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The Chilean Foreign Exchange Market, an International Comparison: 1998 to 2013

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THE CHILEAN FOREIGN EXCHANGE MARKET, AN INTERNATIONAL COMPARISON: 1998 TO 2013*

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Resumen

Este trabajo presenta hechos estilizados a nivel internacional del mercado cambiario spot y de derivados, entre los años 1998 y 2013. Estos mercados se caracterizan por presentar altos volúmenes de transacciones fuera de Bolsas organizadas, en los denominados mercados Over The Counter (OTC). La principal fuente de información cambiaria OTC es la Encuesta Trianual coordinada por el Bank for International Settlements, cuya última versión fue realizada durante el año 2013 y en la cual participaron más de 50 economías. Este trabajo es una actualización de documentos anteriores, que abordaron resultados previos de esta encuesta, para los años 2007 y 2010. En primer lugar se presenta una comparación internacional de Chile, respecto de tres bloques de economías: Avanzadas, Emergentes y Latinoamericanas. A continuación, se muestran indicadores de profundidad, liquidez e integración financiera, los que son complementados con un indicador de concentración de mercado. Adicionalmente, se estudia la evolución del mercado cambiario chileno, en el cual se expone el comportamiento de distintos sectores económicos, incluyendo a los no residentes. Finalmente, se presentan las conclusiones.

Abstract

This document presents the international evolution of the foreign exchange markets, including the Over the Counter (OTC) derivatives activity, between 1998 and 2013. The main data source is the Triennial Central Bank Survey of foreign exchange and derivatives market activity coordinated by the Bank for International Settlement's, in which more than 50 economies participated in its latest version. This study complements and updates previous works, from 2007 and 2010. The document is organized as follow. The first section presents an introduction. The next section shows an international comparison, considering different markets indicators such as depth, liquidity, integration and concentration. The third section studies the evolution of the Chilean foreign exchange market and their main participants, including the non-residents sector. The last part summarizes the conclusions.

*The opinions and mistakes are of exclusive responsibility of the authors and do not necessarily represent the opinion of the Central Bank of Chile. We thank Alexander Hynes for valuable contribution to this version. Emails: jvillena@bcentral.cl y jsalinas@bcentral.cl.

I. INTRODUCTION

The foreign exchange market is one of the most active markets in the world. This market channels capital flows and payments for foreign trade operations, and allows management of financial risk by companies.

Spot and derivative forex transactions are primarily conducted outside of regulated markets and therefore information is limited. Taking account of this, the Bank for International Settlements (BIS) conducts a triennial survey on foreign exchange and derivatives markets activity, in which Chile has participated since 1998. Based on these surveys, section II presents a comparative international analysis, which is then complemented in section III with stylised facts about the Chilean foreign exchange market.

This paper aims to contribute greater understanding of the forex market as well as facilitate analysis of this topic through the publications of the Central Bank of Chile.

II. GLOBAL AND CHILEAN FOREIGN EXCHANGE ACTIVITY

II.1 Global foreign exchange activity

This section presents information based on results from the BIS triennial survey on foreign exchange and derivatives market activity between 1998 and 2013. The latest survey in 2013 utilises information from around 1,300 banks and other financial intermediaries in the foreign exchange markets, reported by 53 participating countries.[2]

The BIS conducts the survey by requesting information from central banks and monetary authorities on average daily foreign exchange transactions (spot and derivatives) made in the over-the-counter (OTC) markets during April of each survey year.

The survey highlights that the volume of forex transactions conducted in the OTC markets account for approximately 98% of the amounts traded globally and 100% in the case of Chile.

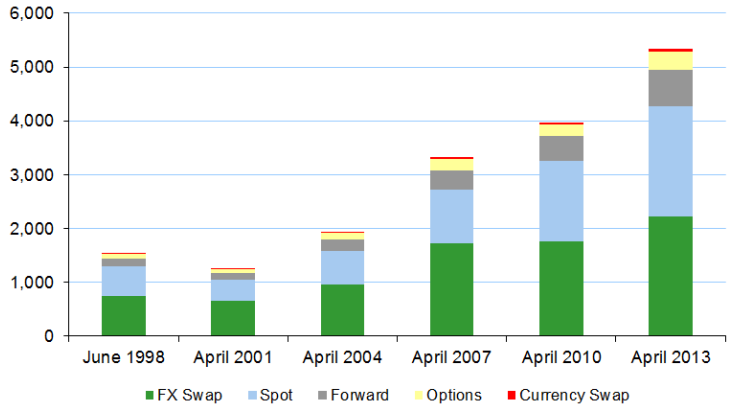
According to the results published by the BIS, global foreign exchange activity amounted to US$5.3 trillion per day in 2013. This represents an increase of 35% from 2010 and continues the upward trend that began in 2001. In 2001 the volume of transactions decreased with respect to 1998 due to the coming into force of the euro

[2] Triennial Central Bank Survey: Foreign exchange and derivatives market activity. The results from the latest survey conducted by the BIS can be found at the following link: https://www.bis.org/publ/rpfx13.htm.

as the official currency of the Eurozone. The increased turnover was observed in all instruments, highlighted by Foreign Exchange Swaps (FX swaps) and spot transactions, respectively, making 42% and 38% of the total for 2013 (Graph 1).

Graph 1: Global daily foreign exchange turnover

US$ billion



Source: BIS.

Regarding geographical distribution, turnover has historically been concentrated in the United Kingdom and the United States. Foreign exchange trading in both countries made up around 60% of the world's total in 2013. This is up from 51% in 1998 and from subsequent periods (2004 and 2007) (Table 1).

Table 1: Principal countries in terms of global foreign exchange turnover

Daily averages in April; percentages

Country	1998	2001	2004	2007	2010	2013
United Kingdom	32.6	31.8	32.0	34.6	36.8	40.9
United States	18.3	16.0	19.1	17.4	17.9	18.9
Singapore	6.9	6.1	5.1	5.6	5.3	5.7
Japan	7.0	9.0	8.0	5.8	6.2	5.6
Hong Kong	3.8	4.0	4.1	4.2	4.7	4.1
Switzerland	4.4	4.5	3.3	5.9	4.9	3.2
France	3.7	2.9	2.6	3.0	3.0	2.8
Australia	2.3	3.2	4.1	4.1	3.8	2.7
Netherlands	2.0	1.8	2.0	0.6	0.4	1.7
Germany	4.7	5.4	4.6	2.4	2.2	1.7
Denmark	1.3	1.4	1.6	2.1	2.4	1.5
Canada	1.8	2.6	2.3	1.5	1.2	1.0
Others	11.2	11.5	11.3	12.7	11.2	10.1
Total	**100**	**100**	**100**	**100**	**100**	**100**

Source: BIS.

The US dollar maintained its leadership as the most traded currency in the world, participating in 87% of all transactions. The euro declined in importance between 2010 and 2013 driven by the Eurozone's sovereign debt crisis (BIS, 2013), with global transactions of 33.4% in 2013, versus 39.1% in 2010. Transactions with Japanese Yen increased in 2013, influenced by the foreign exchange interventions adopted by the monetary authority of Japan (Table 2).

Table 2: Currency rankings of global foreign exchange turnover

Percentages to a total of 200%[3]

	Moneda	1998	2001	2004	2007	2010	2013
1	US dollar	86.8	89.9	88.0	85.6	84.9	87.0
2	Euro	0.0	37.9	37.4	37.0	39.1	33.4
3	Japanese yen	21.7	23.5	20.8	17.2	19.0	23.0
4	British pound	11.0	13.0	16.5	14.9	12.9	11.8
5	Australian dollar	3.0	4.3	6.0	6.6	7.6	8.6
6	Swiss franc	7.1	6.0	6.0	6.8	6.3	5.2
7	Canadian dollar	3.5	4.5	4.2	4.3	5.3	4.6
8	Mexican peso	0.5	0.8	1.1	1.3	1.3	2.5
9	Chinese yuan	0.0	0.0	0.1	0.5	0.9	2.2
10	New Zeland dollar	0.2	0.6	1.1	1.9	1.6	2.0
11	Swedish krona	0.3	2.5	2.2	2.7	2.2	1.8
12	Russian ruble	0.3	0.3	0.6	0.7	0.9	1.6
13	Hong Kong dollar	1.0	2.2	1.8	2.7	2.4	1.4
14	Norwegian krone	0.2	1.5	1.4	2.1	1.3	1.4
15	Singapore dollar	1.1	1.1	0.9	1.2	1.4	1.4
16	Turkish lira	0.0	0.0	0.1	0.2	0.7	1.3
17	Korean won	0.2	0.8	1.1	1.2	1.5	1.2
18	South African rand	0.4	0.9	0.7	0.9	0.7	1.1
19	Brazilian Real	0.2	0.5	0.3	0.4	0.7	1.1
20	Indian rupee	0.1	0.2	0.3	0.7	1.0	1.0
21	Danish krone	0.3	1.2	0.9	0.8	0.6	0.8
22	Polish zloty	0.1	0.5	0.4	0.8	0.8	0.7
23	Taiwan dollar	0.1	0.3	0.4	0.4	0.5	0.5
24	Hungarian forint	0.0	0.0	0.2	0.3	0.4	0.4
25	Malaysian ringgit	0.0	0.1	0.1	0.1	0.3	0.4
26	Czech koruna	0.3	0.2	0.2	0.2	0.2	0.4
27	Thai baht	0.1	0.2	0.2	0.2	0.2	0.3
28	Chilean peso	0.1	0.2	0.1	0.1	0.2	0.3
29	Israeli shekel	0.0	0.1	0.1	0.2	0.2	0.2
30	Indonesian rupiah	0.1	0.0	0.1	0.1	0.2	0.2
31	Philippine peso	0.0	0.0	0.0	0.1	0.2	0.1
32	Romanian leu	0.0	0.0	0.0	0.0	0.1	0.1
33	Colombian peso	0.0	0.0	0.0	0.1	0.1	0.1
34	Saudi riyal	0.1	0.1	0.0	0.1	0.1	0.1
35	Peruvian sol	0.0	0.0	0.0	0.0	0.0	0.1
	Other currencies	...	6.6	6.6	7.7	4.7	1.6
	Total	**200**	**200**	**200**	**200**	**200**	**200**

Source: BIS.

