Targeting Inflation in a Dollarized Economy: The Peruvian Experience

BY

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Abstract[*]

This discusses the unique experience of Peru's Central Bank with inflation targeting in an economy characterized by a high degree of financial dollarization. The paper outlines how Peru has taken financial dollarization into consideration in the design of monetary policy, then deals with monetary policy implementation and the Central Bank's strategy for controlling financial dollarization risks. The paper concludes with analysis and lessons drawn from the Peruvian case.

1. Introduction

The theoretical and policy literatures do not provide a clear answer about optimal monetary and exchange rate policies in a dual-currency economy. Some financially dollarized economies, however, have recently moved from hard pegs to more flexible exchange rate regimes. Questions nonetheless remain regarding the effectiveness of monetary policy in a financially dollarized economy, how to deal with financial dollarization risks, and how to restore long-run confidence in the domestic currency.

Inflation targeting as a monetary policy framework has become popular among several emerging market economies, especially since the end of the past decade. Inflation targeting gives the central bank an explicit and permanent commitment to price stability. If this commitment is credible, it allows the anchoring of expected inflation at the target level. Therefore, inflation targeting enhances monetary policy effectiveness and is a possible way to restore the domestic currency role of store of value.

On this basis, the Central Bank of Peru has engaged in a monetary policy based on inflation targeting since 2002. This is the only case so far known of a financially dollarized economy that has adopted an inflation targeting framework.

Although financial dollarization has been steadily declining in Peru in the last few years, it remains significant. By the end of 2004, 55 percent of broad money and more than 70 percent of credit to the private sector were denominated in foreign currency. Financial dollarization must therefore be taken into consideration when designing and implementing monetary policy in Peru, both to control its inherent risks and to promote the role of the domestic currency as a store of value.

Compared with an environment without dollarization, the design and implementation of the inflation targeting framework in a financially dollarized economy like Peru differ in many ways. The differences have to do with the inflation target, the operational target, the inflation forecasting system, and the Central Bank's responses for dealing with financial dollarization risks.

In terms of the inflation target, the Central Bank has chosen a level that is lower than that in the other inflation targeting countries in Latin America. These countries have annual inflation targets that range from 3 percent to 5.5 percent, while Peru's target is 2.5 percent (with a maximum tolerated deviation of 1 percentage point above and below the target). This is related

to the need to have a credible commitment to maintaining strict price stability. With strict price stability, similar to long-run inflation in the United States, the domestic currency is in a better position to compete against the U.S. dollar.

Under inflation targeting, the operational target changed from a banking reserves objective to an interest rate target. In addition to the widespread benefits of having interest rates as the operational target, in Peru this further helps to dedollarize the economy by means of the increased stability and predictability of the short-term interest rate in domestic currency. These effects on the short-term interest rate, as well as the recent development of a benchmark yield curve for public debt in domestic currency, favor the issuance of long-term financial instruments by the private sector. This induces financial dedollarization and thus reduces the vulnerability of the economy to the balance-sheet effect of large domestic currency depreciations.

Financial dollarization also affects the implementation of monetary policy. Although the inflation forecasting system of Peru's Central Bank is very similar to those of other inflation-targeting central banks that do not face financial dollarization, there are some differences. These differences are basically concerned with the specification of the investment-savings (IS) curve in forecasting models, taking into consideration the possible effects of financial dollarization through aggregate demand. In particular, the Central Bank's quarterly projection model extends the IS curve to allow for the presence of both the foreign interest rate and the exchange rate. There is also an inertia term in the exchange rate equation, given the Central Bank's aim of moderating excessive exchange rate volatility.

To reduce the negative effects of stressed markets on a financially dollarized economy, the Central Bank implements several policies. These negative effects are related to the fact that financial dollarization makes the economy face an exchange rate risk and increases the liquidity risk. To deal with these risks, the Central Bank promotes financial dedollarization, tries to induce economic agents to internalize financial dollarization risks, and tries to prevent the balance sheet effect of large domestic currency depreciations, aiming at the same time to assure the availability of liquid funds in foreign currency for a contingent financial sector liquidity shortage. The latter type of policy involves the moderation of excessive exchange rate volatility, requiring commercial banks to have large reserves on their foreign currency liabilities, and maintaining a high level of Central Bank international reserves.

The next section outlines how Peru has taken into consideration financial dollarization in the design of monetary policy. Section 3 deals with monetary policy implementation, while Section 4 describes the Central Bank's strategy for controlling financial dollarization risks. Finally, concluding remarks are made in Section 5.

