Abstract

Chile’s derivatives markets are a large and growing part of its financial markets and its overall economy. Of special importance is Chile’s over-the-counter market in foreign exchange derivatives which has become an established market with dealers, high liquidity and low bid-ask spreads. These derivatives markets have helped many firms lower their risks and lower their borrowing costs, and at the same time pose new challenges to the stability of Chile’s economy. This report provides an analytical description of the growth of Chile’s derivatives markets and an economic analysis of their role in Chile’s economy. This first includes a discussion of the various derivatives instruments, the different market participants and the manner in which prices are determined in these markets. Also included in this descriptive analysis is a discussion of Chile’s regulatory framework for derivatives and how they have shaped the growth and stability of the markets. The second part to the report includes an economic analysis of what derivatives markets mean for the cost and risk of foreign borrowing, other international capital flows, the pro-cyclicality of exchange rates, the volatility of capital flows and the potential risks to the stability of Chile’s financial markets. Using a unique data base of derivatives’ daily open position for Chile, provided by the Central Bank, we analyze their impact on the exchange rate.

1 We thank Jose Luis Machinea and Ricardo Ffrench-Davis for all their encouragement and intellectual support that has made this report possible; the IADB for valuable financial support and Rodrigo Heresi for valuable research assistance as well as his overall contribution to the study. We are very grateful to colleagues at the Central Bank, Superintendencia de Bancos, several private banks and Banco del Estado, as well as to SOFOFA and several major companies, for their information, and valuable insights. Though so many colleagues helped during interviews, we want to highlight the important contribution of Carlos Mussi to the Brazil section as well as Enrique Marshall, Manuel Marfan and Estaban Jadresic, from the Central Bank of Chile, for their support and their intellectual contribution to this work. We are very grateful to Esteban Jadresic and Alejandra Marinovic for organising a seminar at the Central Bank; Esteban Jadresic facilitated access to a unique and very complete database on derivatives from the Central Bank of Chile and Felipe Alarcon very helpfully provided the data. Any mistakes are our own responsibility.
during particular periods. It also includes a discussion of derivatives’ use in speculative flows between Chile and Brazil.
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Introduction

The report is in two parts. The first part provides an analytical description of Chile’s derivatives markets and how they operate. It will also offer a brief comparison to Brazil’s derivatives markets. Part 2 will provide a policy analysis of various issues raised by the growing role of derivatives markets in the Chilean economy. This will include an analysis of their interaction with exchange rate fluctuations, response to external shocks, whether or not their impact is cyclical, how they deal with capital surges and droughts, and how they serve as conduit for certain hedge fund investment strategies.

The analytical description in Part 1 explains the importance of derivatives markets, the structure of those markets and how they operate. The market structure of the markets includes the role of derivatives dealers, brokers, end-users or customers and any bilateral or multilateral trading facilities. End-users can be hedgers or speculators, and these include pension funds, exporters, importers, hedge funds and unknown others. Part 1 will also briefly describe the role of regulation in these markets. All together it is hoped that the picture painted in Part 1 will prove useful to policy makers, the media and scholars to better understand the changing character of Chile’s financial markets.

As often is the case, there is a caveat. Some derivatives markets are non-transparent, and Chile’s over-the-counter derivatives market suffers from this fate. It is therefore not possible to make assurances that the picture is 100% complete. This work does nonetheless reflect a great deal of information collected from a wide array of sources. This includes very valuable data from Chile’s Central Bank (to which we were lucky to be given access), its bank superintendent authority, its pension fund regulatory agency and the BIS. It also includes many hours of interviews with senior representatives from foreign banks, local Chilean banks, ‘investment companies’, pension fund managers, independent financial consultants, bank regulators, central bank staff and managers, and pension fund regulators.

PART 1

1. Market Importance

Derivatives markets serve two important economic purposes: risk shifting and price discovery. Risk shifting – or commonly called hedging – is the transfer of risk from one entity who does not want it to another entity that is more willing or able to bear it. In doing so, derivatives can help discover the price of certain assets, commodities or types of risk that would not otherwise likely occur because of transactions costs, dispersion of the underlying item or the conglomeration of many values or risks into one whole thing. One of the most important price discovery functions is the determination of the price of the underlying item, e.g. an exchange rate, over time. Thus it is not just spot prices that are determined but also future prices (and with the case of options the price of the risk embedded in the market price).

Risk shifting is important for a variety of economic agents. Importers and exporters hedge their foreign exchange exposure so that their importing costs and exporting revenues became less volatile. Firms borrowing in foreign markets hedge the peso value of their hard currency debt
payments. Also important are Chilean pension funds who invest a large share of their assets abroad and then hedge the value of these foreign currency assets back into pesos. Lastly, there are hedge funds and other entities that might use derivatives markets for investment strategies such as capturing the large interest rate differential between Chile and Brazil.

One of the implications of efficient risk shifting is the ability to raise capital more cheaply in capital markets. The development of cross-currency swaps in Chile’s derivatives markets has enabled some large corporations and banks to lower their cost of borrowing without exposing themselves to exchange rate risk. They borrow abroad where interest rates are lower than that in Chile, and then use derivatives to shift out of foreign currency exposure and back into peso liabilities in order to obtain a lower cost than borrowing directly in the Chilean capital market.

Table 1 shows the outstanding amounts of derivatives at year end 2005 and the trading volume for the year 2005.

<table>
<thead>
<tr>
<th>Table 1</th>
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<tbody>
<tr>
<td><strong>Size of Chile’s Derivatives Markets</strong></td>
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<tr>
<td>(billions of US$, 2005)</td>
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<tr>
<td><strong>Outstanding Amounts</strong></td>
</tr>
<tr>
<td>Commodities</td>
</tr>
<tr>
<td>Copper</td>
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<tr>
<td>Interest Rate</td>
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<tr>
<td>Fixed rate</td>
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<tr>
<td>Foreign Exchange</td>
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<tr>
<td>Local</td>
</tr>
<tr>
<td>External</td>
</tr>
<tr>
<td>Total Amounts</td>
</tr>
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<td>* Source: Central Bank of Chile</td>
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</tbody>
</table>

The efficiency of derivatives markets in discovering prices is linked to their liquidity and trading volume. The size of Chile’s derivatives markets is large and growing fast. Annual trading volume in foreign exchange derivatives – the largest segment of Chile’s derivatives markets – increased from $113 billion in 1998 to $383 billion in 2005. That amounts to a 240% increase, and the trading volume for the last quarter of 2005 was at an annual rate of $419 billion which amounts to a 31% rate of growth from the last quarter of 2004.

Central Bank data shows that daily trading volume in the foreign exchange derivatives market to be $1.7 billion in the formal market alone. This does not include the “informal market” and it does not include off-shore transactions or transactions between residents who are not registered as part of the formal market because that are not subject to the reporting requirement of the formal market.

Chile’s interest rate derivatives market is also large and growing. Outstanding amounts of interest rate derivatives grew from $4.65 billion at the end of 1998 to $10.97 billion for 2005.
That represents a 136% increase over the seven year period – although most of the increase came in the first few years.

Commodity derivatives grew at a comparably much faster rate. The vast majority of commodity derivatives are based on copper although there is also data for gold and silver. The outstanding amount of these derivatives grew from $2.38 billion in 1998 to $15.92 billion in 2005 – a 569% increase. Most of this growth in just the last three years as outstanding amounts ranged between $2 billion to $4 billion until 2002.

As a point in comparison to the large presence of derivatives in the Chilean economy, the following Table 2 illustrates how the outstanding amounts and trading volume compare to other key financial and economic stocks and flows.

### Table 2
Comparison Figures for Chile, 2005
(Billions of US dollars, 2005)

<table>
<thead>
<tr>
<th>FINANCE STOCKS</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Derivatives Outstanding</td>
<td>$ 51.3</td>
</tr>
<tr>
<td>Domestic credit</td>
<td>88.0</td>
</tr>
<tr>
<td>Money stock (M2)</td>
<td>44.8</td>
</tr>
<tr>
<td>International reserves</td>
<td>16.9</td>
</tr>
<tr>
<td>Market capitalization (2004)</td>
<td>117.1</td>
</tr>
<tr>
<td>Total foreign debt</td>
<td>46.5</td>
</tr>
<tr>
<td>Net stock of foreign investment</td>
<td>57.8</td>
</tr>
<tr>
<td>Gross stock of …</td>
<td>81.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTPUT AND INVESTMENT FLOWS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>115.2</td>
</tr>
<tr>
<td>Exports</td>
<td>40.6</td>
</tr>
<tr>
<td>Imports</td>
<td>32.6</td>
</tr>
<tr>
<td>Net direct investment flows</td>
<td>6.2</td>
</tr>
<tr>
<td>Net portfolio flows</td>
<td>-2.9</td>
</tr>
</tbody>
</table>

*Source: Central Bank of Chile; International Financial Statistics*

In order to better help put the following descriptive analysis of Chile’s derivatives in some context, it is useful to compare it that in Brazil.

The first and most apparent difference in the history of Brazil’s derivatives exchanges. Chile, as we will see, is entirely an over-the-counter derivatives market.

Derivatives trading in Brazil can be traced back to 1917 when derivatives on agricultural products – most coffee and cotton – were traded on the Bolsa de Mercadoria de São Paulo (BMSP). A greater variety of agricultural futures were added starting in the 1970s, and the 1980s witnessed a tremendous period of growth and innovations with the introduction of new derivatives contracts and exchanges.
In 1979, Brazil’s stock exchanges (both BOVESPA and BVRJ) started trading futures and options on individual stocks. The BMSP then introduced futures on gold in 1980. The Brazilian Futures Exchange was created in 1983 and offered trading in futures and options on stocks and stock indexes. Next in 1986, the Bolsa de Mercadorias e de Futuros (BM&F) was created to trade gold forwards and futures on gold and stock indexes.

Thus by the end of the 1980s there was direct competition between three derivatives exchanges that were trading similar products – competition in a business where there is a natural monopoly because trading volume gravitates to liquidity which adds to liquidity and takes it away from where it left. By 1997 the three exchanges merged into a single futures exchange with the old initials of BM&F but a new national name of Brazilian Mercantile and Futures Exchange. Also following this economic logic, the stock exchange in Rio (BVRL) merged into BOVESPA in São Paulo to form a single national stock exchange (which also trades some derivatives instruments).

