




CENTRAL BANK OF CHILE



**MONETARY POLICY
OF THE
CENTRAL BANK
OF CHILE:
OBJECTIVES
AND TRANSMISSION**

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MONETARY POLICY OF THE CENTRAL BANK OF CHILE: OBJECTIVES AND TRANSMISSION

This paper provides information on the objectives of the Central Bank of Chile's inflation policy and how the monetary authority understands the effects of its policies on inflation and price stability.

Along with making the goals of reaching price stability more explicit, the first part of the paper also provides details on the current policy of inflation targeting. It is worth pointing out that other objectives beyond price stability, which could be assigned to monetary policy or other policies available to the Central Bank, are not specifically dealt with.

The second part of this paper describes the channels of transmission used to apply monetary policy throughout the economy, before materializing in concrete results relevant to inflation.

This paper, along with other initiatives like the new Regulation for the Functioning of the Board of Governors and

the Monetary Policy Report respond to a decision by the Central Bank to treat its procedures and policies with maximum transparency. Similarly, this paper aims to complement the Monetary Policy Report and make its reading easier.

I. Price Stability and Monetary Policy

The Basic Constitutional Act of the Central Bank of Chile establishes that the purpose of this institution is: "to watch over the stability of the currency and the normal functioning of internal and external payments". To fulfill this purpose, the law gives the Central Bank the authority to regulate the amount of money and credit in circulation, to carry out international exchange and credit operations, and to regulate monetary, credit, financial and exchange matters. These attributes allow the Bank to configure its main tool: monetary policy.

The Purpose of Price Stability and the Main Principles of Monetary Policy

Money plays a fundamental role in the correct functioning of any economy, particularly the Chilean economy. To preserve this role, the Central Bank's monetary policy must defend the value of our currency, the peso, seeking to maintain a *low and stable* inflation.

The purpose of keeping inflation low and stable, which is how the concept of *price stability* is interpreted in practice, is no mere whim of the law, but rather serves the broader goal of maintaining the country's economy on the road to sustained growth, with full employment, and, in general, with progress and well being for Chileans. In fact, the Central Bank's greatest contribution to growth and progress is rooted in the confidence in the future associated with price stability. This stability provides an incentive to saving, investment and productivity gains, all of which are indispensable to economic growth. Furthermore, low, stable inflation is beneficial from the distributive point of view, because it favors the growth of employment and protects the income of the most vulnerable sectors of society.

Monetary policy can not influence long-term growth beyond this contribution of price stability. The potential consequences of this policy on economic activity and employment over the short- and medium- term arise from the different channels through which changes in monetary policy are transmitted in order, finally, to affect inflation. This is why monetary policy takes an *anti-cyclical* stance that, along with preserving price stability, seeks to avoid extreme variations

in overall expenditure or domestic demand, conducive to unnecessary risks in financial markets and difficult conditions in terms of recession and unemployment. In this sense, *the focus of the Central Bank of Chile's monetary policy is price stability over time, taking into consideration this policy's effects on economic activity and employment in the short- and medium-term.*

- The Inflation Target Range

To preserve price stability, the Central Bank has committed itself to a monetary policy stance that seeks to maintain annual inflation within a range of 2% to 4% per annum over time. The central value of this range, 3%, constitutes the *operational target* that guides monetary policy in the medium term. Both this central value and this range adequately represent the concept of price stability in the current conditions facing the Chilean economy, in spite of the fact that they are somewhat higher than the mean inflation rates observed in developed countries' economies (between 1% to 3%). In the first place, this 2-4% range takes into account a degree of inflationary inertia derived from the extensive use of indexing (with respect to past inflation) in diverse markets, practices that in turn form part of the legacy of high inflation that affected Chile from the thirties onward. In the second place, international experience reveals that countries that grow faster than average (like Chile) are also those with greater productivity growth in the tradable sector (linked to foreign trade), which is associated with a slight tendency to increase inflation. This is due to the fact

that improved productivity in the tradable sector pressures wage increases and these, in turn, affect the prices of non-tradable goods, a situation that is not completely offset in the short-term because of the downward inflexibility of some prices. Finally, it has been demonstrated that inflation indicators demonstrate a positive bias in every country in the world, because of the way they are calculated, due to changes in consumption habits, and the inclusion of new products (among other elements). These factors are usually more acute in countries experiencing rapid growth, like Chile, introducing a positive bias somewhat greater than in developed countries.

The operative medium-term target is defined in terms of changes in the Consumer Price Index (CPI). This indicator, however, can show a relatively high degree of volatility from month to month, as a result of the variation in the prices of perishable foods (affected by seasonal and climatic factors), and fuels (associated with fluctuations in the international oil price). Therefore, to periodically interpret price information over the short term (up to 12 months), the Central Bank prefers to focus its attention on measures of *underlying or trend inflation*, such as shifts in *underlying or core* CPI (an index that excludes vegetables, fruit and fuel) maintained by the National Statistics Bureau (*Instituto Nacional de Estadísticas*, INE). To project the evolution of inflation trends over the medium term, between 12 and 24 months, both indicators will be used, which does not present practical or interpretative problems, given that both figures tend to coincide over this time horizon.

Temporary deviations from the *trend inflation* with respect to the central value of the range (3%) are tolerable, but only to the extent that they remain within the established limits and it can be expected, with reasonable security, that *within a prudent period*, inflation will return to 3%. That is, both the ceiling and the floor of the range *represent exceptional levels of inflation and not targets as such*.

- The Operative Aspects of this Policy

The main *operative instrument* of monetary policy consists of the auction quotas for its own debt securities that are held on the open market from month to month. This adds or subtracts liquidity from the very short-term interbank market as needed (*repo* and *anti-repo* operations, to use international terms), in order to stabilize the (overnight) *interbank interest rate* around the *operative or instrumental target*, defined as the *monetary policy rate* (*tasa de interés de política*).¹

- Transmission Channels and Monetary Policy Horizon

The transmission of changes in monetary policy towards the rest of the economy takes place through several different channels and takes a relatively long and variable amount of time to materialize.² Thus, for example, a more

¹ Note too that the Bank has other operative instruments, whose use is less frequent (see sidebar).