2. Inflation Targeting under Financial Dollarization

The Central Bank used a monetary targeting framework during the disinflation process (1991-2001). In the new low-inflation environment (since 2002), the base money growth rate has become more unpredictable, and it is no longer suitable for communicating the stance of monetary policy. In this context, in 2002 the Central Bank adopted inflation targeting, an approach made feasible given its autonomy and operational independence.[1] The Central Bank's monetary policy decisions are made in terms of changes in its operational target. Since 2001, the timing of monetary policy meetings is made public at the beginning of the year, and the policy decision is immediately announced after each meeting.

2.1 The Inflation Target

As seen in Table 1, the characteristics of the inflation target in Peru are largely the same as in other countries that have reached and maintain a low inflation rate that is consistent with their long-run inflation target level.

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[1] The Constitution establishes that the Central Bank's objective is to preserve monetary stability. It also stipulates the Central Bank's autonomy according to the Charter Law. This autonomy is supported by the fact that the central bank is explicitly prohibited to take actions against its objective, which include the prohibition of granting direct loans to the Treasury.

Table 1

Inflation targets in some IT countries

Country	Inflation target	Target's horizon
Australia	2% to 3% (since 1993)	Medium term
Brazil	5.1% (for 2005)	1 year
Canada	1% to 3% (since 1998)	Medium term
Chile	2% to 4% (since 2001)	Medium term
Colombia	4.5% to 5.5% (for 2005)	1 year
Czech Republic	2% to 4% (since 2005)	Medium term
Mexico	2% to 4% (since 2004)	Medium term
Norway	1.5% to 3.5% (since 2001)	Medium term
Peru	**1.5% to 3.5% (since 2002)**	**Medium term**
Philippines	4% to 5% (for 2004-2005)	2 years
Poland	1.5% to 3.5% (since 2004)	Medium term
Sweden	1% to 3% (since 1995)	Medium term
England	2%	Medium term

Table 1 shows that countries that are in a disinflation process (Brazil, Colombia, and the Philippines) state their inflation targets for one or two years. Countries that have already reached a low inflation rate state that they will try to maintain it indefinitely at that level (for the medium term). The inflation target level in the latter group of countries is between 2 and 3 percent. Once the long-run inflation target has been reached, central banks usually stop revising the target. This is a signal of stability for long-run savings and investment decisions.

Chile and Peru, among the Latin American countries in Table 1, ended their disinflation processes at least three years ago.[2] Both countries have now reached an inflation rate that is consistent with their long-run inflation targets. The Peruvian inflation target is similar to the average U.S. inflation rate in the past 90 years, and it is the lowest inflation target level in Latin America.

In the case of Peru, the chosen level for the inflation target involves the need for a credible commitment to maintaining strict price stability, given the country's domestic dollarization, whereby the U.S. dollar serves as a substitute for domestic currency for all functions of money. With strict price stability, similar to U.S. long-run inflation, the domestic

currency is in a better position to compete against the U.S. dollar. In particular, by keeping domestic currency long-term purchasing power similar to that of the U.S. dollar, there is a higher probability of reducing real and payments dollarization in the economy.[3] Financial dollarization could thus eventually be lowered.

From a historical view, the Peruvian economy has not recorded an inflation rate of 2.5 percent since the 1930s. As Table 2 shows, such a level can be taken as consistent with monetary stability.

Table 2. Average Inflation Rates in Peru, 1900-2004

Period	Inflation [1/]
1901-05	7.4
1906-10	-1.8
1911-15	0.7
1916-20	13.4
1921-25	-0.8
1926-30	-3.3
1931-35	-2.0
1936-40	3.9
1941-45	11.2
1946-50	19.3
1951-55	7.3
1956-60	8.4
1961-65	9.0
1966-70	9.8
1971-75	12.7
1976-80	67.0
1981-85	104.9
1986-90	2,342.2
1991-95	113.3
1996-2000	6.9
2001-04	1.8

1/ Average annual percent for the period.

Source: *Compendio de estadísticas monetarias* 1959-95
(Central Bank of Peru) and Central Bank Annual Reports.

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[2] In the disinflation period, when the Central Bank did not use an inflation targeting framework but monetary targeting, the central bank began to announce one-year inflation targets in 1994 (Rossini, 2001).
[3] Real dollarization is the indexing of local prices and wages to the US dollar; payments dollarization, on the other hand, is the use of foreign currency for transaction purposes.

2.2 The Operational Target

The operational target changed when inflation targeting was adopted in 2002. The current interest rate target is more in accordance with the inflation targeting framework goal, as well as with the need to reduce financial dollarization. In this respect, the volatility of the interbank overnight interest rate has decreased and the interest rate pass-through has strengthened.

For most inflation targeting central banks (and some that do not target inflation, such as the European Central Bank and the United States Federal Reserve), the operational target is a very short-term money market interest rate, usually the interbank overnight loan interest rate. Daily monetary operations are thus oriented toward making the interest rate chosen as the operational target the target level announced by the central bank.