The BM&F now acts as a national clearing house for currency, bonds and many other assets, commodities and carbon emission credits. It also offers a range of types of derivatives contracts that include forward, futures, options, flex options and swaps. It also opened an electronic trading platform that allows small market participants to trade on the exchange and to trade smaller sized contracts called ‘minis’. Today the vast majority of derivatives contracts traded on the BM&F are on interest rate products and those on exchange rates are a distant second.

### Table 3

**BOLSA DE MERCADORIOS & FUTUROS**

Derivatives – Products Traded on the BM&F

- **Agricultural:** forwards, futures and options
  - Live cattle
  - Feeder cattle
  - Sugar
  - Coffee, Arabica and Robusta-Conillon
  - Ethanol
  - Soy beans
  - Corn
- **Gold:** forwards, futures and options
- **Stocks and stock indexes,** including Brasil 50 Index and IBOVESPA forwards, futures and options
- **Interest Rates:** forwards, futures, options
  - External debt of Brazil
  - Inter-bank deposit rate
  - Inflation rate
- **Foreign Exchange:** forwards, futures and options
  - US dollar, Euro and US dollar volatility
- **Carbon**

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2 Trading operations such as bucket-shops and electronic communication networks (ECNs in the US) sometimes continue to exist because they ‘steal or borrow’ the price discovery that occurs on the liquid exchange.
In addition to this development of Brazil’s exchange traded derivatives market, it also has developed a robust over-the-counter market. The Bank for International Settlements (BIS) offers scant data on derivatives markets in developing countries, and Brazil and Chile are no exception. They report that daily trading volume in foreign exchange derivatives is roughly the same as that as Chile -- $1 billion per day. On the other hand, the BIS reports that Brazil also has roughly $1 billion per day in OTC trading in single-currency interest rate derivatives.

In comparison to the $2 billion a day in average trading volume on OTC markets in Brazil, the BM&F clearing house reported that on a recent day there was $31 billion in trading on the exchange.

The US Futures Industry Association’s most recent global survey of derivatives exchanges shows that Brazil’s BOVESPA and BM&F rank as the 8th and 10th largest in the world when measured by the number of derivatives contracts traded. BM&F’s futures contract on the overnight inter-bank loan rate has the tenth largest number of contracts traded in the world.3

One of the key distinctions between the exchange traded derivatives and the OTC market is that the exchanges have a clearing house. Clearing houses serve several very important functions. First the raise the credit quality of trading throughout the entire market. That both improve the systemic stability of the market and it allows ‘the little guy’ to trade with the big guys because they all must trade with collateral or margin and not rely primarily on capital. Secondly the clearing house facilitates the post-trading process: this first involves trade confirmation, then position netting, the efficient management of collateral (margin) and last settlements. The recent scandal involving the long delays in confirming and clearing credit derivatives in the New York market are in sharp contrast to the functioning of a clearing house which settles daily and payments are made promptly – in the Brazilian case on a T+1 basis through the central bank.

Brazil’s BM&F exchange’s clearing house also serves to register OTC derivatives. Sometimes the clearing house acts as a guarantor of the contracts, and sometimes acts only to register them.

Thus Brazil’s derivatives markets are comprised of both exchange traded and OTC traded derivatives, while Chile’s market – as we will see – is comprised entirely of OTC markets. A more complete comparison of the economic and regulatory differences between exchange and OTC trading would be a distraction from this report, but it is important to identify the differences.

2. Market Instruments

A good general definition of a derivative is the following.

*A derivative is a financial contract whose value is derived from an underlying asset or commodity price, an index, rate or event. They commonly go by names such as forward, future, option, and swap, and they are often embedded in hybrid or structured securities.*

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Derivatives known as futures and options are traded on exchanges where centralized trading allows for everyone in the market to make quotes, see others’ quotes and execute trades. These derivatives exchanges are usually regulated and have a clearing house. Derivatives are known as forwards, options or swaps and there are a variety of swaps such as foreign exchange swaps and cross-currency swaps. These types are traded over-the-counter (OTC) where one or more dealers serve as market makers. These markets are decentralized and are often unregulated. All of Chile’s derivatives markets are organized as OTC markets.

The forward contract is the most basic of derivatives contracts. Its use dates back to the third millennium B.C. in Mesopotamia, and it is currently the predominant contract used today in Chile’s OTC derivatives markets.\(^4\)

By far the most prominent derivatives instrument traded in Chile’s derivatives markets is the forward contract on foreign exchange. A forward is the obligation to buy (or sell) a specified quantity of a specified item at a specified price or rate at a specified time in the future. Consider the following example. Firm X enters a forward contract with firm Y on January 1 to sell Chilean pesos (CHP) forward for US$1 million (or in other words buys dollars with pesos) at 600 pesos per dollar ($0.001667) for delivery on April 1. On the settlement day, firm X will transfer CHP600 million to counterparty Y and will receive in return $1 million. The transaction will represent a gain for firm X if the spot exchange rate at the time of settlement, the price of pesos expressed in US$, is lower than the contracted price of $0.001667. A higher spot price or exchange rate would represent a loss for firm X. A forward contract does not necessarily require any transfer of funds, currency or collateral between the counterparties at the origination of the transaction. In the above example, no transfers occurred until the April 1st date.

Making delivery, or receiving the delivery, or foreign currency associated with foreign exchange forward trading is sometimes unnecessary, expensive or inconvenient. In order to avoid these unwanted costs of settlement, derivatives market participants sometimes trade foreign exchange forwards that are “cash settled” in one currency. These are known as non-deliverable forwards (NDF). A NDF market in Chilean peso-US$ exchange rate has developed in off-shore markets – presumably in New York and London. An NDF performs the same risk shifting functions as a forward, but it is settled by a single payment in US$ that is equal to the US$ value of the difference between the forward rate and the spot exchange rate on the terminal date of the contract.

Consider the following example. Firm X enters a 90-day NDF to sell CHP forward for US$ 1 million at $0.001667 in order to hedge a future on foreign debt or for imported merchandise. The contract is settled on the ninetieth day, and the spot exchange rate turns out to be $0.001515 (or 660 pesos to a dollar). The price of pesos has fallen by $0.000152, and so firm X – the short seller of pesos – will receive gains on the NDF. The amount will be equal the US$90,900 or the savings of CHP 60 million valued at the new exchange rate of $0.001515. That gain is paid in US$ by the long side of the forward (the purchaser of pesos).

The current daily trading volume in the NDF market in Chilean pesos is estimated to be $0.4 billion. There are no reporting requirements for this portion of Chile’s derivatives market – if

one can refer to it as Chile’s since it is off-shore – and so these figures are only estimates. The NDF market interacts closely with the deliverable forward market in Chile. When dealers in the NDF market lay-off their exposures with transactions in Chile’s “formal” foreign exchange market then that transaction is subject to reporting requirements and will then be included in official figures.

Another important type of instrument in the Chilean derivatives market is the cross-currency swaps (CCS) which is also known as a foreign currency swap. CCS are designed to exchange a stream of payments in one currency for that in another. The stream of payments is generally chosen to match that of a bond or loan. In that case the CCS is an exchange of interest rate and principal payments – of equal present value – in one currency for that in another. It amounts to a fair trade of a US$ bond with a coupon rate of x% for a Chilean U.F. bond with a coupon rate of y%. The interest rate payments may be based either on fixed or floating interest rates. A typical example of a 10-year CCS exchanges fixed Chilean peso payments for variable US dollar payments. The dollar payments are equal to LIBOR plus a spread, the peso payments are usually at a fixed rate, and there is a final exchange of peso for dollar principal payments at what is a long-dated forward rate. The CCS against US dollar LIBOR is “priced” by choosing the fixed peso rate and the “spread” so that the present value of the contract is zero.

In Chile, the most likely use of CCS by hedgers is to swap floating rate US$ debt obligations, e.g. those linked to a floating rate such as LIBOR, into a fixed peso rate. Interviews with representatives from several large corporations in Chile claim that they are able to trade CCS of at least 12 years in tenor (maturity) so that the market risk on long-term LIBOR debt is shifted into fixed rate peso obligations.

Representatives of major corporations explained that they sometimes prefer to use options are a means to hedge when they were especially uncertain about the direction of change in the exchange rate. This is relevant in situations, such as the present one, where the peso has experienced an extended appreciation in value. Whereas forwards of CCS would lock in the value of the peso for some time to come, an option position would, for example, enable them to protect against a fall in the peso’s value while at the same time avoiding losses from an appreciation in its value.

The options market in Chile is substantial and rapidly growing, but not nearly as large as it might be because of restriction on the offering of options by banks and restrictions on their use by pension funds. These restrictions were caused by prudential concerns that led to a gradual introduction of options into the Chilean market. The extent of options trading in Chile’s markets was limited to the efforts of off-shore dealers and on-shore but unregulated bank affiliates called “investment companies.” Recent changes in banking regulations (September 2005) will allow banks registered in Chile to begin offering options. Reportedly, it was the introduction of risk models by banks that will then be validated by the bank regulator (in preparation for the implementation of Basle II Capital Accord), as well as the existence in practice of options, that encouraged the bank regulator to allow formal introduction of options, for banks which they consider have a proper assessment of risk. Initially, reportedly it has only been Banco Santander that has developed this type of model and was authorized to develop options in the formal market. This has restricted the growth of this formal market. Although they can be expensive in comparison to forwards and swaps, options fill a useful role in risk management.
An option contract gives the buyer or holder of the option (known as the long options position) the right to buy (sell) the underlying item at a specific price at a specific time period in the future. In the case of a call option, the holder has the right to buy the underlying currency at a specified exchange rate – known as the strike or exercise price – at a specified time in the future. If the spot market price of the currency were to rise above the strike, then the holder would be able to exercise the option and buy at the lower strike price. The value of exercising the call option would be the difference between the higher market price and the lower strike price. If the market price were to remain below the strike price during the period when the call option was exercisable, then the “out of the money” option would not be worth exercising and it would expire worthless.