[3] Because each transaction involves two different currencies, the sum of the percentage shares of individual currencies totals 200% instead of 100%. For example, if we take a transaction between CLP and USD (500 CLP = 1 USD), both currencies participate in the transacted amount (500 CLP and 1 USD).

The situation described above is also reflected in the most important currency pairs of the USD/Euro and USD/Yen with turnover of 24.1% and 18.3%, respectively, in 2013 (Table 3).

Table 3: Currency pair turnover

Daily averages in April, in billions of US dollars and percentages

Currency pairs	1998		2001		2004		2007		2010		2013	
	Ammount	%	Ammount	%	Ammount	%	Ammount	%	Ammount	%	Ammount	%
US dollar												
Euro*	542	38	372	30	541	28	892	27	1098	28	1289	24
Yen	257	18	250	20	328	17	438	13	567	14	978	18
British pound	118	8	129	10	259	13	384	12	360	9	472	9
Australian dollar	42	3	51	4	107	6	185	6	248	6	364	7
Canadian dollar	50	3	54	4	77	4	126	4	182	5	200	4
Swiss franc	79	5	59	5	83	4	151	5	166	4	184	3
Other currencies	172	12	199	16	307	16	669	20	749	19	1167	22
Euro*												
Yen**	24	2	36	3	61	3	86	3	111	3	147	3
Other currencies***	120	8	62	5	121	6	253	8	342	9	350	7
Other pairs	31	2	28	2	50	3	139	4	149	4	195	4
All pairs	**1430**	**100**	**1239**	**100**	**1934**	**100**	**3324**	**100**	**3971**	**100**	**5345**	**100**

Source: BIS.

II.2 The Chilean foreign exchange market in the international context

This section compares the spot and derivative foreign exchange markets of Chile with other economic blocks for the period between 1998 and 2013. It compares indicators of depth, liquidity and financial integration, following the methodology presented by Acharán and Villena (2011b)[4]. There is also a contrast of market concentration, measured with a Herfindahl index.

In order to present a comparative analysis, countries are grouped into three economic blocks: Advanced Economies, Emerging Economies and Latin American Economies. These groupings are considered in the World Economic Outlook of the International Monetary Fund (IMF).[5]

II.2.1 Depth Index

This indicator measures how active a forex market is after normalising the data with respect the size of the economy. The index is constructed by taking the notional amount[6] of spot and derivative contracts negotiated during April (in US dollars), annualising the data using the number of working days in the United Kingdom and then dividing by the gross domestic product (GDP) of each country. A weighted average is then calculated for each economic block. GDP data is

[4] Methodology for the construction of liquidity indicators is complemented by Burnside et al. (2006).

[5] In preparing the indices, weighted averages are considered based on the relative importance of each country.

[6] The notional amount of a derivative contract is the amount in which payments are calculated at maturity. If the contract is for physical delivery, it will be the amount to be exchanged in different currencies.

extracted from the database of the IMF's World Economic Outlook from April 2013.[7]

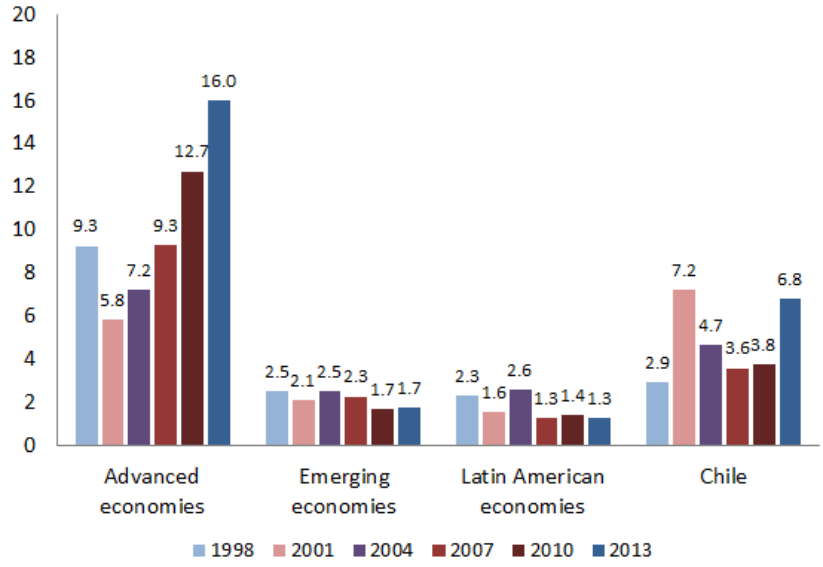
Between 1998 and 2013 the advanced economies continued to lead the spot market with average activity in 2013 of 16 times GDP. Observed over this period is a growing difference between the advanced economies and the emerging and Latin American economies (Graph 2).

The advanced economies are also highlighted in the OTC derivatives markets, registering trading volumes of 16.8 times GDP in 1998 and 27.6 times GDP in 2013. These trading volumes are principally located in the major international financial centres of London, New York, Singapore, Tokyo and Hong Kong (Graph 3).

Chile shows higher spot and derivative market indicators than the average emerging and Latin American economies, reaching 6.8 times GDP in both. This represents a double (spot) and quadruple (derivatives) increase since 1998. This growth is explained by the elimination of capital controls in 2001, the growth of exports and imports during the period, higher stocks of assets and liabilities abroad (International Investment Position or IIP), and less-restrictive foreign investment limits for Pension Fund Managers (AFPs).

Graph 2: Spot market activity, 1998-2003

Annual turnover/GDP

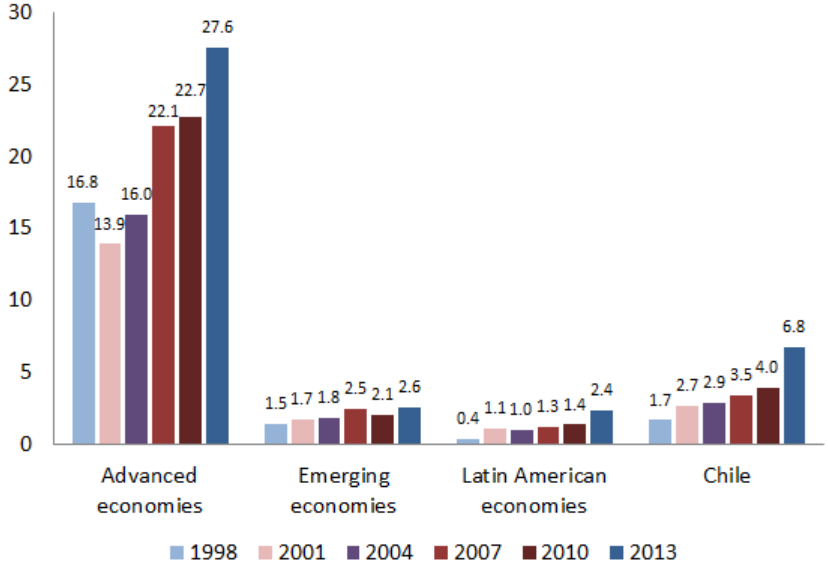


Source: Prepared by the authors based on BIS and IMF information.

[7] Indicators for 2013 use 2012 GDP data due to incomplete data at time of construction.

Graph 3: Derivatives market activity, 1998-2003

Annual turnover/GDP



Source: Prepared by the authors based on BIS and IMF information.