One of the advantages of the interest rate operational target is its communicating force—that is, the monetary policy stance can be communicated to the public in a clear and simple way. Because the stance can be easily understood, monetary policy is more effective and powerful.[4] For example, a reduction of the interest rate target level indicates to the public that the central bank has eased its monetary policy stance, and vice versa.

A second advantage of an interest rate operational target is that, by means of making the short-term interest rate more stable and predictable, it helps to develop a yield curve of interest rates for different maturities. In the absence of a stable and predictable short-term interest rate, the market has no benchmark to set up interest rates in domestic currency for different maturities. When this happens, either there are no long-term operations in domestic currency or, if there are, their interest rates are the same as for similar operations in foreign currency (in a financially dollarized economy), plus the expected depreciation of the domestic currency. In the latter case, domestic currency interest rates would tend to closely follow the evolution of foreign currency interest rates and the expected future depreciation of the local currency (as in a pegged exchange rate regime).

The use of an interest rate operational target was not desirable at the beginning of the 1990s, when the disinflation process in Peru began. The hyperinflation environment made communication easier with a monetary target: the gradual reduction of the base money growth rate was a good indicator of commitment to disinflation. In addition, the high level and

variability of expected inflation did not favor the use of an interest rate operational target: changes in inflation expectations would have created significant noise in signaling the monetary policy stance.

In a low-inflation environment, however, monetary targets are less helpful because monetary aggregates tend to be loosely correlated with inflation in the short run. Moreover, it is difficult to communicate the policy stance because changes in the monetary target might be due to expected changes in money demand. In addition, this target does not favor the capital market in domestic currency because the short-term interest rate might be too volatile.

Given that inflation was already low when inflation targeting was adopted (actually it was around zero percent in 2001) and that the interbank overnight interest rate was very volatile (its standard deviation in 2001 was close to 1 percentage point), it seemed reasonable to gradually move the operational target from a monetary aggregate to the interbank overnight interest rate.[5]

The current Central Bank operational procedure targets the interbank overnight interest rate. The benchmark interest rate for injection standing facilities acts as a ceiling interest rate for the interbank funds market, while the overnight deposits interest rate acts as the floor. Both ceiling and floor form the so-called benchmark "corridor" for the interbank interest rate. This operational procedure was put in practice in 2002; however, the emphasis on the center of the benchmark corridor dates from 2003.

The evolution of the operational target is summarized in Figure 1.

Figure 1. Evolution of the Operational Target Interest Rate

Quantity operational target: **Banks reserves**	**Benchmark "corridor" for the interbank interest rate**	**Interbank interest rate** (centre of benchmark "corridor")
(2001-2002)	(2002-2003)	(Since 2003)

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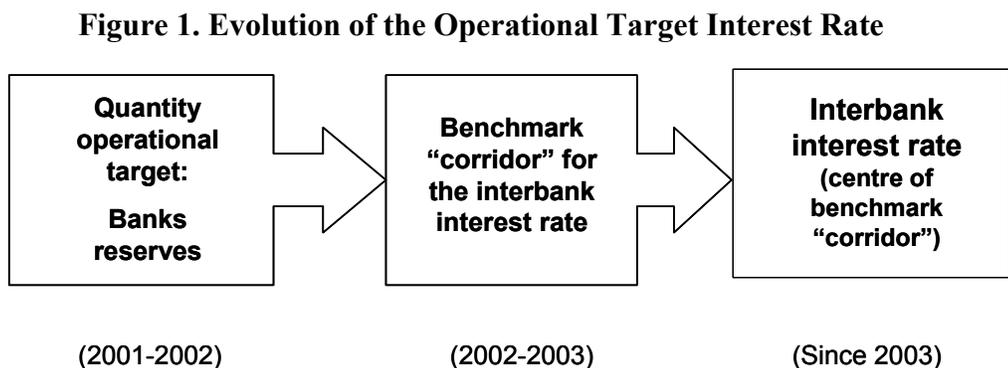
[4] Felices and Tuesta (2005) develop a model where both domestic and foreign currency coexist in the economy. Their preliminary results show that Peruvian macroeconomic volatility in the last few years has reduced as a consequence of changing the basis of the monetary operational target to the interest rate.
[5] Grippa (2004) provides more details on this transition period.

During the gradual process of changing the operational target, interbank interest rate volatility has been steadily reduced. The current variability of this interest rate is low, comparable to that of other central banks with a similar operational target. In 2004, the standard deviation of the interbank interest rate was 7 basis points, while that of the U.S. Fed funds rate was 4 basis points.