In the case of a put option, the option holder has the right to sell the underlying item at a specified price at a specified time in the future. A put option on foreign currency allows the holder to sell at the exercise price, and thereby to profit if the market price falls. A put option acts as a form of price insurance that guarantees a floor or minimum price. Like an insurance policy, the price paid for the option is called a premium. Keep in mind that an exchange rate is the relative price of two currencies, and so a put on one currency is a call on the other.

Whereas the holder of the option has the right to exercise the option in order to buy or sell at the more favorable strike price, the writer or seller of the option (known as the short options position) has the obligation to fulfill the contract if it is exercised by the option buyer. The writer of an option is thus exposed to potentially unlimited losses. The writer of a call option is exposed to losses from the market price rising above the strike price, and the writer of a put option is exposed to losses if the price of the underlying item were to fall below that of the exercise price.

Consider the following example. An importer buys a put on the Chilean peso against the dollar with an exchange rate of 600 pesos to the dollar ($0.001667 per peso). It has a notional principal of $1,000,000, is exercisable for 6 months, and the premium is 5% of the notional principle or $50,000. If the peso depreciates to 660 to the dollar ($0.001515 per peso), then the put can be exercised for a gain by selling the pesos (buying dollars) at $0.001667 instead of the lower spot rate.

There is a large variety of different types of options, although it is not certain which are being traded in Chile. There are path-dependent options such as barrier options (especially knock-in and knock-out options) and “Asian” options which can be exercised at the average price or the minimum (maximum) price during the exercise period. There are also options on swaps called swaptions which allow the options holder the right to enter into an interest rate swap at a specified fixed rate.

Due to the non-transparent nature of OTC derivatives, it is not possible to determine exactly which varieties of options or other derivatives are being trading in Chile’s derivatives markets. There is evidence from Central Bank data that there are single currency interest rate swaps and forward rate agreements and there are commodity based derivatives – especially on copper prices.

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5 Additional information about derivatives instruments can be found at “Primers” at www.financialpolicy.org.
3. Market Structure

Chile’s derivatives markets are organized as “over-the-counter” markets. They are comprised of dealers, who form the core of the market, plus brokers who improve the flow of information in the market, and finally the customers or end-users who trade derivatives in order to hedge or speculate.

OTC derivatives markets are organized differently than exchanges. The OTC markets have traditionally been organized around one or more dealers who “make a market” by maintaining bid and offer quotes to market participants. The OTC is often bifurcated. One portion of the market consists mostly if not entirely of dealers – an inter-dealer market – they maintain price quotes to each other and allow a dealer to quickly lay-off the risk of buying or selling to a customer. The bid-ask spread in the inter-dealer is smaller than that offered by dealers to their customers. This is one way that dealers consistently make money through trading volume.

In Chile’s inter-dealer market, the dealer can observe some market prices through electronic bulletin boards managed by brokerage firms. Presently these screen show bids, asks and executions on forward foreign exchange contracts, cross-currency swaps and interest rates swaps. Dealers cannot trade through the screen. Instead the screen is just for information, and the dealer must trade through the broker or call other dealers directly over the phone in order to execute a trade. (Note that some dealers also use an instant messaging arrangement in order to ask for quotes and even accept the quotes.) Dealers can also use the direct calls to the broker and other dealers to post quotes and inquire about quotes that are not listed on the brokers’ electronic bulletin board screens. The broker screens are generally not available to non-dealers.

Although it is not currently operating for derivatives transactions, there are two electronic trading platforms in Chile to allow dealers to post quotes and to execute trades in foreign exchange. This spot market handles a large quantity of small and sometimes large transactions and replicates the experience of an exchange – except that it is not open to everyone.

The second portion of the OTC market is comprised of the bilateral trading between dealers and end-users. This market is entirely voice negotiated although dealers might offer their customers some means of observing quotes and submitting orders electronically. These dealer provided electronic screens are bilateral though. If a customer wants to get a more complete view of the market they will need to contact several dealers in order to observe the range of market prices.

The trading process of negotiating by phone, whether end-user-to-dealer or dealer-to-dealer is known as bilateral trading because only the two market participants directly observe the quotes or execution. This bilateral trading arrangement is in contrast to the multilateral participation on exchanges.

Electronic bulletin boards and trading facilities have recently made substantial changes to the trading process in OTC markets. The trading facilities create a near-multilateral environment for those that can participate, but it is not truly multilateral until participation is extended to all market participants. Derivatives exchanges and stock exchanges are fully multilateral and this allows everyone buying and selling in the marketplace to observe the same quotes and trade at the same prices. Trading between dealers and customers remains a bilateral market because only
one party is posting quotes and only the dealer and the customer know the price at which the trade actually occurs.

However, it should be pointed out that the bilateral negotiation process that occurs in OTC derivatives markets is often automated. Dealers have direct phone lines to other dealers as well as to their major customers. This enables them to have near-instantaneous communication. A market participant can call up a dealer, ask for quotes, hang up and then repeat with another dealer in a matter of a few seconds. This amounts to a quick survey of several dealers in just a few seconds in order to determine the prevailing prices in the market. A quick series of such calls can give a dealer or an active investor a view of the market that is close but not exactly the same as that obtained by observing a multilateral negotiating process such as an electronic or physical exchange.

Briefly put, the dealers are the market makers. This means they are the ones that post bid and ask prices, and they are the ones that derivatives end-users go to buy or sell. Nearly all trades are executed between dealers and end-users or dealers and dealers (there are some trades between end-users). If someone wants to buy or sell, they contact one or more dealers and inquire about these quotes. Once they have located the best price, then they execute the trade with the dealer offering that price.

If the transaction leaves the dealer with unwanted exposure to the last such sale or purchase, then the dealer can lay-off the risk in the inter-dealer market where other dealers are usually standing ready with bid-ask quotes at which they are willing to conduct a trade. The dealer can observe other dealers’ quotes through either an electronic bulletin board on which these quotes are posted, an electronic trading facility or through a series of telephone calls to brokers and other dealers.

The end-users are the final customers in the derivatives marketplace. They trade in order to hedge some existing risk, to adjust their hedge due to some change in the market or to speculate. End-users include smaller and medium sized banks that unlike the larger banks do not act as derivatives dealers. Pension fund managers and other institutional asset managers are end-users; they employ derivatives to manage the risk on their portfolios. End-users also include non-financial corporations who use derivatives to hedge their market risk as well as to structure their financing so as to lower borrowing costs. Non-financial corporations might face the risk of exchange rate volatility if they are importers or exporters, and they might face commodity price volatility if they are producers or heavy users of commodities. End-users also include hedge funds who use derivatives as part of their investment strategies.

4. Dealers

There are reported to be 15 or 16 dealers in Chile’s derivatives markets. A dealer is defined in economic terms as a market participant who is actively making price quotes, and is executing buys and sells at the quoted prices. It is also a regulatory matter. Chile’s regulations governing the use of derivatives by pension funds also limits who is an eligible derivatives counterparty for their private pension fund managers. In addition, Chile’s banking regulation also put some limitations on the ability of banks to act as dealers. At present, banks are required to
demonstrate the adaptation of internal risk management models prior to their being allowed to act as options dealers.

While there are possibly 16 dealers in Chile’s derivatives markets, not every dealer is the same size or acts as a dealer in every type of derivative product. Major dealers, of which there are four or five, include Santander Santiago, JPMorgan Chase, HSBC, Deutsche Bank and Banco de Chile. Thus four the five major market players are foreign owned subsidiaries that are regulated by the Chilean authorities.

Chile’s markets are also comprised of unregulated “finance companies” (Sociedades Financieras) that are affiliates of the foreign-owned banks. These finance companies trade and often operate as dealers in Chilean derivatives markets. (This has been especially the case for options trading – which until recently was forbidden for Chilean banks – and for other derivatives transactions that might involve high capital requirements for the regulated affiliate).

Local Chilean owned banks that serve as derivatives dealers, such as Banco de Chile, does not operate a ‘finance company.’

There are also derivatives dealers in external markets such as those in New York and London. These dealers often trade in NDF contracts in order to facilitating trading without having to regularly clear payments through Chile’s banking system.

5. Brokers

The role of the brokers in OTC derivatives market is to consolidate information and to allow the major participants to trade with anonymity. Sometimes dealers do not want their investment strategies revealed by other dealers observing who is doing much of the buying or selling in the marketplace. Sometimes dealers are concerned that the market will move away from them as they try to execute large volumes of purchases or sales. By trading through a broker, a dealer can maintain their anonymity and benefit from a centralization of market information by posting their quotes through the broker.

The role of a broker in OTC markets can replicate a multilateral dimension to the marketplace. Brokers can post the quotes from all dealers to an end-user who is calling for the best price, and the broker can also post quotes to a dealer that wants to know what all the other dealers are doing. Dealers sometimes prefer to trade through a broker in order to protect their identity from being tied to or confused with their investment strategy.

Chile’s inter-dealer derivatives market has three brokers. These are Tullett Prebon, GFI and Lopez-Leon. GFI claims to broker NDF on Chilean pesos and other Latin American currencies (www.gfigroup.com). Lopez-Leon, with a location in Santiago, claims to broker swaps, foreign exchange forwards and swaps, and interest rate swaps (www.lopezleon.com).

6. Customers

Customers, who are also known as end-users, are those trading derivatives for the purpose of hedging, or speculating, but not with the expectation of immediately reversing the transaction to capture the bid-ask spread in the market. They are not market makers, even though some active
participants such as pension funds and hedge funds provide a great deal of liquidity to the markets.

Non-financial corporations, especially large corporations with strong credit ratings, use derivatives markets to hedge or as part of their financial strategy to lower borrowing costs by issuing debt in international markets. International credit markets are very deep even for long maturity debt issuances, and the nominal rates are usually much lower than those denominated in Chilean pesos. This allows firms to raise large amounts of funds with a single issue, and to borrow for longer maturities. Chilean firms often pay relatively small credit risk premiums (interest rate spreads) when they borrow at a variable rate in these credit markets. Borrowing internationally in US dollars or Euros does, however, result in foreign exchange exposure. In recent years, highly rated corporations have begun using cross-currency swaps to avoid this risk by swapping back into fixed rate CHP payments. The cross-currency swap consists of exchanging a series of payments between the Chilean borrower and the derivatives counterparty in which they receive floating rate US dollars and pay fixed interest rate payments in Chilean pesos. The combination of low US dollar interest rates, low credit spreads and the CCS rate allow the firm to effectively borrow in long-term fixed peso interest rates at a lower rate than would be possible in Chile’s domestic credit market.