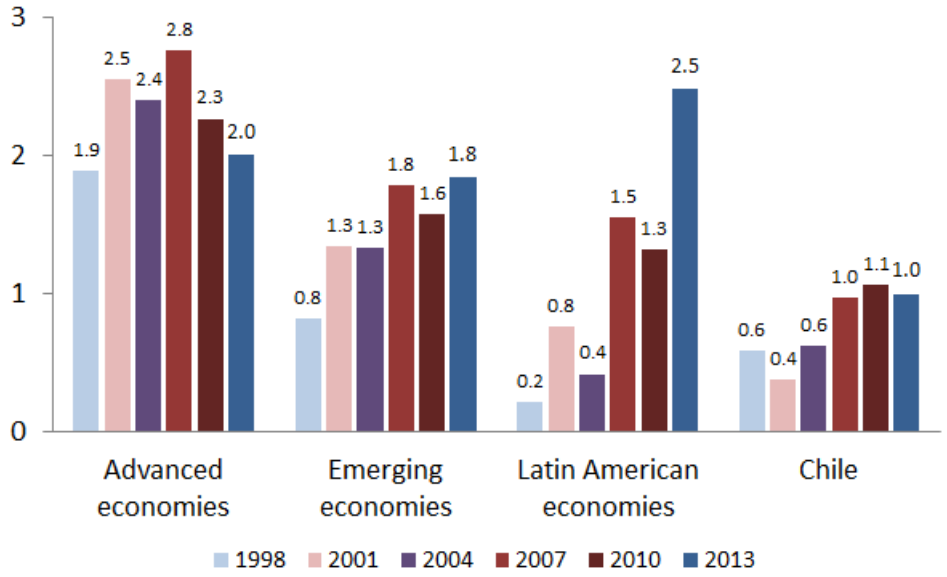
In many of the economies analysed, activity in the derivatives market is greater than activity in the spot market, and is more than double in the case of the advanced economies block (Graph 4). However, it appears that this relationship decreased in 2010 compared to 2007. This can be linked to the US subprime mortgage crisis and its relationship with the utilisation of credit default swap (CDS) derivative instruments. Additionally, in response to the crisis, the authorities have tightened regulations on financial risk management, which has discouraged the use of derivatives in some ways.

The index continued its decline in advanced economies in 2013, situating itself in a level similar to that of 1998, in a context of weak economic growth and fiscal debt crises.

By contrast, increases in the ratio of the use of derivatives over spot are observed in the other economic blocks since 1998, with Chile registering the lowest value at close to one (Graph 4).

Graph 4: Ratio of derivative to spot turnover, 1998-2003

Derivative/Spot



Source: Prepared by the authors based on BIS and IMF information.

II.2.2 Liquidity Index

Liquidity is desired by investors because it reflects the ease with which financial assets can be transacted without significant losses in value. The following formula is used to quantify the liquidity of a currency:

$$LI = 100*\ln(SP/ BP)$$

Where SP is the sell price of a currency and BP is the buy price of the same currency. Greater differences between the sell price and buy price result in a higher index and indicate less liquidity.

Shown below are weighted average liquidity ratios by economic block for both spot and derivative markets. In the case of derivatives, prices for 30-day forwards are taken as this product is used extensively for risk hedging in the market, and therefore, there is a significant volume of contracts and publicly available information.

The figures were constructed using bid/ask quotes sourced from Bloomberg and Reuters (not actual transactions). The indicators were constructed back to 2001 due to lack of complete information before this.

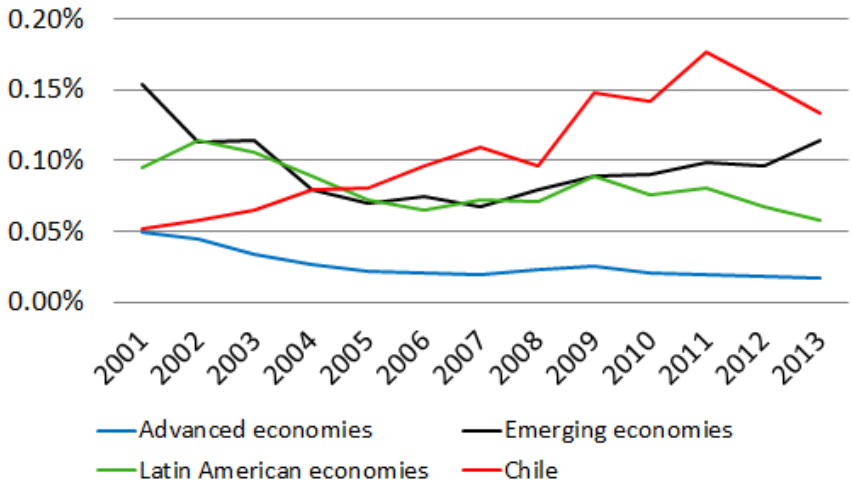
Both the spot and forward markets in advanced economies show higher levels of liquidity, with spreads of 0.02% in both markets. Overall, the liquidity in advanced economies has increased over time with the exception of 2008 and 2009 which were affected by the global financial crisis. This same trend is present in the

forward markets of the emerging and Latin American blocks, however, higher liquidity is generally observed in the spot markets instead of the forward markets.

In the case of Chile a decline in liquidity is observed in both markets[8] (Graphs 5 and 6).

Graph 5: Average weighted spread of spot transactions, 2001-2013

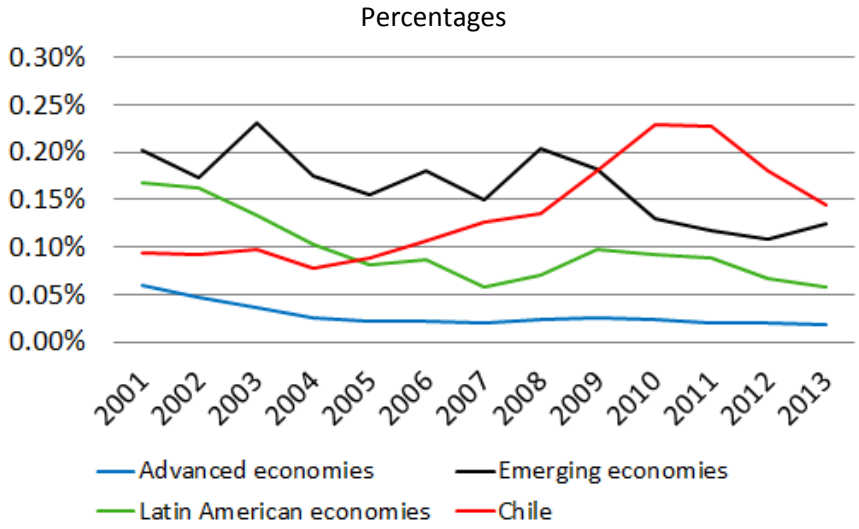
Percentages



Source: Prepared by the authors based on Bloomberg, Reuters, BIS and IMF information.

[8] Liquidity is expected to increase with the addition of improvements to the infrastructure of existing financial markets in other countries, such as the implementation of clearing houses and central counterparties to clear and settle transactions on a multilateral basis (Budnevich and Zurita, 2009; Central Bank of Chile, Financial Stability Report 2012).

Graph 6: Average weighted spread of 30-day forward transactions, 2001-2013



Source: Prepared by the authors based on information from Bloomberg, Reuters, BIS and IMF.

II.2.3 Financial Integration Index

Financial integration is taken to mean the level of cross-border foreign exchange turnover. It is a reflection of the internationalisation of a currency and the level of access an economy has to international capital markets, where OTC transactions must operate with lines of credit. The formula for calculating the spot index is shown below:

$$SII = TSC / TS$$

where *SII* is the spot integration index, *TSC* is the total spot cross-border volume traded and *TS* is the total spot volume traded in the local economy (i.e. with local and foreign counterparties).

The formula for calculating the forward index is shown below:

$$DII = TDC / TD$$

where *DII* is the forward integration index, *TDC* is the total forward cross-border volume traded and *TD* is the total forward volume traded in the local economy (i.e. with local and foreign counterparties).

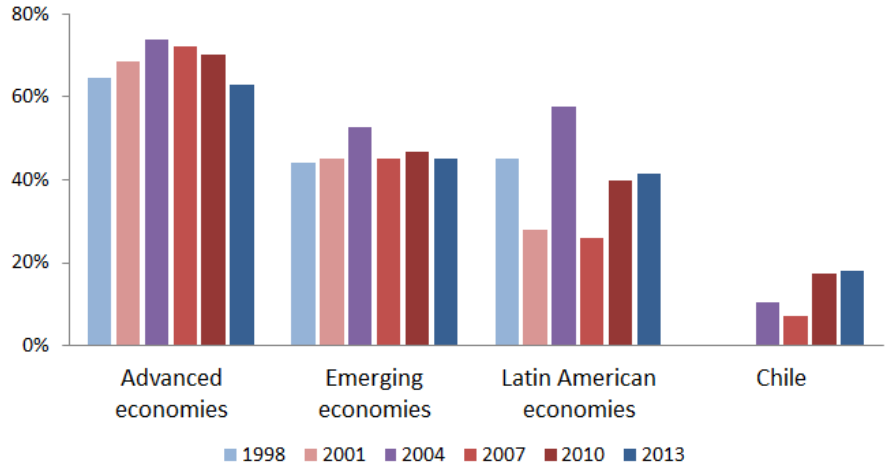
The indices show that advanced economies have higher degrees of financial integration with 63% and 69% in the spot and derivatives markets respectively.

