality, as the result of the constitution as a trust.
- Management of Omnibus account

How can you participate?

- **As a Client:** You become a customer of BBVA Bancomer for both trading and clearing.
- **As an Omnibus Account:** You can open an Omnibus Account and trade through a Broker. All positions can be net down upon your request; BBVA Bancomer can manage individual subaccounts.
- **As a Remote Member (Proprietary or Third Party Broker):** You will trade directly in MexDer's floor on behalf of your customers or your proprietary account.

Futures & Options Products

BBVA Bancomer Derivatives trades and clears all futures and options listed on the MexDer:

Futures Contracts		
CURRENCIES	United States of America-Dollar	DEUA
	Legal currency of the European Monetary Union	EURO
INDEX	IPC Index of the BMV (Mexican Stock Exchange)	IPC
INTEREST RATES	28 day Interbank Interest Rate	TE28
	91 day Treasury Bill Certificate	CE91
	3 Year Bond	M3
	10 Year Bond	M10
	20 Year Bond	M20
	Inflation Index	UDI
	10 year Interest Rate Swap Futures	SW10
	2 year Interest Rate Swap Futures	SW02
	10 year Interest Rate Swap Futures (Centrally Cleared Swaps)	SW10
	2 year Interest Rate Swap Futures (Centrally Cleared Swaps)	SW02
SINGLE STOCKS	América Móvil L	AXL
	Cemex CPO	CXC
	Femsa UBD	FEM
	Gcarso A1	GCA
	Telmex L	TMXL
	Walmex V	WAL
Options Contracts		
INDEX	Futures on the Mexican Stock Exchange	IP
SINGLE STOCK	América Móvil L	AX
	Cemex CPO	CX
	Walmex V	WA
	GMéxico B	GM
	Tlevisa, CPO	TV
	Naftrac O2	NA
	Telmex L	TX
ETF	ETF 'S Specific Terms	ETF
CURRENCIES	United States of America-Dollar	DA

Information as of August 2010

MexDer's Futures & Options General Conditions can be found in the following links:

http://www.mexder.com.mx/MEX/Futures_Contracts.html
http://www.mexder.com.mx/MEX/Options_Contracts.html

Risk Management

Initial Margin Contributions requirements are financial resources that Asigna demands to the members that maintain open contracts in the market; these resources are constituted in cash or securities and are managed by Asigna².

Excess in Initial Margin Contributions are determined by BBVA Bancomer Derivatives through a financial assessment based upon the customer's yearly income and balance sheets.

Payment Options

BBVA Bancomer is able to receive payments in cash either in Mexican Pesos (MXP) or US Dollars (USD), and securities deposited in U. S. T-Bills and T-Notes and deposited in Mexico eligible Mexican Stocks, eligible Mexican bonds and CETES (Mexican Treasury Bills). The Bank of New York (BNY) is the custodian for the US Treasury Securities granted as collateral for derivatives clearing and settlement through ASIGNA (Clearinghouse).

The custody of the securities will be done through an S.D. Indeval Account in the Custodian Bank. Indeval (Securities Depository Institution) which will function as a subcustodian for the securities and Asigna will function as the final beneficiary and owner of the securities.

Tax Regime

As of 2010, in the majority of MexDer contracts there are not withholding taxes³.

Clients are able to take advantage of volume pricing, reduced back-office processing and a more efficient use of margins by clearing all futures and options transactions with BBVA Bancomer.

Any further information, do not hesitate to contact us.

Web Page: http://www.bancomer.com/mercado/derivados_ing/index.html

²Asigna's margin requirements can be found in the following link:
http://www.asigna.com.mx/wb3/wb/ASG?externa=ASG_fortaleza_financiera&language=en

³Detailed information will be founded as Anex1.

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