Another important use of derivatives is by large corporations that borrow abroad through foreign currency debt (usually US dollars) but have little or no foreign exchange revenue; they use derivatives markets to reduce their net foreign exchange exposure.

The medium sized firms are unlikely to be able to borrow abroad and thus unlikely to have foreign currency denominated debt to hedge. They are most likely to hedge their exchange rate exposure that arises from their participation in or exposure to the import or export business.

Small and medium enterprises involved with importing or exporting, however, could benefit greatly from hedging. This is particularly important for exporters in the current context of a strong and possibly stronger currency. In an interview with bank regulators, it stated that less than 15% of small and medium term enterprises (SMEs) that export are estimated to use derivatives. This is a source of growing concern, and business institutions like the Banco del Estado, Sofofa and the Association of Banks are active in disseminating information about derivative markets to SMEs. Improving their risk management practices may require even greater efforts. In addition, there are possibly deeper economic issues regarding the cost of, and access to, such instruments by SMEs. A more detailed study of the issue would be instructive.

Pension funds are the largest and the most important actors in the market. Not only is the mere size of their derivatives transactions volume important for market liquidity, but they form a critical role as the largest long-peso hedgers in the markets. Developing countries are generally faced with more short-hedgers than long-hedgers in their foreign exchange markets. This arises from privately issued hard currency denominated foreign debt and sometimes from importers hedging more than exporters. In addition, the general expectation in the market for many local currencies of the currency’s secular depreciation against the US dollar or other major currency does not promote long-hedging.

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6 The Head of Bank Regulation, Mr Arriagada.
Long-hedgers are critical to ‘completing’ derivatives markets, and Chile’s financial regulations requiring their privately managed pension funds to hedge their foreign investments back into Chilean pesos has made a major contribution to the growth of Chile’s foreign exchange derivatives markets. Pension funds are required by regulation to hedge. The rule prohibits them from exceeding a certain maximum foreign exchange exposure on their portfolio. The exposure ceiling is measured as a percentage of assets, and it varies for each different type of fund. Chile’s private pension funds have in fact hedged far more than that required by regulation.

Also contributing to the growth in Chile’s foreign exchange derivatives markets is the requirement for private pension funds to hedge their foreign exchange exposure with banks or registered derivatives dealers located in Chile. This helps assure that the local foreign exchange derivatives dealers will have a critical amount of liquidity in the markets.

Without pension funds’ participation in the markets, it would be very difficult for derivatives dealers to manage the risk arising from market making because most other hedgers in the Chilean markets are likely to want to short-hedge the peso.

One pension fund manager we interviewed said that the firm conducted about $40 to $50 million of foreign exchange forward transactions a day. Central Bank data show that during the second half of 2005 monthly sales of peso-dollar forwards by pension funds reached US$2,000 million, with a net forward outstanding position of pension funds reaching US$12,000 million by December 2005 (for analysis of impact on exchange rates, see below). Most of these transactions were conducted in the short-term maturity portion of the forward market, and in particular they were concentrated in the 30 to 60 day range of maturities. Although the market offers good prices (i.e. low bid-ask spreads that are not significantly higher than in the 30 day contracts) in one-year maturities, the market is reportedly nonetheless lacking in sufficient depth to allow pension funds to roll-over their large positions without moving market prices away from them. The term ‘moving prices away from them’ means that the process of buying back pesos (from expiring contracts) and selling them forward tends to drive down the forward price if the market is not sufficiently deep. As a result, pension funds find it cheaper to operate mostly in the 30 to 60 day range of the forward market.

7. Other market participants such as Hedge Funds

It is not possible to know all the various entities who participate in OTC derivatives markets. Pension fund regulation requires that derivatives dealers become eligible derivatives counterparties for the pension funds. This offers some indication of the identity of the major derivatives dealers in the Chilean market. And then of course the pension funds are known to participate as they are required to hedge a substantial portion of their foreign exchange exposure. In addition, banking regulation requires that banks demonstrate their ability to efficiently manage foreign exchange risk prior to their being allowed to act as dealers in options. That provides another source of information of who is participating in the markets. Publicly-traded non-financial corporations also report in their financial statements, although to varying degrees of detail, their derivatives activities and how they are changing in value. Privately held businesses have no such reporting requirements. Foreign non-bank entities participating in the market also have no such reporting requirements. Individuals using the Chilean derivatives markets to hedge – or speculate – face no such reporting requirements. In short, it is possible to identify some of
the derivatives dealers, the pension funds and with case-by-case analysis the major non-financial corporations who are using derivatives markets. Otherwise there is a substantial short-coming in the data. Other customers, although not identified, include hedge funds who use derivatives markets for a variety of reasons. There are also likely to be some high net-wealth individuals who have access to the markets.

Hedge funds are believed to play a significant role in Chile’s derivatives markets, however the lack of transparency and the lack of reporting requirements means that the particulars are unknown. They are believed to be engaged in investment strategies that capture the interest rate differential between the Chilean peso and the Brazilian real (called the ‘carry trade’) and that earn arbitrage profits between the Chilean peso and copper prices.

8. History

There was far less hedging through derivatives markets during the 1990s. This was not because there was less need for hedging, because Chile had large amounts of foreign currency debt and a large share of the economy was linked to traded goods. Chile also faces significant exposure to variations in the price of copper and other commodities. The lack of hedging, instead, was due to the higher cost of hedging and the limited availability of suitable derivatives instruments.

Many of Chile’s financial and non-financial companies had large net foreign exchange exposures and were surely aware of the risks from potentially large exchange rate movements despite the presence of an exchange rate band and of the relative stability of the peso. After all, companies with unhedged net foreign exchange positions made large losses in the wake of the 1994 Mexican crisis and the 1997 Asian crisis. To some, extent, this non-hedging could be called “passive speculation”.

In the last five years the derivatives markets have grown rapidly in total volume, depth and in the variety of derivatives instruments. Most of the major companies interviewed for this report stated that they hedge any significant net foreign exchange exposure arising from foreign indebtedness. Note that foreign subsidiaries in Chile said that they did not generally hedge their profit remittance payments and that any hedging of the payments, if any, was conducted by the parent holding company.

There are additional reasons why an increasingly large number of companies in Chile hedge their net foreign exchange exposure: rating agencies punish them if they are not fully hedged; furthermore, their major shareholders require it, as do banks when they lend to them. In general, there is greater appreciation for the benefits of risk management, that it is difficult to forecast exchange rate movements, and that the cost of not hedging can be very large. Adding to this is the reduced cost and increased availability of derivatives transactions.

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7 The Chilean Central Bank set a ‘band’ within which the exchange rate was allowed to fluctuate and beyond which it would elicit a policy intervention by the Central Bank.
8 Interview material.
In the recent growth of Chile’s derivatives markets there are a few important milestones. The most significant development has been the growth of the OTC forward market in foreign exchange. This market together with that for cross-currency swaps had $383 billion in trading volume and $24.4 billion in open positions at the end of 2005 (recall Table 1 above).

The growth of this market can be largely attributed to the growth in foreign investment by pension funds and their hedging of those foreign investment positions back into pesos in the forward market. A key regulatory measure allowed private pension fund managers to invest abroad and required them to hedge the resulting foreign exchange rate risk by setting a ceiling on their allowable foreign exchange exposure. In addition, it restricted pension fund managers to trading in derivatives markets with eligible, registered derivatives counterparties. Together these regulatory measures both created the demand for foreign exchange derivatives trading and directed it to Chile’s derivatives markets.

Another key development was the introduction of the long-term cross-currency swap (CCS). The chart above illustrates the growth in the market for this derivative instrument. Providing long-term hedging instruments is often a challenge for market makers. The problem was an unbalanced market. There were large amounts of long-term obligations in US$ that peso earning firms wanted to shift into peso obligations, but there was not nearly an equivalent amount of interest in shifting from peso obligations into US$ payments. This one-sided market was a deterrent to dealers in offering CCS to the market.

According to interviews, the solution to this problem was found in a series of transactions starting 2000 whereby a highly credit rated entity would borrow in Chilean pesos and then swap these peso obligations into US dollars. The first of these was conducted between the World Bank and Chase Manhattan Bank. In June 2000, The World Bank (I.B.R.D.) issued a 5-year,
CHP 55 billion bond denominated in Chilean pesos but whose repayment was calculated so as to equal a U.F. interest rate. The actual payments were to be made in US dollars but in amounts determined by the U.F. rate. Next the World Bank entered into a cross-currency swap with Chase that swapped fixed U.F. payments (equivalent to the bond payments) for payments based on USS LIBOR plus a spread. This provided Chase with a long-dated peso obligation, and this allowed it to offset the risk of offering the opposite CCS contracts to large Chilean firms that wanted to shift their US dollar denominated debt payments into fixed U.F. peso payments.

Next, in November of 2000, Chase acted as underwriter for the government of Uruguay to issue a 7-year, CHP 82 billion bond at a fixed U.F. rate (and payable in US dollars). The Uruguay government and Chase then swapped the U.F. peso obligations into US dollars, thus giving Chase a 7-year tenor on a fixed U.F. peso obligation. This was used to offset the risk of offering 7-year CCS to other banks and non-financial firms in Chile.

In March 2001 another similar transaction, this time between the government of Uruguay and J.P. Morgan extended the maturity of the local currency bond and the equivalent CCS to 10 years.

The next big step came in 2002 when CODELCO issued long-dated U.F. denominated debt in Chile’s capital market and then swapped it into a US dollars with a CCS. (CODELCO wanted US dollar obligations to match its export earnings and benefited from more favorable credit spreads in Chile than in international markets.) This both gave Chase a long-dates peso obligation to offset the risk of offering CCS in Chile’s derivatives market but it also demonstrated that a Chilean firm could cheaply issue long dated instruments in Chile’s capital markets.