Table 3. Interbank Interest Rate

(*Percentage points*)

Year	Average	Standard deviation
1998	18.7	6.45
1999	15.0	4.72
2000	12.6	2.67
2001	9.0	0.91
2002	3.2	0.48
2003	3.4	0.09
2004	2.7	0.07

The reduction in interbank overnight interest rate variability has made monetary policy more predictable and has thus significantly strengthened the impact of changes in this interest rate on other interest rates in domestic currency.

Lahura (2005) estimates the interest rate pass-through. He analyzes the effect of inflation targeting on this interest rate pass-through and finds that since 2001, with the announcement of the operational target and the adoption of the inflation targeting framework in 2002, the pass-through from changes in the interbank overnight interest rate to interest rates on loans and deposits has significantly increased.

Figure 2. Interest Rate Pass-Through by Loan Type, 1999-2004

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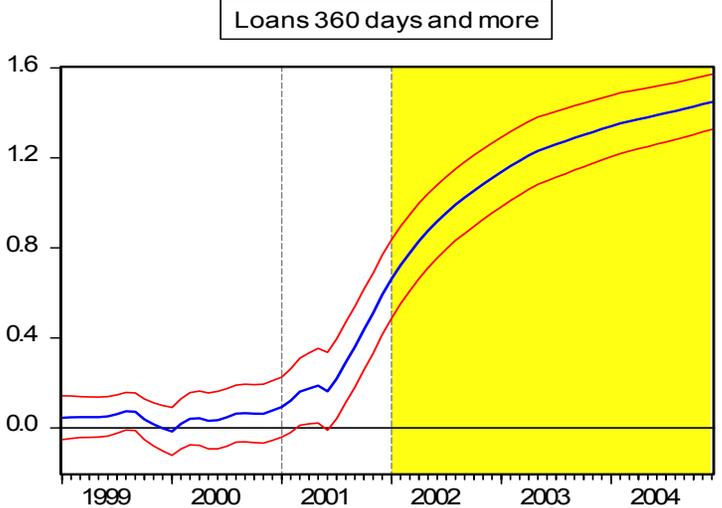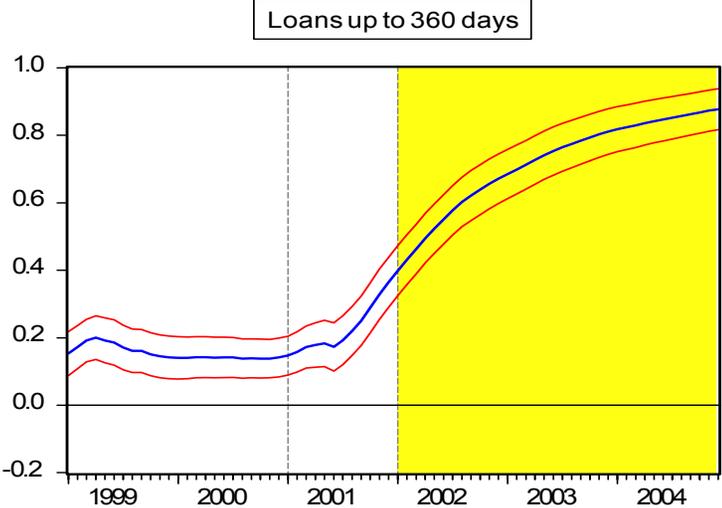
Figure 2. Interest Rate Pass-Through by Loan Type, 1999-2004, continued
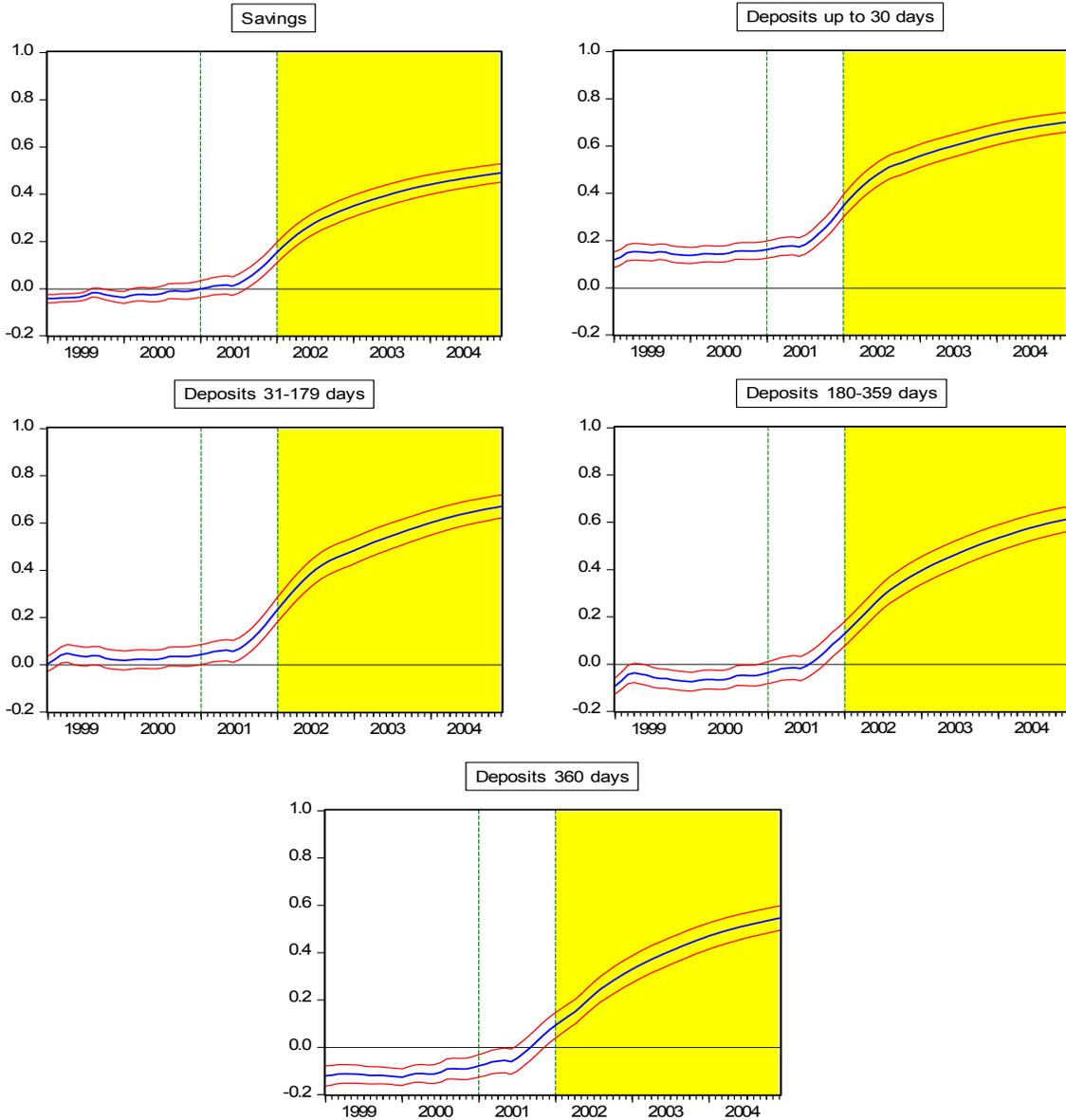
Figure 2 shows the increase in the interest rate pass-through for seven different interest rates (loans and deposits) over the past few years (the shaded area is the inflation targeting period).