Results in 2013 indicate lower percentages than preceding years. This could be influenced by the new regulations being implemented in the United States (Dodd-Frank) and in Europe (European Market Infrastructure Regulation) that are establishing greater restrictions on counterparties operating certain regulated financial vehicles.

Capital controls had restricted the flow of cross-border transactions in Chile until 2001. The derivatives market indicator is higher than the spot indicator as operations are compensated in foreign currency through accounts maintained abroad by participating banks (Graphs 7 and 8).[9]

Graph 7: Cross-border spot turnover as a percentage of total spot turnover

Percentages

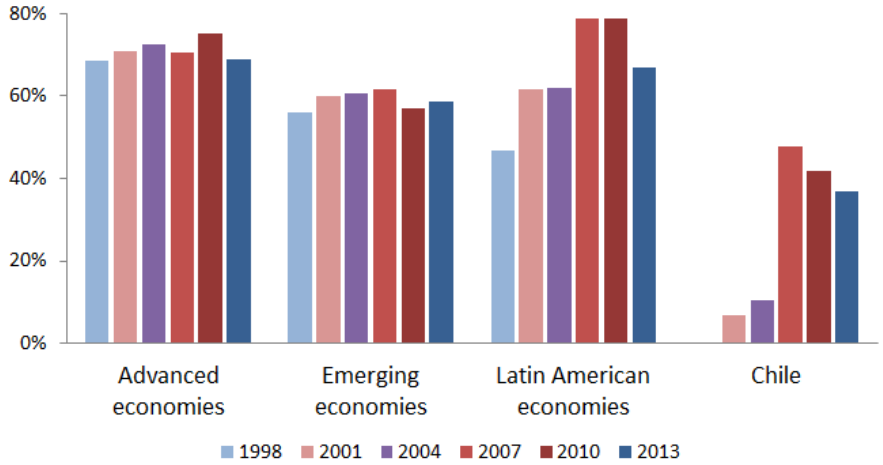


Source: Prepared by the authors based on BIS and IMF information.

[9] The low level of cross-border spot turnover could be linked to the lack of offshore Chilean peso transactions (Wu, 2014).

Graph 8: Cross-border derivative turnover as a percentage of total derivative turnover

Percentages



Source: Prepared by the authors based on BIS and IMF information.

II.2.4 Concentration Index

The Herfindahl-Hirschman index, which is a measure of the concentration of a market or when a lack of competition occurs, is presented below.

The index corresponds to the sum of the squared market shares of the agents in a particular industry. The formula is calculated as shown below:

$$HHI = \sum s_i^2$$

where s_i is the percentage market share of agent "*i*". In the case of a purely concentrated market (monopoly), the index will have a value of 10,000.

In the United States, a market is considered to be moderately concentrated if the index falls between 1,500 and 2,500 and that values higher than this would typically indicate a more highly concentrated market.[10]

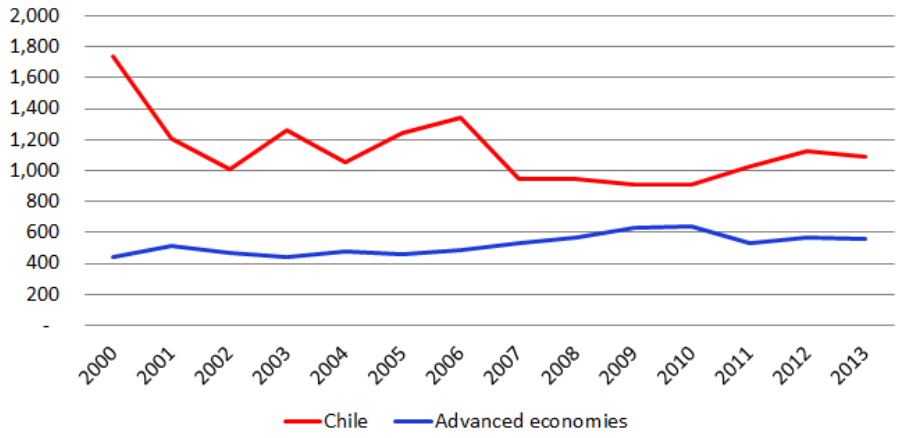
The BIS calculates the HHI for forwards, FX swaps and currency swaps on a semi-annual basis for advanced economies that provide information on the activity of their currency markets.[11] The results indicate a lower concentration than that of the Chilean economy, which has shown a value lower than 1,500 since 2001 (Graph 9).

[10] The United States Department of Justice, http://www.justice.gov/atr/public/guidelines/hhi.html

[11] Countries participating in the BIS semi-annual survey are: Australia, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, United Kingdom and United States.

Graph 9: Herfindahl-Hirschman index of market concentration

Forward, FX swap and currency swap



Source: BIS for Advanced Economies; prepared by the authors based on Central Bank of Chile information.

III. THE CHILEAN FOREIGN EXCHANGE MARKET

This section presents stylised facts that aim to explain the evolution that has taken place in Chile's foreign exchange market between 1998 and 2013. Data is sourced from information reported to the Central Bank of Chile by banks and other entities that form part of the Formal Exchange Market[12], representing approximately 96% of transactions performed in the Chilean market.

The structure of this section is as follows: outstanding positions (stocks), turnover (flows) during a given period, behaviour of the main non-bank financial institutions such as Pension Fund Managers (AFPs) and non-financial companies, and finally information on operations with external counterparties.

Definitions of the concepts used in this section can be found in Acharán and Villena (2011). Any references to purchases or sales made in the remainder of this document refer to purchases or sales of foreign currency.

It should be noted that much of the information presented below is published in the statistics database on the Central Bank of Chile's website.

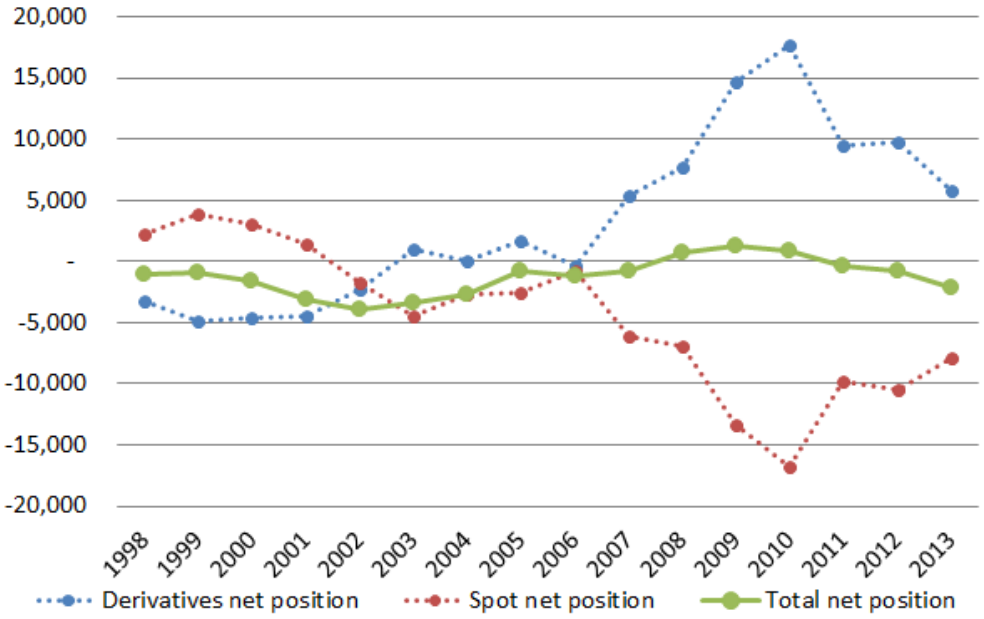
[12] According to Article 41 of the Organic Constitutional Law of the Central Bank of Chile, "shall mean the Formal Exchange Market formed by banks. The Bank may authorise other entities to join the Formal Exchange Market if the purpose is only to carry out foreign exchange transactions". "It is understood that transactions are carried out in the Formal Exchange Market when performed by or executed through one of the persons or entities that constitute it". The other entities correspond principally to brokers indicated in Annex 2 of Chapter III of the Manual of Procedures and Information Forms of the Compendium of Foreign Exchange Regulations which are ´legal persons authorised by the Central Bank of Chile to form part of the Formal Exchange Market' (http://www.bcentral.cl/normativa/cambio-internacional/manual-procedimiento/index.htm).

III.1. Outstanding positions

Banks intermediate between the spot and derivative markets which explains why, since 1998, the global position (spot plus derivatives) has not fluctuated beyond -US$3.8 billion and US$1.3 billion (Graph 10)

Graph 10: Net outstanding position in the Formal Exchange Market

Derivatives[13] and spot[14]; US$ million



Source: Central Bank of Chile.