A similar series of transactions followed with the energy firm ENAP whose revenues embodied significant USS exposure as the pricing of gasoline in Chile immediately reflects both global price of gasoline in dollars plus changes in the US$/CHP exchange rate.

Yet another major event in the development of Chile’s derivatives market was the introduction of capital controls in the form of Unremunerated Reserve Requirements (URR) – encaje – on capital inflows. This posed a serious challenge for derivatives dealers in the foreign exchange market. That market regularly balances itself by using the spot market and the peso or dollar credit markets in order to create synthetic short or long positions to lay-off the risk from exposure to unequal amounts of long and short transactions in foreign exchange derivatives. In order to avoid the cost of URR, foreign owned banks in Chile could use their internal lines of credit with their parents or affiliates in New York or London to replicate these synthetic transactions without actually transferring funds into or out of the country.

What this facilitated was the development of the NDF\(^9\) market whereby off-shore entities could take positions long or short in the peso and then later settle the trades in US dollars – thus not having to transfer funds into or out of Chile. It also enabled local Chilean derivatives dealers to manage their risks without generating an expensive cross-border transfer of funds. Though this technically did not violate the capital controls because there were no capital movements across

\(^9\) NDF, or non-deliverable forward, see description of contract above in Market Instruments section.
boarders, it did allow the transfer of risk across borders without the usual ties to the actual movements of funds. It allowed banks to avoid paying the cost of URRs (encaje), and thereby diminished the impact of capital controls on setting exchange rates.

As mentioned above, there was little hedging by Chilean firms prior to the East Asian crises of 1997-98. It was expensive, and the market was not deep. When they tried to hedge, it moved the market away from them as large forward sales of pesos drove down market prices.

During the Brazilian crisis of 1998, there was less volatility. This may well have been due to many Chilean corporations being hedged ex ante of exchange rate exposure. By then, already the NDF offshore market had deepened.

There was even less volatility during the Argentinean crisis as the crisis was seen coming for some time and more people were hedged. By 2006, large creditworthy companies can hedge at 20-30bp, which is very low cost and with very long tenors, reportedly up to 12 years.

9. **Key Regulatory Features**

There are three regulatory authorities in Chile who have a direct role in shaping or overseeing the derivatives markets. One is the Central Bank of Chile that regulates the “formal” foreign exchange market. Another is the Superintendency of Banking.\(^\text{10}\) It sets regulations on how banks can act as derivatives dealers, capital adequacy with respect to derivatives positions, oversees use of accounting norms for derivatives, regulates how banks treat customers with foreign exchange exposures, and conducts bank examinations. The third regulatory agency is the pension fund regulatory agency, Superintendencia de A.F.P.\(^\text{11}\) It sets the maximum foreign exchange exposure for pension fund managers (and thus the minimum hedging requirements), requires that pension hedge with Chilean banks, and prohibits pension funds from posting collateral with Chilean banks (although they can in external markets).

Banks are allowed to trade options, but first must demonstrate adequate risk model. This may lead to change in collateral rules by bank supervisor and even pension fund regulatory.

Chilean regulators require international accounting standards for derivatives. They are having same difficulties in adopting these accounting rules.

Chilean derivatives markets are entirely devoid of collateral requirements and almost devoid of collateral in practice. Non-financial firms claim that they do not use it. Pension funds are prohibited from posting it with domestic counterparties. Banks claim it would discourage customers. Market participants and bank regulators claim that there are no provisions in their derivative contracts that allow one counterparty to demand collateral from another in the event that credit exposure grows or exceeds credit exposure limits. Altogether, this results in a market that is seriously lacking in collateral (also known as margin payments) that is needed to ensure the prompt and complete performance on a large and growing amount of derivatives transactions.

\(^\text{10}\) Superintendencia de Bancos e Instituciones Financieras Chile (www.sbif.cl)
\(^\text{11}\) www.safp.cl
In regards to capital adequacy, banks’ net foreign exchange exposure is currently limited to 20% of capital and reserves. Also there are daily exposure limits of 4% of capital.

Bankruptcy problems. There are no bankruptcy statues in Chile that allow for the enforceability of netting provisions.

Tax issues. NDF markets being used to capture gains at parent firm instead of subsidiary in Chile.
PART 2

12. Derivatives and International Capital Flows

Derivative markets are enormous and rapidly growing, even in developing countries. Their impact on international economic stability should be considered as important, or potentially important, as that for foreign bank loans and portfolio investments. Despite their prominence, only recently have derivatives markets come to the fore as a concern for international policy makers.

The most important economic policy issue raised by the growth and development of Chile’s derivatives market is their impact on international capital flows. Concerns about the impact of derivatives trading on capital flows have focused on four basic questions. These are:

a. Whether or not risk-shifting and price discovery, the two key economic functions of derivatives markets, encourage or discourage the net flow of capital to developing countries?

b. Whether or not hedging – through the use of derivatives – the foreign exchange risk exposure of investing in developing country generates a comparable amount of capital outflows?

c. Whether or not there is any cyclical dimension to the role of derivatives in international capital flows? Do they also accentuate exchange rate movements in a pro-cyclical manner?

d. Whether or not derivatives markets make developing country financial systems more vulnerable to instability and thereby discourage the flow of capital to developing countries?

The first question addresses whether the economic benefits of derivatives markets, namely price discovery and risk-shifting, have a positive effect on the volume and stability of international capital flows. The second, and for many the most important issue, is whether hedging activities off-set or otherwise neutralize the benefits of capital inflows. These concerns have been raised by economic studies that have identified reciprocal capital outflows arising from hedging activities. The third issue is whether derivatives trading aggravates or exacerbates capital flows and especially in regards to cyclical capital flows or highly volatile capital flows. These concerns were raised by some of the financial crises that hit developing country financial markets during the 1990s. More recently, there is also a concern about the impact of derivatives in contributing to overshooting of exchange rates as they have been appreciating. The broader question, addressed in this study, is thus whether derivatives can have a pro-cyclical impact on exchange rates, both in periods of depreciations and appreciations. The fourth issue is whether the derivatives markets, especially inadequately regulated derivatives markets, make financial institutions and financial systems more vulnerable to distortions and disruptions and thereby discourage international capital flows.

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12 See Financial Policy Forum, Special Policy Briefs 24, 25 and 27, at www.financialpolicy.org
13 Several studies are discussed in Dodd, Randall. 2000. “The Role of Derivatives in the East Asian Financial Crisis.”
a. Does it encourage greater international investment?

Regarding the first issue, the economic benefit of foreign capital inflows is that they augment domestic savings so as to finance additional investment. Inflows also add to the availability of foreign exchange. While the principal benefit is to increase fixed investment and stimulate domestic demand, capital flows in the form of foreign direct investment also in some cases bring with them new technologies that add further to the economic capacity of the host country.

Derivatives can promote greater international investment by improving asset pricing and especially facilitating risk management at a micro-economic level. This involves several elements:

1. Derivatives provide price discovery. Sometimes the underlying asset is not traded in markets that allow for transparent pricing or centralized pricing or benchmark pricing.
   a. For example, farm products are often sold by their producers in many different and dispersed markets so that the prices established in these markets do not otherwise result in a national price or a benchmark price, e.g. 5,000 bushel lot of number 2 yellow corn. Futures markets can do this. Even bank loan rates might not be known nationally, but Eurodollar futures are.
   b. Price discovery also allows for the decomposition of the risks embodied in an asset or transaction to be broken down and priced separately.

2. For example, buying a Euro denominated corporate bond involves, at the least, foreign exchange risk, interest rate risk and credit risk. Derivatives markets can price the dollar-euro exchange rate into the future, they can price the single currency (euro) interest rate risk, and credit derivatives can price the credit risk. Investors and speculators can then know the value of these risk components and then hedge or take risky positions in those components if desired.

3. Risk shifting gives new meaning to “from the haves to the have nots” – it involves the redistribution of risk from those who have and do not want it to those more willing or able to bear it. This need not necessarily be viewed as safe versus reckless or prudent versus fearless. For example, a farmer hedges by selling corn futures while Kellogg’s cereal hedges by buying corn futures. If the farmer sells to Kellogg’s (who buys), then both reduce risk through the same transaction. This is not true in all cases; in other cases the party taking the risk holds it on speculation.

4. What effect does this have on international investment decisions? More efficient pricing of assets and the risk component of assets should encourage more foreign investment because they would be more confident that they are paying efficient prices and receiving market efficient rates of return on their investment (i.e. they are getting what they pay for).

5. Risk shifting should attract more foreign investment because investors who do not want all the various types of risks associated with owning a foreign asset can now make the investment with the reasonable expectation of being able to hedge away unwanted risk-components such as exchange rate risk or credit risk.

b. Does hedging negate the benefit of capital inflows?

1. Derivatives markets in developing countries are often different from those in developed countries. Investors in developing countries, both foreign and domestic, need to hedge primarily against a fall in the value of the local currency. Almost no one wants to take
additional long positions\(^{14}\) in the local currency, i.e. no one wants to hold pesos or rupees unnecessarily. This makes it hard to create derivatives markets because trading requires one party to take the long side and another to take the short side. There are, of course, periods when developing countries’ currencies have been appreciating, and this poses problems to hedgers and other market participants. The general one-sidedness of the marketplace due to short-hedgers is a challenge to complete derivatives markets. It is interesting however, that the value of the local currency has been rising, mainly due to the increase in the price of its exports. Therefore, derivatives have been used more to hedge against a rise of the local currency.

2. So in the “normal” situation if investors want to hedge against a decline in the value of the local currency, what can they do? Who will take the long side? Or in other words, how can a derivatives market exist in local currency exchange rate risk?

3. If there are more short hedgers than long hedgers in a derivatives markets the only way for all the short sellers to find long buyers is for speculators or arbitragers to take positions in the market. And if no one want to speculate by holding the local currency risk outright? Market makers generally maintain a flat or nearly flat book of positions. They do not sell short unless they can offset the position by buying long. When there is no one to sell short to, then the dealer is reluctant to buy long. Then the trick is for example for a bank to create a synthetic short local currency position to lay off the risk of taking the long position in the derivatives market.