According to Lahura (2005), before the announcement of the operational target in 2001, the interest rate pass-through was statistically different from zero for just two of the seven interest rates considered. Since the announcement of the operational target, the interest rate pass-

through began to increase in all of seven cases considered: at the end of 2004, the pass-through from the interbank overnight interest rate to interest rates on loans and deposits interest rates was greater than 0.5. Moreover, he finds that the impact of changes in the interbank interest rate is greater on interest rates on loans than on deposit interest rates.

A key feature in the design of the operational target in a dollarized economy is how this target can be used to manage a large domestic currency depreciation. This is important because large exchange rate movements may be harmful for economic activity in Peru, given financial dollarization (see Carranza, Cayo, and Galdón-Sánchez, 2003, for a discussion on the balance sheet effect in Peru).

The former monetary operational target allowed the central bank to separate the effect of a shock into two parts, between the interest rate and the exchange rate (part of the shock could also be absorbed through forex sales). In practice, the maintenance of a monetary target allowed the Central Bank to reduce the effect of the shock on the exchange rate by means of increasing its effect on the interest rate. This was the case in the second part of the 1990s, when the Peruvian economy was successively hit by significant negative shocks (Asia in 1997, Russia in 1998, and Brazil in 1999). The current interest rate operational target maintains this possibility: there is an escape clause by which, in extreme situations, the interbank interest rate may increase to prevent a significant domestic currency depreciation from triggering the balance sheet effect, undermining economic activity and the solvency of the financial system.

When there is a strong negative shock that is expected to cause a large domestic currency depreciation, the escape clause may spread its effect between the interbank overnight interest rate and the exchange rate (Figure 3). This has been put into practice only once, in September 2002.