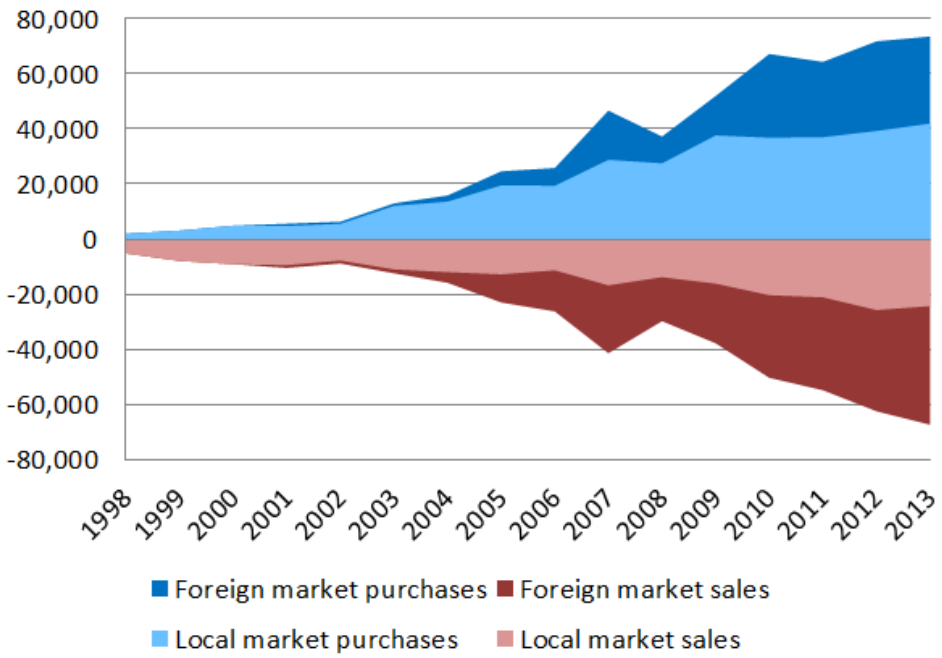
A deepening is observed in the gross position of the derivatives market, for both local and foreign counterparties (Graph 11).

[13] The derivatives net position is the nominal or notional value of all contracts to purchase foreign currency in the future minus the nominal or notional value of all contracts to sell foreign currency in the future. A positive sign indicates a net long position while a negative sign indicates a net short position. Transactions are carried out by institutions in the Formal Exchange Market (FEM) with both local and cross-border counterparties. The most commonly-traded instruments are: forwards, FX Swaps, cross-currency swaps and options.

[14] The spot net position (or spot exchange position) is an accounting concept that corresponds to a stock. It increases with purchases of foreign currency using Chilean pesos and decreases with sales of foreign currency for Chilean pesos. A positive figure indicates that there have been more purchases than sales of foreign currency over the life of the series. A negative figure indicates that there have been more sales than purchases of foreign currency over the life of the series. A negative figure also indicates that sales of foreign currencies have been financed by different sources other than the purchase of foreign currency. An example of this is a bank that takes out an external loan in foreign currency to sell to a company needing to pay import transactions or remit profits abroad.

Graph 11: Gross derivatives outstanding position in the Formal Exchange Market

US$ million

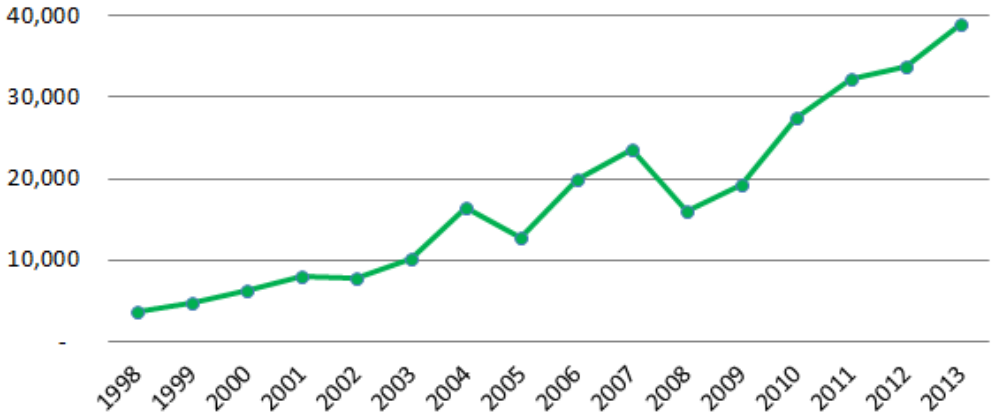


Source: Central Bank of Chile.

This is also observed in the interbank market (Graph 12).

Graph 12: Interbank derivative purchase positions

US$ million



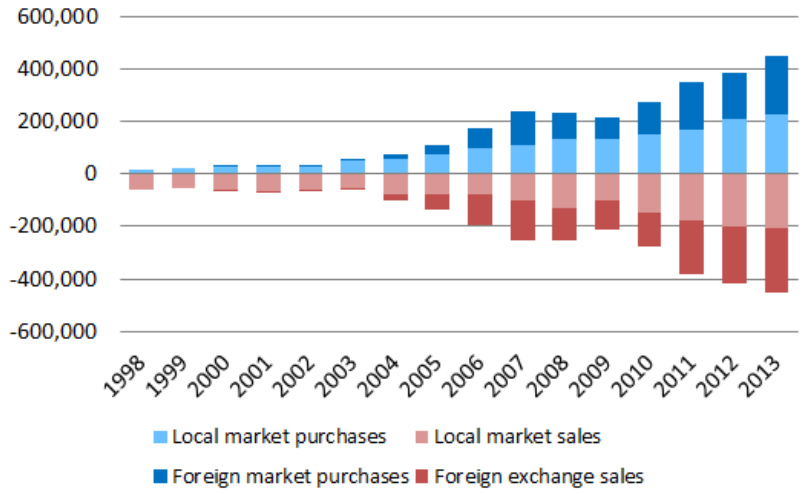
Source: Central Bank of Chile.

III.2. Turnover

Turnover has also been rising since 1998 in the derivatives market, going from US$76.5 billion in 1998 to US$903.1 billion in 2013. This activity is higher than the spot market that has grown by over 519% over the last 15 years, reaching US$630.5 billion in 2013[15,16] (Graphs 13 and 14).

Graph 13: Derivatives turnover in the Formal Exchange Market

US$ million



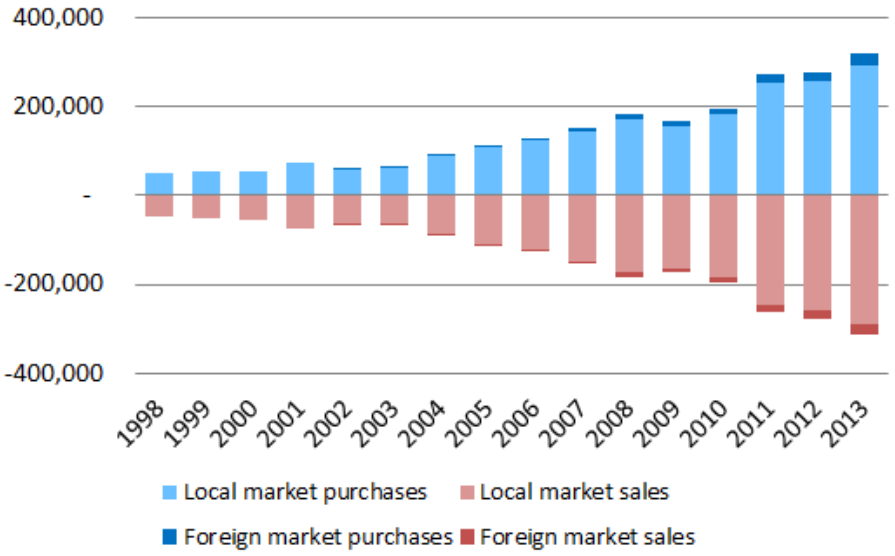
Source: Central Bank of Chile

[15] It should be noted that both the short and the long leg of FX swap transactions are included in this figure.

[16] Foreign exchange interventions by the Central Bank of Chile in 2008 (US$8 billion) and 2011 (US$11 billion) are considered within spot sale turnover to the local market.

Graph 14: Spot turnover in the Formal Exchange Market

US$ million

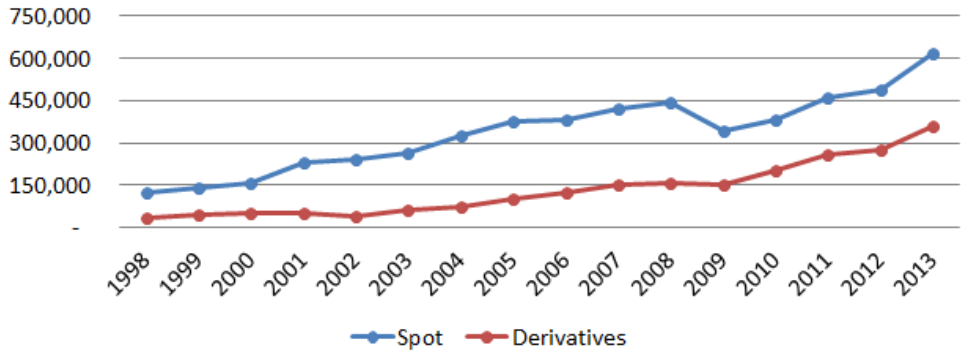


Source: Central Bank of Chile.