² For more details, see Section II of this paper.

restrictive policy stance (reflected in an increase in the monetary policy rate) leads to lower private spending on investment and consumption and in this way, affects the gap between aggregate demand and potential output, and, ultimately, inflation. At the same time, an increase in the policy interest rate can also affect the exchange rate (causing the peso to appreciate), eventually reducing inflation for imported products, as well as affecting external demand and the expenditure to output gap. This process, from the time the policy rate changes until inflation reacts substantially along the series of transmission channels, may take from one to two years. *The Central Bank considers this period of time to be the prudent lapse for the horizon of monetary policy.*

This is why monetary policy decisions are based on the *expected* evolution of inflation over a period of 12 to 24 months and not necessarily on its current behavior. Thus, even if inflation remains within the defined target range at any given moment, it may be necessary to act *preventively* to avoid future deviations in *trend inflation* associated with this range. It is also possible that specific movements of inflation beyond this range may not require policy actions if there is a well-founded assumption that these will be very short-term and do not risk de-anchoring *trend inflation*. Similarly, it's important to underline that the 2% to 4% range, centered on 3%, defines a *symmetrical* target implying that, in principle, preventive action is necessary regardless of whether the projection for trend inflation threatens to rise above 4% or fall below 2%.

Monetary Policy, the Floating Exchange Rate, and Inflation Targets

The floating exchange rate regime currently in effect allows the Central Bank to use its monetary instruments more flexibly and independently than in the case of a rigid exchange rate regime. This is significant, because the price stability sought by monetary policy can be combined with the possibility of absorbing impacts from the world economy through a flexible exchange rate. Furthermore, the floating exchange rate, the growing depth and sophistication of domestic capital markets, and their integration into the global economy are all elements that substantially reduce the probability that Chilean economy, of sound fundamentals, be exposed to tension regarding external payments, such as those resulting from pronounced fluctuations in the terms of trade or external financing conditions.

The floating exchange rate regime, furthermore, is perfectly consistent with the medium-term perspective of current monetary policy, given that inflationary or deflationary effects of transitory exchange rate fluctuations tend to cancel each other out over horizons longer than one year. Additionally, the growing importance of exchange rate hedging mechanisms and the improved know-how of the private sector in dealing with short-term fluctuations in the exchange rate that characterize a floating system are elements that tend to reduce the magnitude of inflationary (or deflationary) impacts of changes in the value of the peso.

The joint adoption of a monetary policy based on inflation targeting and a floating exchange rate regime is

increasingly common around the world, in the case of both developed countries (Canada, New Zealand, Australia, Sweden, the European Union, the United Kingdom and to some degree the USA), and emerging economies (Israel, Brazil, Chile). These experiences have been particularly successful when it comes to maintaining price stability in a growth environment.

Monetary Policy and Transparency

Changes in monetary policy are transmitted to the rest of the economy via their impact on asset prices, like market interest rates, stock prices, and the exchange rate. These effects will be more or less pronounced, and therefore, more or less useful to the objective of affecting inflation, to the extent that market expectations line up with these goals, for which clear signals regarding the future monetary policy stance are absolutely vital. This demands enormous transparency in terms of what the monetary authority seeks to achieve with its policies and with regard to how the Central Bank diagnoses the current state of the economy and projects its future.

In other words, monetary policy will be more successful at achieving target inflation if both financial markets and the public at large understand the factors affecting inflation and the Central Bank's evaluation of these, as well as the policy prescription applied by the monetary authority. During the last decade, for example, it was noteworthy how, to the degree that inflationary targets were achieved one after another, inflation expectations became increasingly oriented by the Bank's own target, based on the

credibility of its commitment to these goals.

Over time, a credible commitment to price stability not only succeeds in reducing inflation, but to the degree that it increases credibility, reduces uncertainty about future inflation and thus, results in lower average interest rates, which favor investment and, in the long-term, growth.

Additionally, growing confidence on the part of people and markets that inflation is under control makes them less sensitive to unexpected factors that could affect inflation. This ensures that, today, a slight adjustment in monetary policy may be enough to avoid a misalignment of expectations, which contributes to greater economic stability and provides the Central Bank with the time necessary to evaluate the depth of permanence of any unexpected events.

- *Transparency Initiatives*

With the aim of increasing the transparency of monetary policy, in May 2000, the Central Bank began publishing its *Monetary Policy Report (Informe de Política Monetaria)*, which will appear every four months (January, May and September). Its main goals are: (a) to support the formulation of the Board of Governors' medium-term monetary policy-making process; (b) to inform and explain to the general public the Board's perspective on recent and expected inflation and its consequences for the conduction of monetary policy; and (c) to orient economic agents' expectations regarding future inflation and output trends.

At the same time, the new *Regulations for the Functioning of the Board of Governors (Reglamento para el Funcionamiento del Consejo)* contemplate a series of measures to achieve greater transparency for Central Bank policies. These include the publication of the dates of monthly monetary policy meetings and the summary of the minutes of these meetings, and other instances whereby policy decisions are adopted, with a 90-day lag. This is intended to formalize communication of the debate carried out during monetary policy meetings and seeks to increase transparency in the relation between the Central Bank and the Ministry of Finance regarding monetary policy.

It is worth noting that the effort to achieve greater transparency does not respond only to the intention of making monetary policy more effective. In fact, transparency allows those who administer State institutions to *account for* their actions and decisions in a simple, direct manner, while promoting greater efficiency and incentives for increased performance. In the case of an autonomous central bank, like Chile's, transparency is particularly important for legitimizing actions and policies before the public and to be accountable for them.