Figure 3. Interbank, Benchmark (Ceiling), and Overnight Deposits (Floor) Interest Rates
(Percentage points)
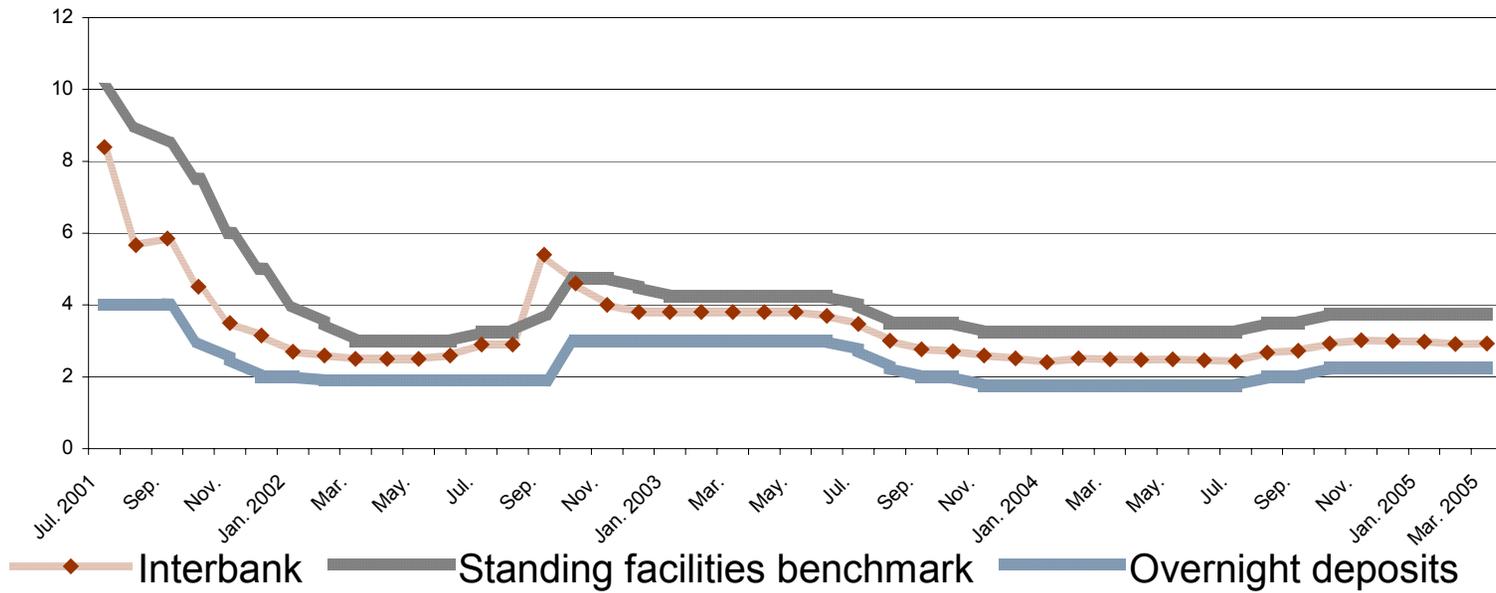
3.   Monetary Policy Implementation under Financial Dollarization

The implementation of monetary policy in Peru considered financial dollarization and its effects on the economy. In this respect, Reinhart, Rogoff and Savastano (2003) study a sample of partially dollarized economies (including Peru) and find that this fact does not necessarily prevent monetary policy from bringing inflation under control.

The Central Bank, as does any other inflation targeting central bank, uses an inflation forecasting system to anticipate future inflation pressures and be able to decide today on measures to counteract them. In addition, the Central Bank implements some policies to deal with financial dollarization risks. This section focuses on the inflation forecasting system and how it accounts for the presence of financial dollarization and its effects on the economy. Control of financial dollarization risks is discussed later.

3.1 The Inflation Forecasting System

The principal inflation forecasting model is the Quarterly Projection Model (QPM).[6] QPM forecasts assume that monetary, foreign exchange, and financial markets are not under stress. Otherwise nonlinearities, which are not considered in the system, might appear.

The QPM is a standard semi-structural calibrated model. Because there are few data available for a low-inflation environment in the Peruvian economy, special emphasis is placed on the calibration of the QPM parameters, which are continuously assessed.

The model analyzes dynamics around trends, which are interpreted as short-term equilibria. QPM is thus focused on a flow analysis (variables are expressed as deviations from trends or as rates of growth), and restrictions are imposed to ensure long-run neutrality of nominal variables on real ones and to guarantee inflation convergence toward the target (2.5 percent).

The model has four main blocks: a Phillips curve, an IS curve, an exchange rate equation, and a monetary policy rule. The differences with models used by other inflation targeting central banks are basically concerned with two equations: the IS curve and the exchange rate.