4. A synthetic short position is simple.
   1. Borrow local currency through a bank loan
   2. Buy dollars with the local currency in the spot foreign exchange market
   3. Invest dollars in dollar assets abroad
   4. This leaves the investor owing local currency and is thus short.

5. What this means is that the synthetic position generates a capital outflow as the investor takes a local currency loan and invests it abroad in a dollar asset. Thus if the foreign investor who is bringing capital into the developing country (whether DFI or portfolio investment) tries to hedge the local currency risk, and the derivatives market requires the use of synthetic short positions in order to complete the market, then the act of hedging capital inflows will result in similar amounts of capital outflows. A similar case occurs if a firm borrows abroad in foreign currency, hedges its’ exchange rate risk by selling pesos for US dollars in the forward derivative market and a “synthetic” forward is created to complete the market. In both cases this would negate the effect of foreign capital inflows augmenting domestic savings as a source of investment or alternatively financing additional imports.

The problem identified in this example is that the use of peso credit to purchase US dollar assets amounts to a capital outflow. The amount of the outflow is roughly equivalent to the amount of capital inflows that are being hedged. Thus the benefit of foreign capital inflows augmenting domestic savings is off-set to the extent that those foreign capital inflows are hedged in a manner that leads to reciprocal capital outflows.

\(^{14}\) Long is what you own, short is what you owe. Long is what you buy, short is what you sell.
6. It might be pointed out that the sale of dollars for pesos to repay the peso loan is an equal reversal of the initial capital outflow, and that the hedging activity would thus not result in a capital outflow over time. This point, however, overlooks the fact that so long as the foreign investment is hedged, the derivatives dealer in turn will lay-off its side of the hedge and that this might entail maintaining or rolling-over in succession this peso loan and dollar asset transaction until the hedging has ceased. In this way the capital outflow backing the dealer’s position would possibly last as long as the hedged foreign investment. If so it would offset the benefits arising from augmenting savings as long as the foreign investment was hedged.

7. This problem of offsetting capital inflows, though real and present, is likely to diminish as the foreign exchange derivatives markets grow larger and deeper. However, when the market becomes one-sided and there are more buyers (or sellers) of the peso in the derivatives market, the problem of off-setting flows returns. A more thorough look at the functioning of Chile’s derivatives market indicates that dealers in the Chilean peso derivatives markets face many opportunities to lay-off such short peso positions with other entities that are long hedgers or are otherwise taking long positions in the foreign exchange derivatives market. A somewhat unique feature of the Chilean market is that the long hedgers include Chile’s pension funds who invest huge assets abroad and are required to hedge a large share of their foreign exchange exposure. Also included in the long hedgers are Chile’s exporters who earn hard currency revenue but must cover most of their expenses and payments in pesos. Others entities might be taking, or be willing to take, long positions in the Chilean peso for speculative purposes. Together these amount to a sizable opportunity to lay-off short hedging positions without having to engage in the series of credit market and spot foreign exchange market transactions needed to create a synthetic position. If derivatives dealers do not take out peso loans to make dollar investments, then there is no capital outflows resulting from the hedging activity.

8. What about the role of the NDF (non-deliverable forward) market in this activity? Might that affect whether hedging results in capital outflows? No, not necessarily. It is economically the same as above except that capital flows occur within the conglomerate bank. However, it is less transparent and can limit effectiveness of capital controls. Furthermore, it may assist tax avoidance. Capital, per se, may not move in a physical or even financial transaction sense but merely by the Chilean subsidiary showing an increase in dollar assets and the parent showing a dollar liability.

9. In sum:
   i. Hedging can negate the benefit of capital inflows to augment domestic savings and provide additional foreign exchange (it might nonetheless transfer technology or have other collateral benefits or costs)
   ii. Hedging will not negate the benefit of capital inflows if and when the derivatives market has equivalent amounts of short and long hedgers – or otherwise long speculators – so that the market can be completed without resorting to creating synthetic positions.

c. Do derivatives markets play any cyclical role in international capital flows?

There are several ways in which derivatives markets can potentially add to the cyclicality or volatility of international capital flows. This does not mean that they will necessarily always
have that effect. Nor does it mean that the likelihood of these effects cannot be reduced by properly designed regulations. The point of discussion in this section is to identify these vulnerabilities, analyze how they occur and then start to explore how proper regulatory measures can help remedy the problem.

- Hedge fund profiting from real-peso carry trade. This works dynamically in a procyclical way because the hedge funds put on the trade when the Chilean peso is falling in value and they unwind their positions if it strengthens (we discuss more empirically below). This results in selling pesos when the value of the currency falls and buying when it rises. This is exactly the opposite of the claims made by many defenders of speculation who insist that speculators are contrarians who sell when the price gets high and buy when the price gets low.
- Hedge funds engage in a similar investment strategy using the copper futures markets.
- Local hedgers, who dynamically hedge, contribute to pro-cyclicality. They do not maintain hedge as a matter of policy. Instead, they sell the peso forward when they think it is likely to fall in value.
- The use of derivatives to increase foreign exchange exposure instead of hedging will add to financial sector vulnerability and can result in a faster, deeper financial crisis (Dodd, 2002). We will now examine the impact of derivatives on systemic stability.

d. Do derivatives improve financial stability?

This topic is more contentious, as it hinges on whether derivatives help or harm financial sector stability. More stability encourages greater capital inflows, while less stability does the opposite.

Some have argued that derivatives markets make a financial system more stable. Former Fed Chair Greenspan has repeatedly argued that large scale use of derivatives by banks has made the US financial system and the overall economy more stable. The basic point is that banks and key financial institutions use derivatives to improve their risk management. This allows them to avoid or transfer unwanted or unwarranted risks while pursuing their business activities and the result is an institution that is more safe and sound. Greenspan cites the lack of failures by financial institutions during the last US recession as evidence for this constructive role.

Others have argued that the OTC derivatives markets do not operate according to safe and sound financial practices and that their large and growing economic role makes financial systems overall less stable.15

Derivatives markets operate at lower prudential standard than most traditional banking, securities or insurance markets.

- Greater leverage and cheaper exposure to market risk – this means that losses can rapidly escalate and compound and that rare events can have greater impacts than otherwise. It also means that losses due to market risk become greater credit exposures and potential credit losses.

• The greater leverage arises from the absence of collateral requirements and lower effective capital requirements. This is one of the more significant problems with Chile’s derivatives markets that was identified above. Inadequate collateral and capital leave derivatives markets more vulnerable in times of stress.
• Greater exposure to liquidity risk – OTC markets can dry up at the worst time as dealers withdraw from markets and other participants hesitate to trade with any dealer viewed to be “at risk”
• Greater exposure to operations risk – OTC markets have poor clearing and settlement arrangements.
• Absence of anti-fraud and anti-manipulation authority and market oversight
• Too many instances of use to dodge taxation and outflank regulation
• Credit derivatives transfer credit exposure from regulated financial institutions with capital requirements to hedge funds that do not have them.

In Sum. Derivatives have the potential to encourage international capital flows. They can improve pricing efficiency and above all, provide means for investors to better manage their risks so as to encourage greater amounts of investment.

That potential may not be realized, and derivatives may actually hamper capital flows. This is more apt to happen if markets are underdeveloped so that dealers generate capital outflows in order to create synthetic short positions to complete markets. Furthermore, the presence of derivatives markets and trading can reduce the safety and soundness of the financial system. In order to assure that derivatives market function to encourage international capital flows and not hinder them, they need appropriate regulatory measures that will promote their use and maintain prudential standards for safety and soundness.

13. How do hedge fund and investment bank strategies affect the exchange rate?

One investment strategy that came up in many interviews with market participants was the peso-real carry trade. This hedge fund and investment bank investment strategy involves taking a short-position in Chilean pesos and a long position in the Brazilian real. The basic idea of the strategy is to capture the difference in Chilean and Brazilian interest rates – which is substantial – while maintaining a hedge on currency risk that is premised on the correlation between the real and the peso. Thus if some event sharply reduces the value of the Brazilian real, then the loss will be offset by the short peso position if the Chilean peso falls an equivalent or even a proportional amount. Indeed, during several periods in 2005 and 2006, amongst the most liquid currencies of the Latin American region, which had the highest correlation with the Brazilian real was the Chilean peso according to the LACI index of JPMorgan and Bloomberg. This correlation, combined with the fact that Chilean Peso interest rates were amongst the lowest in the region, implied that the peso became a natural candidate for the currency of choice for carry trade with the real (interview material, Beltran del Ramon et al, 2005).

There are a few different way to execute this strategy. One way to do this is to sell the peso short in the forward market, and buy the real long in the forward market. This can be done, for example, through the non-deliverable forward market for Chilean pesos. Another way to do this is to borrow the Chilean pesos, thus paying the low peso interest rates, then buying US dollars in
the spot market, buying real with the dollars in the spot market and then investing in a liquid real asset. The gains will be the difference in the real and peso interest rates less or plus the change in the spot exchange rate when the positions are reversed or unwound. If the correlation of the exchange rates were 1, then the profit would be the difference of the interest rates; however, if the correlation is different, there will be additional gains or losses due to exchange rate fluctuations.

This strategy, according to interviews, was popular with hedge funds and foreign investment banks in the early part of 2005 but was unwound in mid-year in June 2005, and especially July 2005 as the peso began to strengthen against the real (see in Chart 1, off-shore positions of banks and non-banks). This occurred both because the peso strengthened as a result of sharp increases in the price of copper and the real weakened due to political problems linked to alleged corruption in Brazil. As the peso began to appreciate, it led to very substantial amounts of real selling combined with peso purchases for the purposes of repaying loans. This large unwinding had the effect of putting further upwards pressure on the peso, thus acting in a pro-cyclical fashion to push the value of the peso beyond what was warranted by the fundamentals (including the higher price for copper).

As shown in Chart 1, the net offshore position of banks and non-banks increased again in October 2005, which coincided with a slight depreciation of the peso even though the price of copper was increasing. This would seem to provide initial evidence that changes in net offshore positions affect the exchange rate.