Turnover in the in interbank spot market exceeded US$600 billion in 2013, nearly five times the figure of 1998. Turnover in the interbank derivatives market was around US$359.5 billion, which is equivalent to 10 times what was negotiated in 1998 (Graph 15).

Graph 15: Interbank spot and derivatives turnover

US$ million

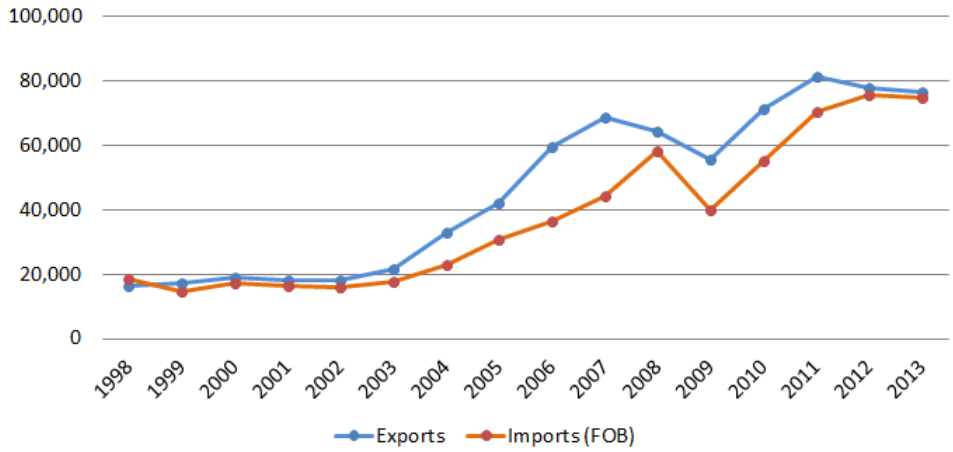


Source: Central Bank of Chile.

One explanation for the increased turnover shown in the graphs above are the greater foreign trade flows present in the Chilean economy, which quadrupled between 1998 and 2013 (Graph 16).

Graph 16: Foreign trade flows

US$ million



Source: Central Bank of Chile.

Another explanation for the evolution of the Chilean foreign exchange market is the growth of the International Investment Position (IIP). The IIP has grown on both the asset and liability side (from 1998 to 2013 the asset position grew more than eight times, while the liability position grew by about five times). This growth reflects the Chilean economy's access to international financial markets in credit, bonds, portfolio investment and foreign investment. This implies that financial entities must operate in the spot market as well as the derivatives market in order to hedge the risks of foreign currency mismatches (Graph 17).

Graph 17: International investment position

US$ million

Source: Central Bank of Chile.

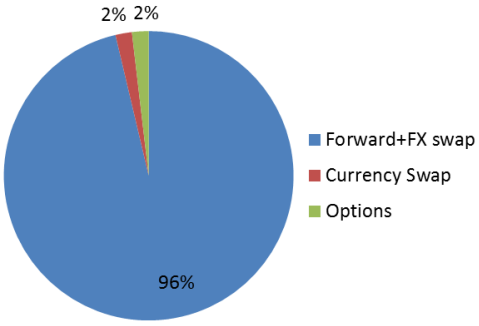
III.3. Instruments, currency pairs and payment methods

a. Instruments

In the Chilean foreign exchange market, the most traded instruments in 2013 were forwards and FX swaps. In outstanding amounts, currency swaps gain more importance with 28% of the total. The difference in currency swaps is explained by their longer-term nature, ensuring a lower turnover compared to forwards or FX swaps. Options represent 2% of turnover and outstanding amounts (Graphs 18 and 19).

Graph 18: Derivatives turnover by instrument

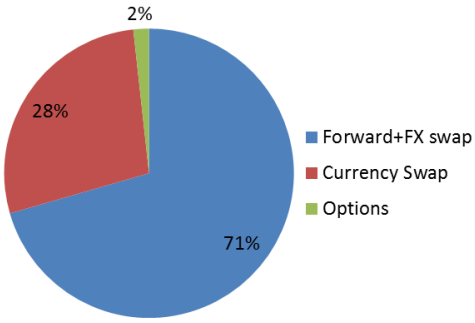
Percentages; 2013



Source: Central Bank of Chile

Graph 19: Derivatives outstanding amounts by instrument

Percentages; 2013



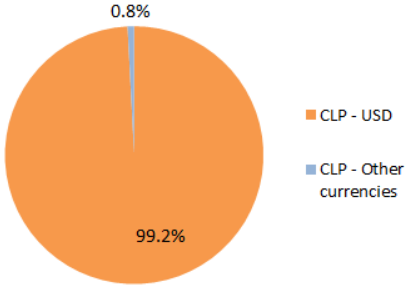
Source: Central Bank of Chile

b. Currency pairs

Regarding currency pairs traded in the Chilean economy, peso-dollar transactions dominate in both the spot and derivative markets with 99.2% and 97.6% respectively in 2013. This situation has remained stable over time (Graphs 20 and 21).

Graph 20: Spot currency pair transactions

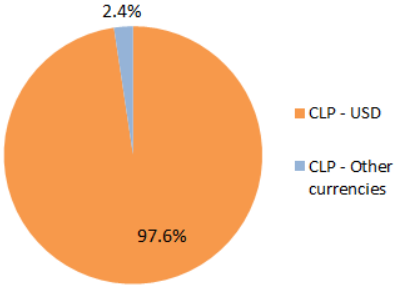
Percentages; 2013



Source: Central Bank of Chile.

Graph 21: Derivatives currency pair transactions

Percentages; 2013



Source: Central Bank of Chile.

c. Payment Methods

Derivatives transactions can be settled with cash or by physical delivery. Physical delivery involves the actual exchange of underlying, while cash settlement involves a comparison between the agreed price and the market price at maturity with the difference paid in an agreed currency.[17] Cash settlement can be expressed with the following formula:

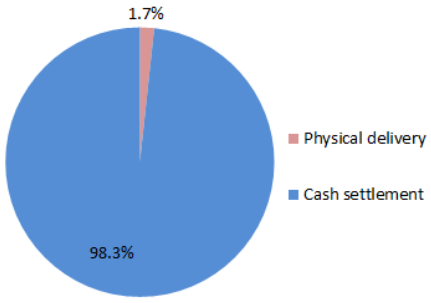
$$SA = NA * (Forward\ Price – Spot\ Price)$$

where SA is the settlement amount and NA is the notional amount.

In the Chilean market in 2013, physical delivery accounted for 1.7% of transactions in the interbank market and 10.3% for transactions with third parties (Graphs 22 and 23). Physical delivery is mainly used by companies in the real sector.

Graph 22: Interbank contracts

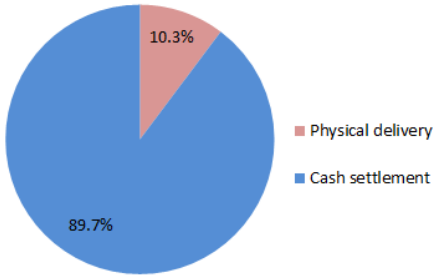
Percentages; 2013



Source: Central Bank of Chile

Graph 23: Formal Exchange Market contracts with third parties

Percentages; 2013



Source: Central Bank of Chile

III.4. Pension funds, corporations and other sectors

The principal counterparties to banks in the local market are: pension funds, mutual funds (FFMM), insurance companies, stockbrokers and broker-dealers, and corporations and individuals. In this latter group, as published by the Central Bank of Chile, most are companies in the real sector, but it also includes information on financial corporations, government, the central bank and other individuals.

Below is a description of the market from the point of the view of pension funds and other financial agents.

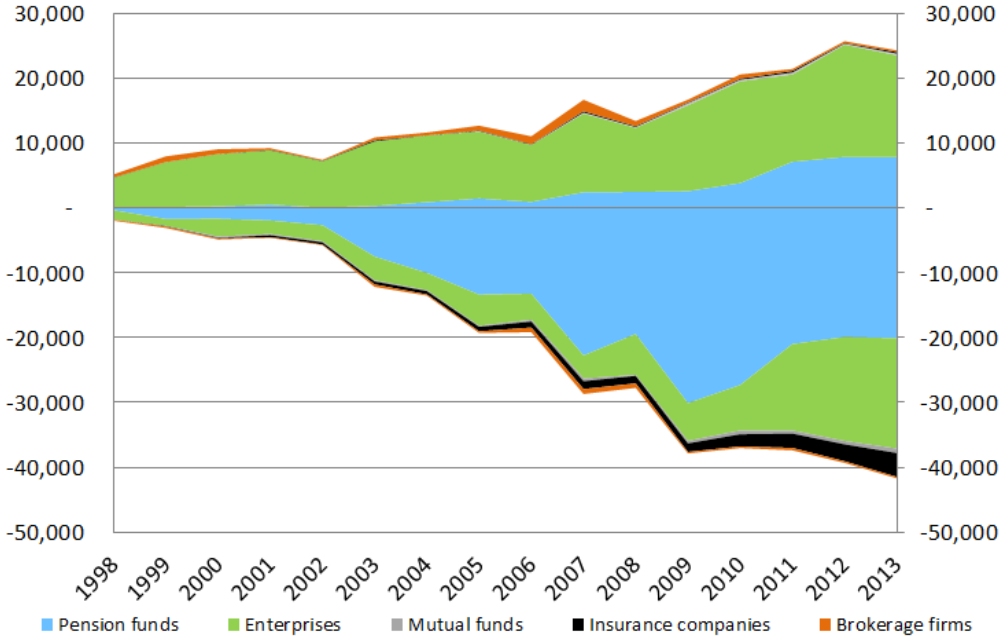
[17] Cash settlement transactions in Chile are settled with Chilean pesos, while cash settlements in *cross-border* transactions are settled with foreign currencies.