II. Transmission Mechanisms for Monetary Policy in Chile

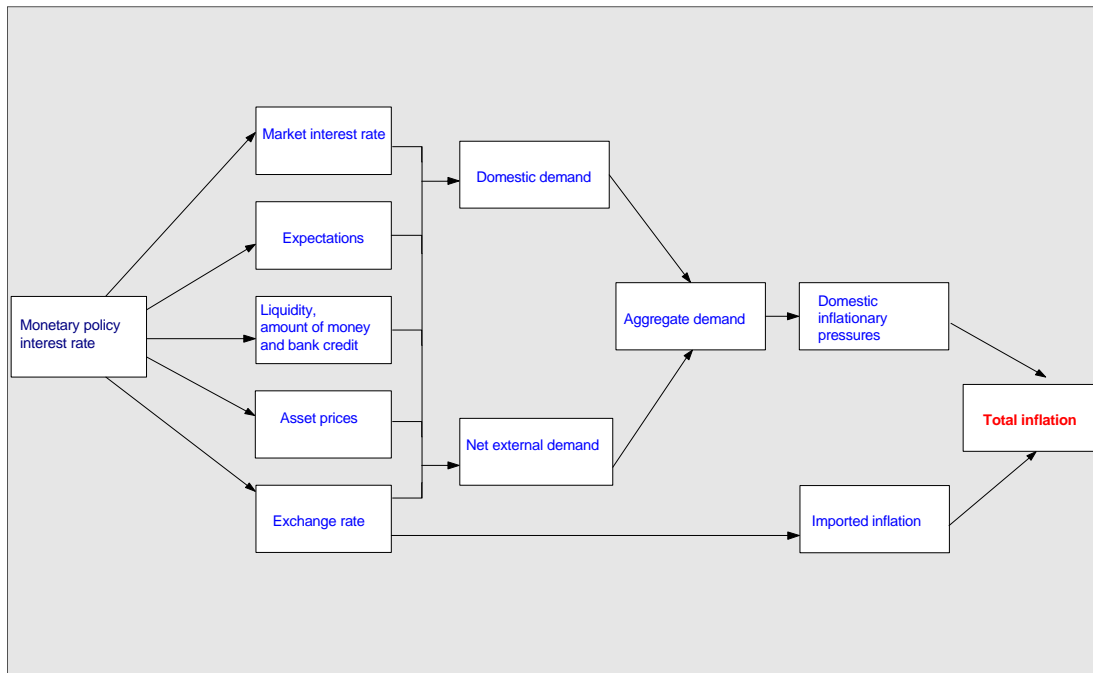
Although monetary policy influences a wide range of variables in the

short term, especially those related to aggregate demand, its consequences on aggregate supply and on growth are practically non-existent in the long term. In the long run, monetary policy essentially influences nominal variables, particularly price levels. It is in this context that some analysts sustain that inflation, defined as the rate of change in price levels, is ultimately a monetary phenomenon. This is why it is important for inflation be the main focus for Central Bank monetary policy.

However, over the short and medium term, monetary policy changes affect real activity, through the different channels through which such changes are transmitted until they finally reach and affect inflation. In this way, the path through which inflation is targeted, after a certain period of time, may have diverse effects on economic activity, employment and external accounts.

The following simplified diagram shows graphically how a change in monetary policy can produce a range of effects on the economy. It highlights the existence of immediate repercussions on financial markets and asset prices, and the triggering of first and second round effects on company and individual decisions that eventually affect inflation. These aspects are explained below.

SIMPLE DIAGRAM OF TRANSMISSION MECHANISMS



The Effects of Monetary Policy on Financial Markets

As already mentioned, monetary policy is the Central Bank's tool for showing the market its stance given the country's economic juncture and inflation prospects. This policy is expressed in an interest rate known as the *monetary policy rate* (or simply, the *policy rate*), which has been directly linked to the interbank interest rate since 1995. The interbank rate is the rate at which commercial banks loan each other overnight funds in order to meet liquidity requirements (mostly due to the legal reserve requirement). Nonetheless, the Central Bank does not set its policy rate by decree, but rather announces an operating target that it tries to sustain through *open market transactions* and other operative instruments with commercial banks themselves. In other words, it injects or withdraws liquidity,

sometimes on a daily basis and using very short-term securities, so that the interbank rate remains near the policy rate. A special table, below, provides details on the operational aspects involved.

The quantitative effect that a change in the policy rate has on other interest rates and on financial markets generally depends on the degree to which this policy change was anticipated and how it affects expectations regarding future policy. On the other hand, it is important to keep in mind that some of the effects described may occur when market expectations regarding the policy change, rather than the policy rate itself.

- Short-Term Interest Rates

An unforeseen change in the policy rate is immediately transmitted to other

short-term rates in the monetary market. Suddenly, interbank rates adjust *pari passu*, then go on to affect nominal 30- to 90-day deposit and loan rates and, with slightly less intensity, nominal and real security, deposit and loan rates for up to one year, particularly those for Central Bank promissory notes like the 90-day PRBC and the 360- and 90-day PDBC. However, these rates don't always move by exactly the same amount as the policy rate, and, transitionally, there may also be adjustments in spreads or margins between asset (loan) and liability (deposit) rates.

- Long-Term Interest Rates

Although a shift in the policy rate produces unequivocal changes in the same direction in other short-term rates (although some react slowly), the impact on longer-term interest rates may go in either direction. This is because these long-term rates are affected by an averaging of short-term rates, both current and future, so that the outcome depends on the direction and the size of the impact of the policy rate change on expectations regarding future interest rates. For example, an increase in the policy rate could create the expectation that interest will drop in the future, in which case long-term rates could even *fall* in response to a rise in said policy rate. However, normally the tendency to rise would predominate, although clearly less than the increase in the policy rate itself.

- The Exchange Rate

Variations in interest rates provoked by monetary policy can also

affect the exchange rate. This variable is the relative price of a foreign currency (normally the dollar) in terms of Chilean pesos, and in this sense, depends on monetary conditions both in Chile and abroad. Nonetheless, the precise impact that a change in the monetary policy rate has on the exchange rate is uncertain, given that its impact will depend on existing expectations about interest rates and domestic and foreign inflation. These expectations, in turn, may be influenced by policy changes. However, if all else remains equal, an unexpected increase in the policy rate normally leads to an immediate rise in the peso (and possibly the UF as well) against the dollar. The appreciation is due to the fact that higher domestic interest rates, compared to external rates applied to equivalent foreign currency assets, causes peso (and UF) assets to become more attractive to local and foreign investors. The exchange rate then moves to a level at which investors expect a future depreciation in the peso (and the UF) that will also reduce the attractiveness of peso-denominated securities. At this point, given the degree of substitution between dollar-denominated securities and peso or UF-denominated securities, investors would be indifferent to holding assets in either of the two currencies. Under these conditions, the corresponding interest rate differential for instruments of any maturity is approximately equal to the sum of the rate of change expected in the exchange rate for the same period, the exchange risk premium, and the risk premium on peso (or UF) instruments.