Aggregate supply (Phillips Curve). The Phillips Curve models core inflation dynamics. The right hand side of the equation incorporates the following: (i) demand factors (output gap), (ii) expected future inflation, (iii) imported inflation, and (iv) core inflation inertia. Central Bank

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[6] A close reference to the QPM is Luque and Vega (2003).

specialists forecast supply factors and non-core inflation components. This is done by means of anticipating future weather conditions; assessing information about crops and food supply, tax arrangements and regulated prices (public tariffs), the recent evolution of input prices and short-term demand indicators, and considering seasonality.

The effect of a domestic currency depreciation on inflation is captured by the imported inflation term. The QPM has a relatively low exchange rate-to-prices pass-through: a 1 percent transitory increase in the exchange rate (sol/US$) causes an accumulated response of inflation of 0.15 percentage points (inflation deviates an accumulated 0.15 percentage points from the target) in one year, as shown in Figure 4. Given that the accumulated depreciation of the domestic currency in the same period of time is 0.79 percent, QPM implicitly considers an exchange rate-to-prices pass-through coefficient of 0.19 percentage points in the first year.

Figure 4. Quarterly Projection Model Simulation: Headline Inflation Path after a 1-Percent Transitory Domestic CurrencyDepreciation Shock
(Percent)
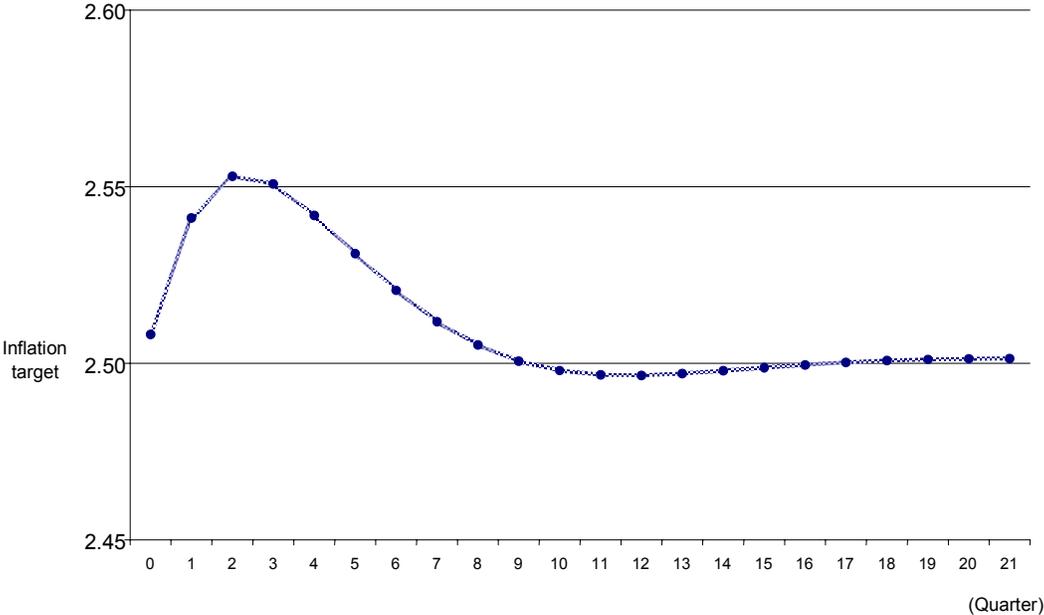
The fact that most prices in the economy are set in domestic currency and not indexed to the exchange rate (low real dollarization) is a key factor in explaining the low exchange rate-to-prices pass-through coefficient. The coefficient is similar to that in Miller (2003), Winkelried

(2003), and Morón and Lama (2005). These studies find that the pass-through from the exchange rate to consumer prices is between 0.15 and 0.30 percentage points in one year.

McCarthy (1999) develops an empirical model to assess the transmission from the exchange rate to three types of prices: importer, producer and consumer. Miller (2003) uses this model for Peruvian data and finds that the nominal exchange rate-to-prices pass-throughs are 89, 46, and 16 percentage points, respectively, in one year.

Winkelried (2003) uses McCarthy's model and incorporates asymmetries into the analysis. He estimates the pass-through to consumer prices to be 0.15 percentage points in one year. However, this estimate could rise to 0.30 percentage points in a year during the expansion phase of the business cycle.

Finally, Morón and Lama (2005) use the same basic model and add a monetary sector to the analysis. Their estimated pass-through coefficients to importer, wholesaler, and consumer prices are 80, 30, and 20 percentage points in one year, respectively.

Aggregate Demand (IS curve). Aggregate demand pressures are represented by the output gap. To capture its dynamics, the QPM includes the following: (i) the domestic currency interest rate; (ii) the sol/US$ bilateral real exchange rate; (iii) the foreign currency interest rate;[7] (iv) fiscal conditions that reflect the effect of the fiscal stance on the output gap; and (v) foreign economic conditions, which include terms of trade, the multilateral real exchange rate, and economic activity abroad.