Derivatives

An increase in all sectors in the derivatives market is observed between 1998 and 2013, particularly in the pension fund sector. Pension funds buy dollars in the spot market in order to invest abroad. As pension fund liabilities are in Chilean pesos, these funds use derivatives contracts to hedge future currency mismatches (Graph 24).

Graph 24: Gross derivatives outstanding position by economic sector

US$ million



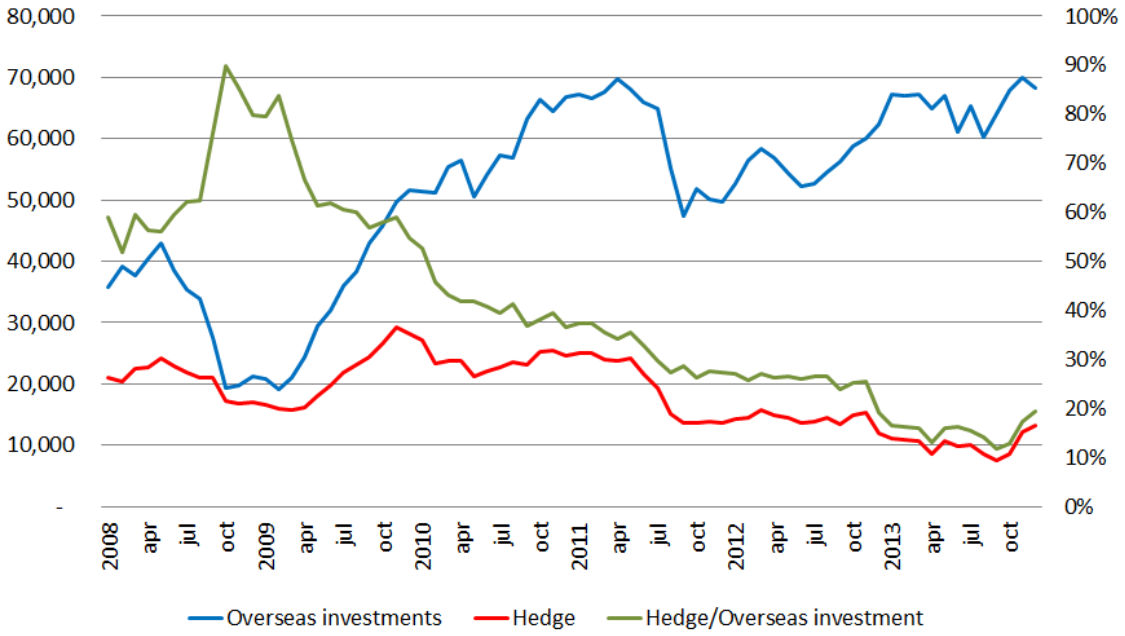
Source: Central Bank of Chile

The highest position held by pension funds was recorded in 2009 with approximately US$28 billion of foreign currency to be sold in the future. This position was later reversed due to regulatory changes including different hedging requirements as well as position ceilings, depending on the type of instrument invested abroad.[18] It is notable that during the global financial crisis in 2008, pension fund investments abroad decreased to US$20 billion, resulting in the hedge ratio reaching 90% in October that year. After the crisis, in response to changes in regulations and as foreign investment picked up again, the hedge ratio settled at 30%. With the rule change in 2012, the ratio settled down between 10% and 20% (Graph 25).

[18] Regulations that define the hedging requirements of foreign investments by pension funds have seen successive changes. Initially, D.L. 3500, art. 45 defined minimum hedging requirements depending on the denomination of the assets. In 2010, these regulations were then linked to the underlying currency of the assets ('Régimen de Inversión Vigente de los Fondos de Pensiones' until 30 November 2012). Subsequently, Resolution no. 46 issued on 27 June 2012 by the Superintendencia de Pensiones required coverage to also consider the underlying assets class (equities and fixed income).

Graph 25: Pension fund foreign investment and hedge ratio

US$ million; Percentages

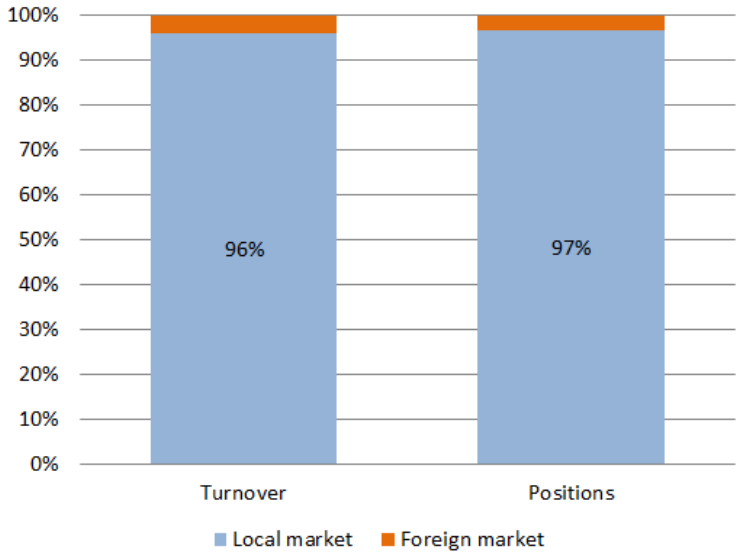


Source: Prepared by the authors based on information published by Superintendencia de Pensiones and Central Bank of Chile.

It should be noted that the pension fund administrators (six in 2013) were authorised to carry out derivatives operations directly with foreign counterparties in 2009. The volumes traded and outstanding amounts of these direct operations are significantly lower than those on the local market. Foreign counterparties are financial institutions that have no relation with any bank-owned enterprise in Chile, raising the cost of operating with Chilean pesos. In 2013, pension fund turnover directly with foreign counterparties made up 4% of the total, whereas outstanding amounts accounted for 3% as at the end of December (Graph 26).

Graph 26: Pension fund use of derivatives in local and foreign markets

Turnover and outstanding amount 2013; Percentages



Source: Central Bank of Chile.

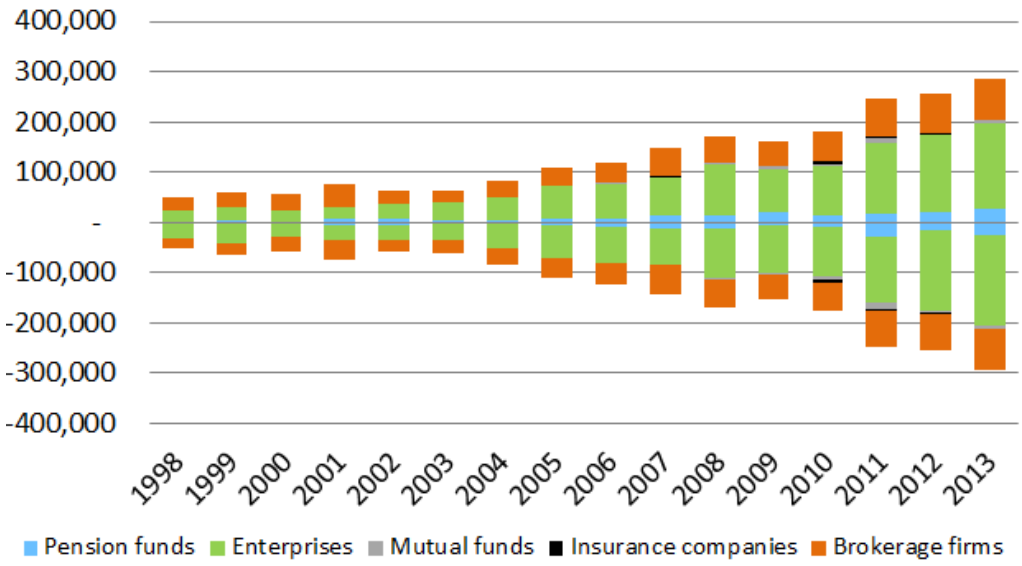
In the other hand, corporations and individuals have increased their share of the use of derivatives, accounting for a higher outstanding amount than pension funds from 2012 and higher turnover than pension funds from 2013 (Graph 24). The principal corporations include large mining companies, as well as those that deal with fuel, trade and services. Exchange rate transactions are carried out either because of local currency liabilities or to hedge the risk of mismatch in foreign currencies. This increase in turnover could be linked to higher foreign trade as well as more sophisticated management of financial risks.