It is worth stating that the effects of monetary policy on the exchange rate can be more limited where there is an

exchange rate band and capital account regulations. In the measure that the reserve requirement was reduced to zero in 1998 and the exchange rate band eliminated in 1999, and the fact that in general, the exchange rate regime became more flexible, this transmission channel has entered into almost full operation in Chile.

- Asset Prices

Changes in the policy rate also affect market prices for securities, including bonds and shares. Bond prices are inversely proportional to long-term interest rates, so that any increase causes the price of bonds to fall. If all else remains equal (especially expectations), higher interest rates also push down the prices of other securities like shares and properties. This is because expected future returns are discounted at a higher rate, so that the current value of any future income source suffers a drop.

It is necessary to point out, however, that several other factors may not remain equal; for example, policy changes may indirectly influence expectations, which will be commented on below.

- Liquidity, the Amount of Money, and Bank Credit

Although the demand for money can be unstable, what is certain is that a shift in the policy rate will affect the amount of available liquid monetary assets (those that don't pay interest or pay very little interest), like currency and M1A (which basically adds demand deposits).

For example, an increase in the policy rate tends to be associated with a monetary restriction, given that its tendency to push up market interest rates will raise the cost to the public of keeping those assets liquid and thus reduce the amount in demand. This in turn leads to a situation where banks require less liquidity for their transactions at the higher interbank rate, which means the Central Bank needs to provide less liquidity to sustain the new rate.

The lower demand for liquid monetary assets has as its counterpart, a reduction in demand deposits at banks, which, if not offset by an increase in other forms of deposit, will reduce the sources of bank funds and their base for extending credit. Similarly, even if other forms of interest-paying deposit rise exactly enough to offset the decline in demand deposits, it will now be more expensive for the bank to obtain funds, so it will have to charge more for its credits. This will affect both the cost of credit (whose consequences on the demand of credit are discussed in more detail below), and the supply of credit. In effect, higher interest rates charged for credits will cause a commercial bank to evaluate the risk involved in loans to its clients more carefully, leading it to partially restrict some clients' access to credit. Furthermore, as can be seen below, a more restrictive monetary policy precedes a deceleration in overall expenditure, which will affect some bank customers' ability to repay, another factor that will lead banks to be more cautious.

- Expectations

Changes in the policy rate can influence expectations about the future

path of real activity, by directly affecting investment and consumption decisions and, thus, indirectly, inflation itself. This occurs even before the indirect effects of monetary policy changes on these variables, after the effects on financial and exchange markets. Predicting the course these effects will take is no trivial matter. For example, an increase in the monetary policy rate can be interpreted as a sign that the Central Bank thinks the economy is probably growing more quickly than expected, thus promoting expectations of future growth. What is most common is that an increase in the rate be interpreted as a sign that the Central Bank feels it necessary to temporarily dampen growth in domestic demand to meet inflation targets. This in turn affects growth prospects for company sales, and their investment and employment plans, but at the same time moderates inflation expectations more quickly, thus contributing to a “smooth landing”.³ In contrast, if the increase in rates is considered tardy or insufficient, the market may infer that a larger correction in interest

is forthcoming, thus magnifying the negative effect on economic activity. The general damage to expectations may, in the short term, be counterproductive in terms of containing inflation.

The possibility of this occurring contributes to uncertainty in terms of the impact of any policy rate change, increasing the importance of a monetary policy regime that is both credible and transparent.

In synthesis, although the Central Bank only acts directly on only a specific short-term interest rate, changes in the policy rate affect market interest rates, the exchange rate, and, to a lesser degree, asset prices. The response of these variables is not always the same, but rather, varies from time to time: neither the external environment, nor the policy regime, nor market sentiments can in reality be assumed constant. However, changes in monetary policy generally affect financial markets in the way described above.

³ In effect, a reduction in the expected inflation rate reduces the alternative cost of maintaining money in its most liquid form, thus increasing the demand for liquidity, causing overall expenditure to fall (or rise), and as a result, reduce inflationary pressure. This facilitates monetary policy efforts.

OPERATIONAL ASPECTS OF MONETARY POLICY IN CHILE

The Central Bank applies its monetary policy through the definition of a target level for the interbank interest rate known as the monetary policy rate (MPR). To ensure that the interbank rate remains at the desired level, the Central Bank must regulate the financial system's liquidity⁴ (or reserves) through the use of several instruments: open market transactions, buying and selling of short-term promissory notes, lines of credit and liquidity deposits (extended facilities). These tools also include the bank reserve requirement over deposits, although in practice the Central Bank does not use this as an active monetary policy instrument.

Open market transactions are essentially carried out through regular auctions of promissory notes issued by the Central Bank: 90-day inflation-indexed promissory notes (PRBC90), 42-day, 90-day and 360-day short-term nominal discount promissory notes (PDBC42, PDBC90, PDBC360), and indexed promissory notes payable in coupons maturing in 8, 10, 12, 14, and 20 years (PRC8, PRC10, PRC12, PRC14 AND PRC20). Banks, financial institutions administering pension funds, insurance companies and mutual funds can participate in these tenders or auctions.

The bidding of promissory notes is carried out using the single price per auction method, that is, a cut-off rate is applied to all participants in the auction placing winning bids, in what is known as the "Dutch method". This encourages competition among auction participants and tends to reflect current market conditions more accurately.

In the case of the (average) interbank rate deviating from the policy rate due, for example, to liquidity levels below demand, liquidity is injected to lower the interbank rate and bring it into line with the MPR. This liquidity injection is generally achieved by overnight purchases of notes with repurchase clauses (repos). When the opposite occurs, and there is excess liquidity and the interbank rate tends to be below the target rate, the excess is withdrawn by selling short-term promissory notes. These transactions are implemented using electronic documentation (documentos desmaterializados, that is, papers that aren't physically issued).