Given the very large amounts that exists in the net offshore positions (over US$6 billion) at the time of writing – see again Chart 1 – there is a risk that if the correlation between the real and the peso weakens and/or the interest rate differential falls, there could be a large unwinding of the “carry trade” that foreign hedge funds and investment banks are making; this unwinding could exercise a pressure for appreciation of the Chilean peso, which would be unwelcome for Chilean producers of tradeables and particularly for exporters. As pointed out, the events of June-July 2005 analyzed above and in Chart 1 give some evidence that this type of impact seems meaningful.

Further empirical evidence is provided by interesting preliminary econometric analysis carried out by staff of the Chilean Central Bank (Marinovic, 2006; Selaive and Alarcon, 2006). The former (Marinovic, 2006, op cit), adopting an approach based on the microstructure of the exchange rate market, focuses on the fact that the level of Non-Deliverable Forwards between Chilean residents and non-residents for peso-dollars have significantly increased. Her econometric analysis shows that for the 2004-06 period, the level of NDFs contributes, at a significant level, to explain the evolution of the nominal exchange rate, particularly within the next week and the periods up to two months. According to Marinovic’s estimates, an increase of 1% in the net positions of NDFs on average during 2004-06 leads to a depreciation of the peso of 0.02% during the following two months. This is because an increase of one standard deviation (60%) in the change in net NDPS is associated to a depreciation of the nominal exchange rate by approximately 1.2% in the next two months. However, the impact is somewhat larger in certain key moments, as discussed above.

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Non Deliverable Forwards (NDFs) are the instruments used for the peso-real carry trade by offshore actors, as described above.
Selaive and Alarcon (2006) provide complementary analysis. They find a significant statistical daily association between NDF positions and the exchange rate for the second half of 2005, when a fall of US$100m of the NDF positions - equal to around 2% of the total stock by the end of 2005 – was associated with to an appreciation of $1 to the US$. For previous periods, changes in NDF positions were not significant, whilst the price of copper was significant for the whole 2001-06 period.

Selaive and Alarcon op.cit. correctly stress that, as NDFs have increased their share within the total derivatives market in Chile (to 34%), they have become an important proportion of the total supply and demand of foreign exchange, including both spot and forward markets. As a consequence, we can argue, an important – and probably the main – channel through which NDFs influence the exchange rate is through their effect on the supply and demand of foreign exchange. There may, however, of course be other special transmission channels from NDFs to the exchange rate level, such as asymmetries of information and difference in the behavior of agents (Lyons, 2004). These may require further research.

The key point is that offshore (or NDF) positions are very large (at over US$6 billion), and fluctuate significantly. Large changes of these positions, by international hedge funds and investment banks seem to lead to an exacerbation of cycles, in particular of exchange rate appreciation in the recent Chilean case, which can be quite damaging for exports, these large positions could lead to excessive exchange rate depreciation and changing under different circumstances. There are two particular additional sources of concern about these activities. One is that they are driven basically by the search of very large short-term profits and are not linked to differences in countries’ fundamentals. Secondly, these activities by international – mainly US an European – hedge funds and investment banks are totally unregulated; even if they were regulated nationally, this may not be sufficient, and international coordination may be required to make such regulation effective, though it may not be easy to achieve. Institutions like the BIS, the Financial Stability Forum or the IMF could provide support for such measures.


The key question for this study is whether derivatives markets are more or less volatile than that for loans, portfolio investments in stocks or bonds, of foreign direct investment. A follow-up and central question is whether they change the volatility of those various types of capital flows? Do they in fact undermine the idea of a hierarchy of volatility? What is the impact of derivatives on the exchange rate market? Is there a pro-cyclical effect?

The answer depends firstly on how volatility is measured – year to year, month to month, day to day or moment to moment. This is an important distinction. A market price may have little year to year volatility, but experience comparatively greater intraday movements. For example, the S&P500 index was largely unchanged over the calendar year 1994, but it did exhibit considerable intraday and day to day volatility. Alternatively, a market can have serious year to year volatility, but exhibit relatively small day to day movements. For example, the US dollar-euro exchange rate has moved up and down considerably since 2000 – moving more than 50% from January 2002 to the end of 2004. However there are very few days when it has changed as
much as 2%. The point is that volatility may be significantly higher at one frequency than another, and comparison across derivatives and various types of capital flows needs to address these distinctions. The volatility we are most concerned with in this study relates to major changes in trends.

Another question is whether the entire issue of a hierarchy of volatility is still meaningful given the interaction between the capital markets and derivatives markets? If, for example, non-financial corporations (with high levels of external debt) selling for the domestic market are initially not fully hedged on their net foreign exchange exposure (which can be called passive speculation) and increase their hedging significantly by buying dollars forward in periods of expected depreciation, as occurred in Chile on a very large scale in 1998-9 (see Chart 1 and 3 on Net Positions), when their net outstanding forward positions increased by US$4,115 million, this would have had a very large impact on the depreciation of the peso as occurred during that period (see also Table 3). This was the case even though such transactions were carried out by foreign direct investors, and not by short-term lenders and speculators. Therefore, foreign direct investment (if not properly hedged) can have – in some circumstances – as volatile an impact on the exchange rate as short term flows due to the use of derivative instruments.

Preliminary correlations indeed clearly confirm that there is a very strong correlation between the daily net positions of corporations on derivatives foreign exchange market and the Chilean nominal peso-dollar exchange rate for the 1998-99 period.
Chart 1

Net Positions (US$MM), Copper Price (dec2004=100) and NER (dec2003=100)

Table 3

<table>
<thead>
<tr>
<th></th>
<th>Financial companies</th>
<th>Pension funds</th>
<th>Non-financial corporations</th>
<th>Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>412</td>
<td>-233</td>
<td>1,407</td>
<td>-1,599</td>
</tr>
<tr>
<td>1999</td>
<td>-4</td>
<td>-1,107</td>
<td>2,708</td>
<td>-1,590</td>
</tr>
<tr>
<td>2000</td>
<td>-162</td>
<td>115</td>
<td>-581</td>
<td>874</td>
</tr>
<tr>
<td>2001</td>
<td>-513</td>
<td>-132</td>
<td>464</td>
<td>-93</td>
</tr>
<tr>
<td>2002</td>
<td>-545</td>
<td>-942</td>
<td>-745</td>
<td>2,575</td>
</tr>
<tr>
<td>2003</td>
<td>801</td>
<td>-4,577</td>
<td>864</td>
<td>2,593</td>
</tr>
<tr>
<td>2004</td>
<td>207</td>
<td>-1,768</td>
<td>464</td>
<td>241</td>
</tr>
<tr>
<td>2005</td>
<td>-1,427</td>
<td>-3,254</td>
<td>599</td>
<td>680</td>
</tr>
</tbody>
</table>

Source: Central Bank database. Author’s calculation. Figures in US$ millions.

However, if derivatives are widely used for hedging, e.g. foreign direct investors with local currency revenues are fully hedged (as many large firms currently claim to be as they expressed
during detailed interviews and as is confirmed by Charts 1 and 3, which show the stability of non-financial corporations net positions) then the hierarchy of volatility still holds, as these foreign investors would not exert additional pressure on the foreign exchange market in times of crisis. Therefore, in that case, foreign direct investment would continue to be less volatile than short-term flows. Thus it may be necessary to try to regulate/encourage such foreign investors, as well as local firms that are heavily indebted abroad, to be fully hedged. Also, smaller actors with net foreign exchange exposure (eg exporters) should be encouraged to be hedged not just for the macro-economic impact of hedging in times of exchange rate turbulence, but also to give protection to the firms from large exchange rate movements.

There may be a case therefore for ensuring that companies (especially large ones) with considerable dollar liabilities and peso incomes are hedged from the start. This could be achieved via direct or indirect regulation. In markets such as the current Chilean one, such hedging is not at all expensive. It would be advantageous, both for the firm (for whom unhedged positions are potentially very costly, as was shown by big losses of some companies in Chile in 1998-9), and from a macro-economic perspective, as it will avoid additional pro-cyclical pressure on the exchange rate, both in times of large inflows and especially in times of large outflows. This is an important lesson that other developing countries can draw from the Chilean experience.

There would seem to be a similar case for encouraging or requiring that foreign investments by Chilean firms be hedged, in times of downward pressure on the Peso, as clearly was the case in 1998-9 in Chile (Ffrench-Davis and Tapia, and Zahler), with a rapid and pro-cyclical increase in foreign investment by Chilean pension funds. However, as discussed below, such hedging is not desirable from this perspective when pension funds are investing abroad at times of expected peso appreciation. An additional general problem may be that in such circumstances, if such outflows are very large, derivative instruments may be expensive on that scale.

There may therefore be a case for restricting the scale of the outflow of pension funds during certain periods (as suggested by Zahler, 2005 and Fontaine, 1996) and/or only allow such large outflows in periods of expected depreciation if such additional foreign investment by pension funds is fully hedged. For the latter, regulations would need to be lifted that currently somewhat restrict hedging by Chilean pension funds, especially for using long-term instruments. This would help make it cheaper for pension funds to hedge and would allow longer term hedging. However, as discussed in what follows, hedging of pension fund outflows in periods of expected appreciation of the peso would be undesirable. It may therefore, not be easy to use regulations on hedging by pension funds, to increase their stabilizing or counter-cyclical role, unless such regulations are changed through the cycle. This may be too complex to implement effectively. Therefore, should in future in Chile, pension fund assets’ investments abroad be liberalized further, it may be desirable to impose limits on their monthly outflows, when macro-economic conditions require this.

Specifically in the period 1998-99, hedging by pension funds was very partial, as there was an increase in investment abroad by Chilean pension funds of US$4,162 million between December 1997 and 1999 (see Table 4), whilst the net increase in outstanding foreign exchange forwards was only US$1,340 million (which represented only 32% of outflows). Therefore, the net impact of pension fund outflows during that period was US$2,822, which implied that significant additional pressure was exerted on the peso to weaken. In interviews it was argued by pension fund managers that pension funds initially needed some foreign exchange exposure, and
therefore did not hedge their initial increased investment abroad that was facilitated by further liberalizing the capital account; this limited hedging however was mainly encouraged by the fact that it was more profitable to invest abroad and not to hedge, given the expectations of the peso falling, in the wake of the Asian and Russian crises.