Spot

Turnover in the spot market has been growing over time with greater participation from corporations and individuals, as well as brokerage houses and broker-dealers. Through the latter, financial agents sell foreign currency savings or purchase foreign currency in order to invest abroad (Graph 27).

Graph 27: Gross spot turnover in the local market by economic sector

US$ million



Source: Central Bank of Chile.

III.5. External sector

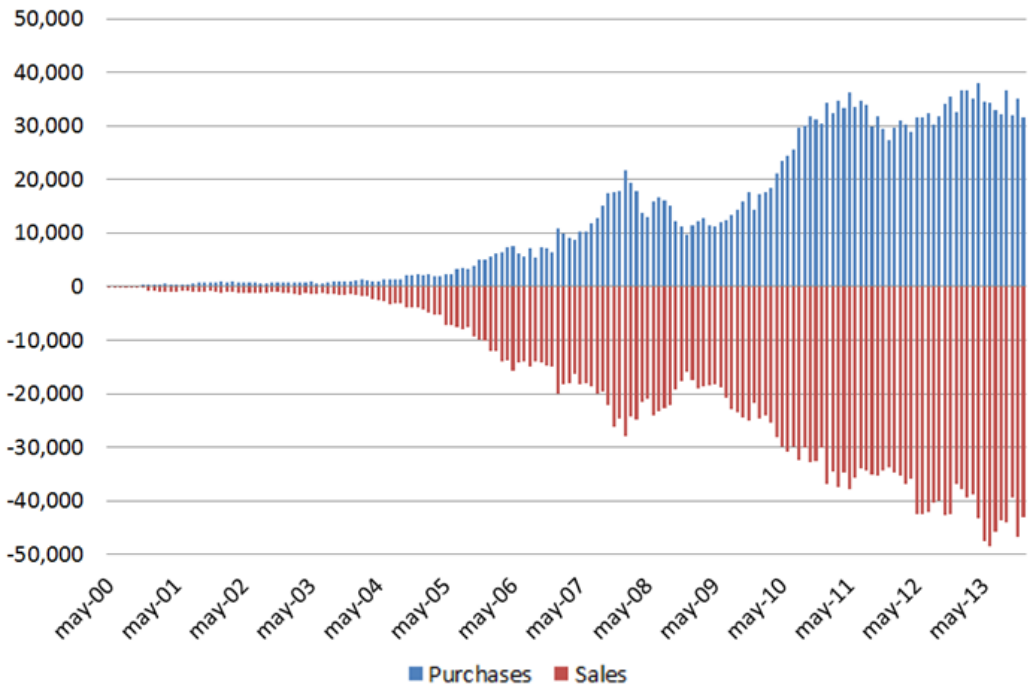
The participation of non-residents in the derivatives market has seen growth in both turnover and outstanding positions (Graphs 11 and 13, respectively). It should be noted that in May 2000 banks were authorised to undertake derivatives transactions with non-residents.

This growth is evidenced by the higher interest in the Chilean peso which, according to the BIS 2013 Foreign exchange and derivatives market activity survey, is the 28th most traded currency in the world with a share of 0.3% from a total of 200% (Table 2).

A persistent increase in non-resident gross outstanding positions of CLP/US$ can be observed over time (Graph 28).

Graph 28: Gross derivatives outstanding position of the Formal Exchange Market with non-residents

US$ million



Source: Central Bank of Chile.

The increased activity with non-residents in recent years has been driven by expectations of appreciations or depreciations of the exchange rate, as well as "carry trade operations in favour of the Chilean peso" (Díaz, González and Sotz, 2013). An example is provided by the year 2013, when expectations of declining interest rates in Chile and increasing interest rates in the United States were generated, with the result of non-residents buying US dollars and selling Chilean pesos. This is shown in the net position of derivatives with non-residents going from –US$1.234 billion in January 2013 to –US$14.123 billion in June 2013, with a resultant depreciation in the Chilean peso (Graph 29).

Graph 29: Net derivatives outstanding position of the Formal Exchange Market with non-residents

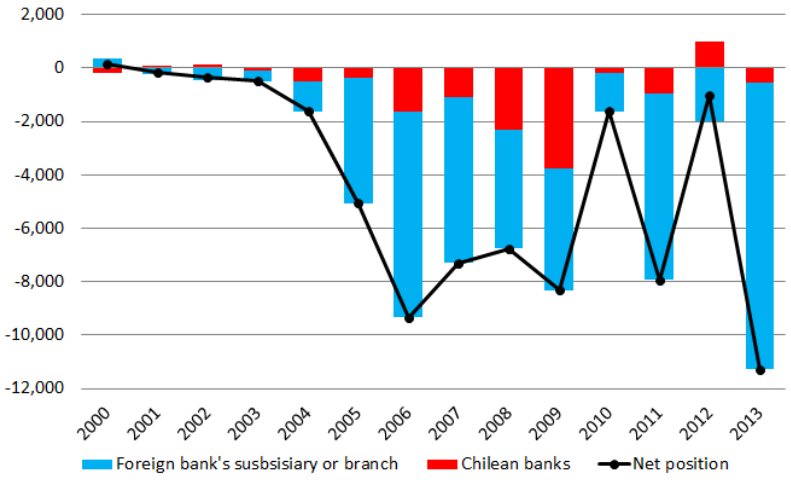
US$ million

Source: Central Bank of Chile

Finally, it is noted that, in Chile, transactions with non-residents are mostly made by branches or subsidiaries of foreign banks, as shown by the outstanding net positions at the end of each year. This could be explained by the parent or subsidiary companies established in the United States or Europe facilitating transactions with their clients who are interested in emerging economy currencies and mediating operations with the subsidiary in Chile (Graph 30).

Graph 30: Net derivatives outstanding position of the Formal Exchange Market with non-residents by bank type

US$ million



Source: Central Bank of Chile.

IV.- CONCLUSIONS

The global foreign exchange market and Chile in particular has experienced significant growth from 1998 to 2013. This growth has been influenced by increasing international trade, more open access to foreign capital by emerging economies, higher activity by institutional investors in traded securities at foreign markets and financial innovation related to the use of derivative financial instruments.

Operations are primarily conducted in the OTC markets. In the case of the Chilean economy, the Central Bank of Chile publishes frequent journals in order to ensure a better understanding of the evolution of these markets.

BIBLIOGRAPHY

Acharán, M.G. and J.M. Villena (2011a). "Publicación de Estadísticas Cambiarias del Banco Central de Chile." Studies in Economic Statistics N° 86, Central Bank of Chile.

Acharán, M.G. and J.M. Villena (2011b). "Mercado Cambiario 2000-2010: Comparación Internacional de Chile." Studies in Economic Statistics N° 88, Central Bank of Chile.

Bank for International Settlements (1998). "Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in 1998."

Bank for International Settlements (2001). "Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in 2001."

Bank for International Settlements (2004). "Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in 2004."

Bank for International Settlements (2007). "Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in 2007."

Bank for International Settlements (2010). "Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in 2010."

Bank for International Settlements (2013). "Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in 2013."

Budnevich, C. and S. Zurita (2009). "Estudio de Diagnóstico, Evaluación y Propuesta de Desarrollo del Mercado de Derivados en Chile".

Burnside, C., M. Eichenbaum, I. Kleshchelski and S. Rebelo (2006). "The returns to currency speculation." National Bureau of Economic Research.

Central Bank of Chile (2013). "Banco Central de Chile da a conocer resultados globales de encuesta del Banco de Pagos Internacionales de Actividad del Mercado Cambiario y de Derivados Fuera de Bolsa." Press release, Central Bank of Chile.

Central Bank of Chile. Circular N° 710: Modifica Compendio de Normas de Cambios Internacionales, 12 May 2000. Available at http://www.bcentral.cl/normativa/circulares/pdf/circ710.pdf.

Central Bank of Chile. Circular N° 748: Aprueba Nuevo Compendio de Normas de Cambios Internacionales, 19 April 2001. Available at http://www.bcentral.cl/normativa/circulares/pdf/circ748.pdf.

Central Bank of Chile (2012). "OTC DERIVATIVES INFRASTRUCTURE IN CHILE." Box VI.1, Financial Stability Report, June.

Central Bank of Chile. Constitutional Organic Law.

Central Bank of Chile. Manual de Procedimientos y Formularios de Información del Compendio de Normas de Cambios Internacionales.

Díaz, S., P. González and C. Sotz (2013). "Carry To Risk como medida de Carry Trade." Studies in Economic Statistics N° 94, Central Bank of Chile.

International Monetary Fund (2013). World Economic Outlook Database April 2013.

Superintendencia de Pensiones (1980). Decree Law N° 3.500, 1980, updated to July 2012.

Superintendencia de Pensiones. 'Régimen de Inversión de los Fondos de Pensiones' in force until November 30th of 2012.

Superintendencia de Pensiones (2012). Resolution N° 46, 27 June.

Wu, Y. (2014). "Why foreign ownership of locally issued sovereign bonds is so low in Chile." International Monetary Fund.

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