Other tools at the Central Bank's disposal are the liquidity credit line and the liquidity deposit account. The Central Bank uses the former to provide financial institutions with overnight loans, without collateral, involving limited amounts and interest charged by tranche. Currently, the interest on the first of the three liquidity line tranches is set at the same level as the MPR; the second at 200 basis points above the MPR; and the third at 400 basis points above the MPR. Similarly, the liquidity deposit allows financial institutions to deposit temporary excess liquidity overnight with the Central Bank and receive a minimum return. Currently, this rate is set at 100 basis points below the MPR and in practice this constitutes the floor of the interbank interest rate.

In order to regulate adequately financial system liquidity, the Central Bank develops a cash flow program that covers the reserve requirement time period, that is, from day nine of each month through day eight of the next month. To encourage less volatility in the banks' reserve requirement compliance and thus the interbank rate, there is also an intermediate reserve required on day 23 of each month, the deadline by which the banks must have complied with at least 90% of the required reserve.

To program cash flow, projections are made for both supply and demand of bank reserves that is bills and coins in the power of banks and balances in banks' current accounts in the Central Bank. Demand is of a derived nature that basically depends on reserve requirement rates and trends forecast for demand and term deposits, along with the behavior of currency in the public's hands. The supply of bank reserves depends on the behavior of currency in the public's hands and from the main sources of emission, particularly the maturities of previously auctioned promissory notes and other, more autonomous sources of monetary expansion for which projections are required. These operations include eventual purchases or sales of dollars within the financial system by the Central Bank and State financial operations having monetary effects.

Once the supply and demand for bank reserves have been determined, the amount of notes to be tendered by the Central Bank is established. The calendar of auctions is published the day before each new reserve period begins.

The liquidity projection is monitored daily to permit fine tuning operations on bank reserves, as needed, using the repo operations already mentioned or special sales of short-term promissory notes.

⁴ Conventionally, financial market liquidity is understood as the level of reserves maintained by banks and financial institutions over and above the minimum reserve requirement. The reserve requirement must consist of bills and coins in cash or deposited in the Central Bank current account, equal to 9% of demand deposits and 3.6% of time deposits.

Individuals' and Companies' Response to Financial and Exchange Market Variations: First Round Effects

Monetary policy affects interest rates, the exchange rate and asset prices. What effects do these changes have on individuals' and companies' spending decisions? The following analysis focuses on the immediate effects of a change in monetary policy, with subsequent impacts on aggregate income, employment and inflation examined further along. Given that the effects of policy changes on expectations and confidence are somewhat ambiguous, this analysis assumes a given level of expectations about the future path of real activity and inflation. Furthermore, it is assumed that the government's fiscal policy remains unchanged in response to a change in monetary policy.

It is important to keep in mind that the effects described, both in the first and second round, are the response to Central Bank action seeking to avoid serious imbalances in aggregate supply and demand, which could place inflation goals at risk. The Central Bank is not trying to influence employment or economic activity per se, but rather is trying to keep the economy on a path of price stability that will facilitate growth and progress over time.

- Individuals

A shift in monetary policy influences individuals in different ways. Firstly, they face a new interest rate on their debts (for example, credit cards) and potential loans (for consumption, at department stores, on mortgages), as well

as for their savings. Thus, peoples' available income changes, as do their incentives to save or to become indebted. Secondly, as access to credit becomes more difficult for some individuals and they therefore present more risks to banks in the face of higher interest rates, their ability to spend is also affected. Thirdly, the value of people's wealth also varies in response to changes in asset prices. Fourthly, any shift in the exchange rate also affects relative prices in local currency for many goods, services, assets and liabilities that are measured in foreign currency. Of these four consequences, the one felt most strongly and directly by most individuals is the impact of the interest applied to debts and loans. When interest climbs significantly and the outlook is for a contraction in economic activity, the second consequence is also relevant.

In Chile, banks' consumer loans constitute nearly 9% of total loans, over 6% of GDP. These credits mature over an average timeframe of about 20 months, so that the amount renewed annually reaches about 3.6% of GDP. Thus, about 1.3 million people per year use these credits, that is, about 24% of the occupied work force. Assuming that GDP growth averages 6% and that the average sum of credits as a percent of output is constant, about 80,000 additional people obtain this kind of credit each year. At the same time, mortgages, which are provided at a fixed rate, are the principal means for acquiring housing. They represent 12% of GDP and on average they mature in about 13 years. If to this you add GDP growth, it can be said that the annual flow of housing mortgages subject to changing interest rates represents about 1% of GDP. In any case, an increase in market interest rates

following an increase in the policy rate will make credit to individuals more expensive, discouraging debt and thus reducing their spending on goods and services.

Although some people with net savings might spend more following an increase in interest rates, evidence suggests that the overall impact on individuals (which is what is relevant from the macroeconomic perspective) leads to a reduction in total consumption, even though this reduction may not be very large during the first round of effects.⁵

The impact on wealth will probably behave in the same direction. However, in Chile's case, shifts in interest rates have a more noticeable impact on housing prices, than on stock and bond prices, given the low penetration of these markets. In the case of housing, higher interest rates normally increase financing costs and therefore reduce demand. Lower demand will result in slower growth in housing prices or even make them drop. As housing is a major component of (gross) personal wealth, any change in its equity value can affect consumer purchases in the same direction as changes to financial wealth, although not necessarily to the same degree. Part of this result derives from the fact that individuals may feel poorer when the market value of their housing falls. Another factor stems from the fact that housing is used to guarantee loans, such that the lower net value of this asset becomes an obstacle in obtaining a loan.

The level of consumer purchases is also influenced by the changing interest rate's effect on consumer expectations

regarding prospects for future savings and employment. These effects vary circumstantially, but when consumers expect a policy change to stimulate economic activity, their expectations regarding future employment and income growth tend to rise, all of which is conducive to a higher level of consumption. The reverse situation could occur after a policy change aimed at slowing growth in aggregate expenditure.

The eventual exchange rate appreciation that would result from an increase in the policy rate may also affect individual spending, although certainly more in terms of its composition (shifting from domestic to imported goods, for example), than in its level. However, wealth impacts cannot be ignored particularly if a significant share of individual debt is expressed in, or indexed to, the dollar (a minor effect in Chile).