Thus, during 1998 and 1999, there was a combination of non-financial big companies (mainly in the telecommunications and energy sector) hedging on a significant scale, by buying dollars forward, and pension funds investing abroad on a large scale (with very partial hedging) implying that due to both factors, there was major pressure on the peso to weaken from these flows, both on the spot and the forward market, which it did. This contributed to the need for a sharp macro-economic adjustment, that led to a fall in GDP of 1% (Ffrench-Davis and Tapia, 2001).

Table 4
Pension Funds: Changes in foreign investment and hedges

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment abroad</th>
<th>Changes in net outstanding forward</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>1399</td>
<td>-233</td>
</tr>
<tr>
<td>1999</td>
<td>2773</td>
<td>-1107</td>
</tr>
<tr>
<td>2000</td>
<td>-1759</td>
<td>115</td>
</tr>
<tr>
<td>2001</td>
<td>734</td>
<td>-132</td>
</tr>
<tr>
<td>2002</td>
<td>1332</td>
<td>-942</td>
</tr>
<tr>
<td>2003</td>
<td>5727</td>
<td>-4577</td>
</tr>
<tr>
<td>2004</td>
<td>5330</td>
<td>-1768</td>
</tr>
<tr>
<td>2005</td>
<td>8000</td>
<td>-3254</td>
</tr>
</tbody>
</table>

Sources: Association of Chilean pension funds and Central Bank data base

In the period 2003-2005, the situation has changed; large companies report that for the last 5 years they have had their net foreign exchange exposure fully hedged. This seems to be reflected in the fact that they do not experience very large changes in their net outstanding forward positions (see Table 1 again) in this later period. On the other hand, pension funds hedged heavily (around 80%) of their large investment abroad in 2003 (see Table 4 again), which implied that this investment abroad would only, to a very limited extent, moderate the significant strengthening of the peso that was occurring. However, in 2004 and 2005, there were again large outflows by pension funds, but there was a smaller proportion of hedging (see again Table 4), of 40% or less during those two years, which implied that the outflows by pension funds did have an effect in slowing the important appreciation of the peso.

Therefore, hedging of their large investment abroad by pension funds is stabilizing the exchange rate in times of expected peso depreciation, but implies less of a stabilizing role of pension fund outflows in times of expected appreciation.
What becomes increasingly important for Latin American countries is not just how derivatives are regulated, but also how (and how much) their use by firms, pension funds, etc is regulated, so their impact is not too pro-cyclical, or (ideally) could be neutral or even counter-cyclical. This is quite difficult, as derivatives are currently not very regulated, the aim of this limited regulation is not linked to macroeconomic concerns e.g. of pro-cyclicality, and in some cases, regulations on hedging would have to be changed according to cycles of exchange rate trends, and/or capital flows. Further research and policy discussion seems to be required.

There are new issues such as hedge funds and investment banks speculating on currencies (e.g. to take advantage of interest rate differentials between Chile and Brazil and a perceived correlation between the two currencies, that happened after the Argentinean crisis; this clear case of self-fulfilling prophecy was discussed above. The scale of this activity (reaching over $US6 billion in 2005) is very large (see Chart 3). This lead to an exacerbation of cycles, in particular in exchange rate appreciation or depreciation, which can be quite damaging, for example, for exports. Further research is required in this new important area of carry trade between emerging market currencies and their potential pro-cyclical impact. Possible options for regulation also need to be explored by regulators, both nationally and internationally.

15. Role of Regulation in Shaping Market

1. Goal is to ensure derivatives markets are safe, sound and efficient. Purpose is to help ensure sound institutions and stable financial systems. Another purpose is to ensure safe markets that are free of fraud, manipulation and predatory practices aimed at consumers and small investors. Yet another purpose is to promote efficient markets – the focus of which is pricing efficiency and transactions costs.

2. The regulatory framework is built upon three pillars.
   i) Registration and reporting requirements. These help prevent fraud, create transparency and encourage more efficiency in the price discovery process.
   ii) Capital and collateral requirements. These help protect against credit failures at institutions as well as transactions. This in turns helps promote market liquidity.
   iii) Orderly Market Rules. These help maintain orderly trading and price discovery in the marketplace. Some examples of this include position limits, price movement limits (sometimes called circuit breakers), requiring dealers to maintain bid and ask quotes throughout the trading day and

3. The purpose of this section is to explore the use of regulatory framework to encourage the development as well as govern the market for trading derivatives instruments. Markets do not allow arises and develop on their own.

It is recognized that market sometimes do not exist in areas where a need can be conceived. The lack of markets for certain things or services is known as incomplete markets. This is explained in some instances as arising from asymmetric information, or an externality of some sort or an inappropriate legal restriction or prohibition. But these explanations do not satisfy all the instances or absence or insufficient development.
There are some instances that are important for economic development and the financing of economic development which cannot so easily be explained by the above. There are too few markets for local currency denominated assets in developing countries. Too few equity markets in developing countries. Too little supply of consumer and rural credit and financial services in developing countries. These also include the difficulties in establishing efficient derivatives markets in developing economies.

Markets may create incentives for individuals and firms to hedge their exposure to certain risks. However it is observed time and time again that many if most do not do so. Is it possibly just their bad habits? Is it the lack of insight or understanding into their own financial self-interest that is less apparent than other material incentives? Is it markets that fail to offer efficient prices, efficient transactions costs and a safe market environment?

Markets are not black boxes in which buyers and sellers are mysteriously matched with efficient prices which equilibrate the quantities they wish to buy and sell. Markets have microstructures that are comprised of the institutions through which market participants can post their bid and offer quotes, negotiate or otherwise match quoted prices at which transactions can be executed, and then the transaction settled through the payment of cash against delivery of asset or fulfillment of obligation.

The institution is cheap and simple if it involves the sale and purchase of produce in a cash-and-carry market. The market involves more legal protections and complications for rental housing or bank loans which involve transactions that occur over time. The market for securities requires more institutional support because the contracts traded in the market are contracts over time and thus pose far greater vulnerabilities to fraud and mispricing than cash and carry markets. Also, securities markets need high volume and low cost transactions. Lastly, securities markets need to address the conflicts of interest inherent in the issuance and secondary trading of securities. Derivatives markets of some kinds require substantial institutional support, without which the markets suffer inefficiencies and vulnerabilities.

Sure, some derivatives markets such as that for agricultural forward delivery contracts and agricultural trade options thrive with little direct institutional support. However, they would suffer severely if they were not able to price off of benchmark prices established on the major derivatives exchanges in Chicago and New York.

16. Regulatory Proposals to Improve Chile’s Derivatives Markets

Prudential measures to promote hedging and reduce instability

1. Registration and reporting requirements
2. Better management of credit risk
   • Netting
   • Collateral
3. Capital adequacy for dealers/ market-makers
   • Better provision of liquidity
   • Obligations on dealers to maintain bid-ask quotes
• Real time price disclosure/reporting

4. Orderly Market Rules
   • Require dealers to maintain quotes throughout trading day
   • Larger trader reporting requirements
   • Position limits
   • Clear, enforceable prohibitions on fraud and manipulation, and better policing of pricing function of market

5. Promote Multilateral trading facility
6. Take measure to promote the orderly creation and development of local derivatives markets
7. Link with the macro
17. CONCLUSION

Derivatives may alter the hierarchy of volatility of capital flows, making long-term flows potentially less stable; this was, for example, clearly the case when in 1998-99, foreign companies, selling for the domestic market in Chile, heavily hedged their external debt exposure, fearing a peso depreciation. This contributed significantly to such a depreciation, however, this can, to a significant extent, be controlled if derivatives’ users are effectively regulated to hedge any significant foreign exchange exposure. Effective regulation would strongly encourage hedging and this in turn would help create a more balanced market in derivatives instruments and reduce the exposure of financial and non-financial businesses to market risk such as exchange rate fluctuations. A more balanced market would seem to be less likely to generate reverse capital flows as derivatives dealers seek to balance the risks on their trading book.

This key policy lesson is perhaps more important outside Chile (where large companies are already hedging their currency exposures) for example in some other Latin American countries where derivatives markets have yet to, or are only beginning to, develop.

At the same time, new and possibly more dangerous sources of volatility are opened by the use of derivatives. For example, the speculative use of derivatives by unregulated entities (such as hedge funds) could lead to significant losses that would cause credit losses at derivatives dealers who are the core of Chile’s financial sector. They also may have important pro-cyclical effects on the exchange rate.
DEFINITIONS

Affiliate – another firm related by being either the parent or another subsidiary of the same parent.

Bullet bond – semi-annual or annual interest payments (called coupon payments) and entire principal and coupon is paid on date of maturity.

Collateral (see margin) – cash, government securities or other assets posted to counterparty in order to help guarantee full performance on the derivatives contract and thereby reduce counterparty credit risk.

Counterparty – the entity enters into the other side of the derivatives contracts and takes the opposite position.

formal foreign exchange market – in Chile the Central Bank requires reporting of most foreign exchange transactions in order that convertibility is guaranteed

lay-off risk – to enter into another similar but opposite transaction in order to reduce the overall exposure.

long-hedge – entering into a long-position in a derivatives contract to hedge an already existing short position. For example, an airline buying heating oil futures in order to hedge their requirement to purchase jet fuel in order keep their planes flying.

offset risk – see lay-off risk

short-hedge – entering into a short-position in a derivatives contract to hedge an already existing long position. For example, a corn farmer hedges his crop (a long position) by selling corn futures.

spread – the different between bid and ask quotes, or the risk premium above a risk-free or other benchmark rate.

LIBOR – the rate at which off-shore or Eurodollar banks are willing to lend (London Interbank Offered Rate).

strike price (see exercise price)

“take a position” – a phrase meaning to enter into a transaction (or series of) in order to potentially profit from a future price movement.

UF or “Unidad de Fomento” – Chilean pesos indexed to inflation at an official CPI rate
SOURCES


Financial Policy Forum, Special Policy Briefs 24, 25 and 27, at www.financialpolicy.org


CHART 3
Non-Financial Companies