In synthesis, in the absence of other factors (expectations remaining the same), raising the policy rate leads to a decrease in consumer expenditure. Eventual exchange rate appreciation would shift spending towards goods and services produced abroad. The size, and even the direction, of these effects may be altered by the impact of the policy change on individuals' expectations. The hypothetical increase in the policy rate would arise from Central Bank projections showing an increase in overall expenditure inconsistent with the goal of keeping inflation within the target range over a one or two-year horizon.

- Companies

The effects of changes in the policy rate on market interest rates, asset prices

⁵ Only afterward, during a second round of effects and when economic activity has already been affected, does individuals' spending react more strongly to the fall in current income (due to higher unemployment, lower real wages or lower sales).

and the exchange rate also influence companies. However, the size of this impact depends on the nature of the business, the size of the company and its sources of financing. Here again the analysis focuses on the direct effects of a shift in monetary policy, assuming other factors remain constant and leaving the indirect impacts on aggregate demand for analysis further along (in spite of the fact that these may be more important).

An increase in the policy interest rate and its impact on market rates will directly affect all companies using bank financing, or something similar, for their working and investment capital. An increase in rates reduces these companies' profits and increases the returns that owners demand on investment, thus reducing new project startups. Higher interest rates affect inventory costs, given that these too are often financed by bank loans. Higher financial costs also make it less likely that these companies will hire more personnel, and in fact increase the likelihood of layoffs or reduced working hours.

Some companies may be less adversely affected by the direct impact of changes in short-term interest rates. This may be due to the fact that they have very few short-term loans and/or fixed assets, or that their short-term liquid assets and liabilities are very similar, so that changes in short-term interest do not strongly affect their cash flow. Even so, however, every time they use the capital market to finance long-term investment, they may suffer the consequences of the impact of policies on long-term interest rates.

The cost of capital is an important factor in company's investment decisions. As mentioned, monetary policy changes have only an indirect effect on the interest rates of long-term bonds. Their impact on the costs of financing capital goods is also indirect and hard to predict. Thus, there is no simple link between policy interest rate changes and the cost of capital. Moreover, in the case of large companies and multinationals with access to international capital markets, their financing costs are hardly affected by changes in short-term domestic interest rates.

Many companies experience a very close relationship between their liquidity and their investment decisions. These companies prefer to finance themselves primarily using internally generated funds (undistributed profits), followed by bank credits and lastly, bond and share issues. In this way, and due to imperfections in financial markets, these firms' investments can be sensitive to the availability of different types of financing, especially those closest to their own funds and bank credit. During the first round of effects following an increase in the monetary policy rate, some companies could find themselves forced to reduce spending beyond the effect of the increase of interest rates if their access to bank loans is restricted for risk reasons. Empirical evidence indicates this effect is relevant in Chile.

Changes in asset prices also influence companies' behavior in different ways. The loans provided by banks to firms (especially small ones) are normally backed up by assets, so a drop in the prices of these may become an obstacle to obtaining credit, due to the drop in the

company's net worth. When interest rates are low and asset valuations high, companies can show healthier balances and thus gain easier access to financing to acquire capital goods. The amplifying effect that financial factors have on cycles is known as the "financial accelerator".

Variations in the exchange rate that may result from a shift in the policy rate may also significantly affect many companies. This is the case, for example, of a Chilean firm with many of its costs denominated in pesos, but producing goods facing competition in Chile or abroad from companies whose costs are expressed in other currencies. A (real) appreciation in the peso would worsen the competitive position of the Chile-based company for some time, generating lower profit margins or sales, or both. Both producers of export goods as well as goods competing with imports will certainly be affected. This would also affect services, like tourism, for example and some activities that rely intensively on imported inputs.

A change in the value of the local currency will also affect companies that produce goods for the domestic market that are not directly related to international trade (non-tradables, to use the technical term). This occurs if a significant share of those companies' debt is contracted in foreign currency and there is no suitable exchange rate hedging. This situation, called exchange rate mismatch, may affect companies' financial solvency, reducing their credit ratings and increasing credit costs (and access to same). This would also lead to a probable contraction in expenditure and investment, and eventually employment, in these firms.

Events in Chile in 1998-1999 provide a clear example of this effect.

The impact of monetary policy changes on companies' expectations regarding the future path of the economy also influences their investment decisions. Once made, fixed capital investments are difficult if not impossible to reverse, so that projections of future demand and risk evaluations are vital elements for decision-making with respect to new investment. An expected decline in the future behavior of demand tends to reduce spending on investment projects. It is hard to predict the effect that any change in the policy rate will have on companies' expectations. However, there is little doubt that these effects constitute a potentially significant influence, particularly in terms of investment.

To summarize, many companies depend at least partially on bank financing in pesos, particularly over the short term, and are directly affected by changes in interest rates. If interest rates are high, the financial position of companies that depend on these short-term credits worsens (all else remaining equal). At the same time, shifts in companies' financial positions can lead to changes in employment and investment plans. To put it more generally, changes in the rate of return demanded from investment mean that higher interest rates lead to the postponement of investment and the reduction of inventory. Policy changes also alter expectations regarding the economy's future performance. This affects investment spending beyond the direct effect exercised by interest rates, asset prices and the exchange rate. It's important to remember that companies' tendency to

reduce spending is what the higher policy rate strives to achieve, based on the idea that this adjustment is necessary to keep inflation within the medium-term target range and to ensure sustainable growth in economic activity over time.

Second Round Effects: How Changes in Spending Decisions Affect GDP and Inflation

The reaction of individuals and companies faced with a higher policy rate is a reduction in their levels of expenditure (investment, inventories and consumption).^{6,7} The resulting change in aggregate spending will affect other agents, even in the cases where the financial effects of a monetary policy change have not reached them directly. In other words, a company that was not directly touched by the changes in interest rates, asset prices or the exchange rate resulting from a change in the policy rate, can still be affected by changes in consumer spending, or in demand for inputs from third party firms. For example, a cement company may suffer from a drop in housing demand. Moreover, the fact that these indirect, or second round effects are foreseeable means they can also influence

expectations. Thus, it is likely that any induced change to aggregate spending will alter the conditions in which the private sector produces for the domestic market, which in turn affects the suppliers of these companies. Due to the very nature of economic cycles, many sectors expand together during peaks in the cycle and there is a general increase in confidence and growth expectations, which translates into higher spending *per se*. As cycles bottom out, many suffer from similar slowdowns and, as a result, growth expectations fall, reinforcing a more cautious approach to spending. This means that individuals and companies more directly affected by policy rate changes (first round) are not necessarily the most affected by the overall impact of a change in monetary policy (first and second round combined).

Finally, the relationship that exists in many companies between available liquidity and investment means that, during the second round of effects, if their profits suffer due to lower demand following a more restrictive monetary policy stance, their investment spending may suffer even more. This is a result of the reduced availability of liquidity for investment, which can not be completely offset by new bank credits or bond issues. Once again, this result must be evaluated on the basis that originally (before authorities raised the policy rate), companies' spending was growing at a rate beyond what was prudent.

- Lag-times Affecting Monetary Policy Operations

The effects of a change in the policy rate take some time to make

⁶ Total or aggregate domestic expenditure in an economy is by definition equal to the sum of private consumption expenditure, state consumption expenditure, and investment expenditure, which commonly includes investment in inventories. Total domestic expenditure added to the balance of trade for goods and services (net exports) reflects aggregate demand within the economy and is equal to Gross Domestic Product (GDP) at market prices.

⁷ It is worth remembering, once again, that the increase in the policy rate that generates these reactions in individuals and companies is based on a Central Bank analysis that the economy is growing beyond what is prudent or beyond what resources allow. The monetary authority is trying to keep the economy on a path of stable prices that will facilitate economic growth and progress in the medium and long term.

themselves fully apparent in the economy. A change in monetary policy quickly affects very short-term interest rates, the exchange rate and financial asset prices, but its impact on some longer-term rates can be much slower. In certain cases, weeks may pass before a higher policy rate influences payments on new bond or mortgage issues (or those received by the holders of savings deposits). Even more time may pass before these changes in financial payments generate shifts in consumer spending by affected individuals. Changes in individual consumer spending levels that have not been fully foreseen by companies affect retail inventories and this, in turn, leads to changes in orders to distributors. These orders will affect producers' inventories, and once they grow or shrink abnormally, production will shift. Changes in production, in turn, generate modifications in employment and profit levels, which will in turn occasion more changes in consumer buying levels. All of this takes time.

Empirical evidence indicates that in Chile, on average, it takes three to five quarters for a change in monetary policy to reach its main impact on demand and production, and an additional four to six quarters are necessary for these changes in activity to have the maximum impact on inflation. However, these average lag-times are surrounded by a great deal of variation and uncertainty. The precise effect will depend specifically on many other factors, among them companies' and consumers' perceptions regarding the immediate future and how these respond to the policy change, the stage of the economic activity cycle, the exchange rate regime, events in the world economy, and

expectations regarding future inflation. Thus, the impact will be felt more or less quickly depending on how settled expectations are with respect to medium-term inflation. These factors are beyond the direct control of monetary authorities but are important enough not only to produce a delay in the adjustment of the main monetary variables when faced with monetary policy changes, but also to make them variable and uncertain.

- Non-Linear and Asymmetrical Effects

Usually the effects of policy changes are assumed to be linear, that is, proportional to the magnitude of the change in the policy rate. In practice, such effects do depend on the size of the policy change. Thus, a very contractive monetary policy may have proportionately greater effects than those of a more moderate stance. This occurs, for example, because abnormally high interest rates, maintained during a long period of time, can weaken the domestic payments system and, given the loss of confidence and capital, the financial system may begin a process of credit rationing or become overly cautious in the granting of loans. Additionally, a very pronounced shift in the exchange rate can weaken and even break the financial system, generating a deep recession. This is to say, the effect is more than proportional compared to when the change in the exchange rate is small.

The economy's response can also assume different proportions when faced with increases or decreases in the policy rate. If interest is increased a given

amount, output may fall less, proportionately speaking, than it would rise if interest were reduced by the same amount, and vice versa. That is, the effects of changes in monetary policy on the economy are not necessarily symmetrical.

- *GDP and Inflation*

In the long run, GDP grows as a result of supply factors, among them technical advances, capital accumulation, and the size and quality of the work force. Some public policies may be capable of affecting supply-side factors but in general, monetary policy cannot do this directly, at least not sufficiently to raise growth trends in the economy. There is an aggregate output level at which companies operate at normal capacity, and they are not under pressure to change production levels or product prices faster than expected inflation. This output level is known as *potential* or *normal* GDP. When real GDP lines up with potential GDP, production levels are such that they exercise no inflationary (or deflationary) pressures on goods markets. Likewise, employment levels are such that they do not pressure increases in wage levels. There is a balance between supply and demand of domestic output.

The difference between real GDP and potential GDP is known as the “output gap”. When the gap is positive, very high aggregate demand has pulled effective output above a sustainable level and companies are working beyond capacity. Excess demand is reflected both in the current account deficit of the balance of payments and in an increase in domestic

inflationary pressures. For some companies, costs will increase because they are working beyond their most efficient production level. They may feel the need to increase the number of employees and/or the number of working hours to sustain the increase in production. This additional demand for labor and better labor prospects will pressure wages and inflation. Some companies may take advantage of periods of high demand to raise their profit margins and raise prices by more than the increase in their unit costs. When there is a negative output gap, the opposite situation generally occurs. Thus, economic surges that raise output levels above their potential normally precede an acceleration in inflation, while recessions that push output levels below their potential are normally associated with reduced inflationary pressure.

Nonetheless, the output gap cannot be measured with great precision. For example, changes in labor supply and industrial structure patterns imply that the point at which producers achieve full capacity is uncertain and is subject to change. The Chilean economy is very heterogeneous, so different sectors react differently when faced with, for example, expanding domestic demand. No two economic cycles are identical, so some industries expand more in one cycle than another. Furthermore, increase in productivity may change over time. This is particularly hard to measure before a long time has passed since the original event. As a result, the concept of the output gap, even if it could be measured with precision, bears no single numerical relationship to inflationary pressure. It really serves to indicate that to control inflation there is a certain level of

aggregate activity where aggregate demand and supply reach equilibrium. This is its potential level.⁸

Maintaining GDP at its potential level is, in the absence of external shocks, enough to keep inflation on target, when this coincides with the rate expected by economic agents. The absence of an output gap is coherent with any expected constant inflation rate. As a result, if it were possible to keep output at its potential level, this would in theory be equally consistent with high and stable or low and stable inflation. However, these two situations are far from equal, from a social well being point of view. Society loses more with high inflation, even when it is high and expected, because it represents a more intensive use of a kind of tax that seriously distorts the assignment of resources. Given that the Central Bank's monetary policy actions and the credibility of the established target determine the level at which inflation finally stabilizes, a low, stable rate requires clear, decisive action from this institution in order to meet its target. In the short term, when output reaches potential, there can still be obstacles, like those raised by wage indexation, which add certain inertia to inflation.

- Inflation Expectations and Real Wages

Inflation expectations are very important because they influence the

⁸ The difficulties in measuring potential GDP have lead the Central Bank to use as a proxy, the concept of trend GDP, calculated using statistical trends for the GDP series resulting from the Hodrick-Prescott filter, as the basis for its econometric-based inflation projections. The concepts of potential and trend GDP are not necessarily equivalent, but their trajectories coincide from a long-term perspective.

setting of prices and wages and therefore feed inflation in the periods that follow.

Wage increases over and above the labor productivity growth rate reflect the combined effect of an expected positive inflation rate and a (positive or negative) component that results from demand pressure on labor markets. Wage increases that do not exceed productivity growth do not raise unit production costs and as a result, are unlikely to get passed on to product prices. However, wage increases that incorporate inflationary expectations or demand pressures do raise unit labor costs and companies may try to transfer them to their prices. Thus, even without excess demand for labor, there will be a tendency for unit costs to rise according to the expected inflation rate, simply because workers and companies negotiate real wages. To a greater or lesser degree, this increase in unit costs can be transferred to prices for goods. This is why, when the GDP has reached its potential level and there's no significant surplus in labor demand or supply, the effective inflation rate coincides with the expected one. This will only equal target inflation once the target is credible.

- Imported Inflation

So far, this description has covered the process by which changes to the policy rate modify domestic demand and how the gap between domestic demand and potential output defines inflationary pressure. Also examined was the effect of the exchange rate on net exports through its impact on the competitive position of domestic firms compared to foreign companies, and demand for locally produced goods and services.

There is a more direct effect of changes in the exchange rate on domestic inflation. This is when changes in the exchange rate affect the domestic price of imported goods, which constitute decisive factors in the costs of many companies, and the retail prices of many goods and services. Peso depreciation triggers an increase in the domestic prices of imported goods, while appreciation can reduce them.

However, many months may pass before these effects completely reach end prices. In fact, the first effect of peso depreciation will be on wholesale prices of imports, expressed in pesos. How, when and how much of these increases get passed on to end consumers of these goods depends on retail intermediary's price policy, the degree of competition that exists along different points of the distribution chain, including retail sales, and the strength of domestic demand. If changes in the exchange rate are eminently temporary, then intermediary's price policy may opt for not passing on these changes in the price in pesos of imported goods (to avoid unnecessarily altering customers' behavior), and covering variations in their earnings with appropriate financial mechanisms. The same policy may indicate that a depreciation of the peso will only translate into a peso price increase on the imported good once those involved conclude the shift will last. The degree of competition involved in among intermediaries will also influence this decision, because the greater the competition, the riskier it may be for a single intermediate to quickly pass on a depreciation in an import's peso price. In effect, the intermediary may lose market share if other competitors do not raise the peso price and absorb the depreciation for

longer by charging it to their profits. Finally, the strength of domestic demand for the imported product is also relevant, given that this feeds the importer's margin and that of the rest of the participants along the distribution chain. A rapidly growing economy will demonstrate strong demand for imports in general, so that a depreciation in this context may be passed on to end peso prices more quickly, without intermediaries risking a substantial drop in amounts sold. In contrast, where overall demand is depressed, intermediaries will find it difficult to pass depreciation on to consumers without facing a severe drop in the amount demanded. In this case, intermediaries' commercialization margins and activity in general, will clearly suffer, which is consistent with the general economic situation.

The transfer coefficient of a depreciation in domestic inflation can be empirically estimated, but varies over time, along with the economic cycle and the development of domestic intermediation markets. Chile's experience indicates that this coefficient has been reduced in recent years⁹ and may drop even further. This will result in an increased familiarity on the part of the domestic private sector with the exchange rate volatility associated with a floating exchange rate regime and the parallel development of a deeper, more liquid exchange rate hedging market.

Finally, the relationship between the exchange rate and domestic prices is not one way. For example, an increase in the exchange rate triggered by changes to US monetary policy will generate

⁹ This phenomenon was observed in several countries simultaneously during the late nineties.

increases in domestic prices, while increases in domestic prices caused by higher domestic demand will influence the exchange rate. Both the exchange rate and domestic price levels are certainly indicators related to the same, that is, the value of domestic currency (the peso). The exchange rate is the peso's value compared to the value of other currencies, and the price level measures the domestic value of the peso against a basket of goods and services.

III. By Way of a Brief Conclusion

This document reveals the fundamental importance that the Central Bank gives to price stability, which is seen as an essential requirement for Chile to enjoy sustainable growth and progress. Price stability is expressed as low, stable inflation of 2%-4% annually, centered on 3%, which it aspires to maintain over time within the perspective of a medium-term horizon.

Along with describing how monetary policy is applied to meet this goal, this paper also details the channels through which changes in the policy rate are transmitted to the rest of the economy until they affect inflation trends. Although the direction of the effects of a shift in monetary policy can often be foreseen without great difficulty, their size and how they evolve over time vary widely. However, Central Bank credibility, in terms of its commitment to price stability and the technical solidity of its diagnoses and actions, reduces this uncertainty and strengthens the efficiency of monetary policy. A technically appropriate and credible diagnosis also leads to preventive monetary policy that suitably allows for the delay between the moment a shift in the policy rate occurs and when it actually affects inflation, acting ahead of events to avoid imbalances and tardy responses. In this context, the intention of this paper is to contribute to the transparency of Central Bank actions so that, when combined with the Report on Monetary Policy, it supports the effort to maintain price stability.