The particularity of the IS equation is in the first three terms. Both domestic currency and foreign currency interest rates are measured as deviations from their steady-state values, with the domestic rate being the interbank overnight real interest rate in Peru and the foreign rate being the 3-month LIBOR real interest rate. An increase in any of the three terms (the two interest rates and the change in the bilateral real exchange rate) reduces the output gap.

The domestic interest rate component in the IS curve indicates the power monetary policy has to affect economic activity in the short run. An interest rate increase creates disincentives in consumption through the substitution, income, and wealth effects, as well as through interest payments on debts; investment is negatively affected by the higher user cost of capital. In the QPM, a 1 percentage point increase in the domestic currency interest rate reduces the output gap by 0.17 percent. This estimate is higher than Llosa and Miller's (2004) estimate (-0.10 percent).

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[7] A similar type of IS specification can be found in Dancourt et al. (2004).

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The difference is related to the fact that the interest rate pass-through has grown in the last few years since inflation targeting was adopted (Lahura 2005), and the QPM tries to capture this structural change.

Table 4. Slope of the IS Curve

	Instantaneous Response of Output Gap to Domestic Currency Interest
Brazil[1]	-0.39
Chile[2]	-0.28
Colombia[3]	-0.19
Czech Republic[4]	-0.12
Poland[5]	-0.65
Turkey[6]	-0.12
Venezuela[7]	-0.06
Peru (QPM)	-0.17

[1] Springer de Freitas and Muinhos (2001).

[2] Corbo and Tessada (2003).

[3] Gómez and Julio (2000).

[4] Benês et al. (2002).

[5] Łyziak (2001).

[6] Şahinbeyoğlu (2001).

[7] Arreaza, Blanco and Dorta (2003).

In the group of countries in Table 4, although Peru's output gap instantaneous response to (domestic currency) interest rate changes is lower than that of Poland, Brazil, Chile, and Colombia, it is slightly higher than that of the Czech Republic, Turkey, and Venezuela. If consumers and firms are net debtors, the interest rate channel in a financially dollarized economy may be weaker than in an economy that is not financially dollarized: although an interest rate increase still creates disincentives for consumption (through the substitution effect) and investment, it also appreciates the domestic currency, reducing the value of foreign currency-denominated debt (in terms of local currency), and thus rises net wealth. In this way, the overall result may be contrary to what the central bank intends. This is the balance sheet effect, which makes monetary policy less effective in a financially dollarized economy

In this case, the expectations channel might be relatively more important. If the inflation target is credible, an increase in the nominal interest rate by the central bank can be associated with lower inflation in the future. This reduces expected future inflation, and thus the real interest rate (both in local and foreign currency) rises, reducing the output gap. In other words, the credibility of the inflation target may enhance the central bank's ability to control the real interest rate.

The bilateral real exchange rate component in the IS curve captures the balance sheet effect of an exchange rate movement. It is the change in the sol/US$ bilateral real exchange rate. If the domestic currency depreciates in real terms against the US dollar, the output gap goes down.

It must be said that, as is the case in any partially dollarized economy, the extent and effects of dollarization on the economy are difficult to measure. In particular, large exchange rate movements may have nonlinear effects on economic activity. What is more, it might be the case that an unexpected large domestic currency depreciation causes a severe economic downturn if the negative balance sheet effect dominates the real exchange rate increase's positive effect on economic activity. In this case, there would be a negative pass-through from domestic currency depreciation to inflation. Carranza et al. (2004) find that the higher the degree of financial dollarization of an economy, the higher the asymmetry of the pass-through from a nominal exchange rate increase to inflation, where an asymmetric pass-through is defined as a negative pass-through coefficient during economic downturns. The presence of this asymmetry is more

likely for larger depreciations of the domestic currency. The QPM assumes moderate exchange rate changes; thus, these nonlinear effects are not activated in the forecasting horizon.

It should also be noted that the traditional positive effect of a domestic currency real depreciation over net exports, and thus on the output gap, is captured by the multilateral real exchange rate, which is also present in the IS equation.

Finally, the foreign currency interest rate component captures the presence of financial dollarization.[8] Given that there is financial dollarization, changes in the interest rate in foreign currency will affect consumption and investment decisions in the same way these were affected by the domestic currency interest rate. Thus, changes in the interest rate in foreign currency will affect the output gap.

Exchange rate equation. The exchange rate equation relates spot exchange rate movements to the difference between the domestic currency interest rate and the foreign currency interest rate. There is also a risk premium term in the explanation of exchange rate dynamics.

Because of financial dollarization, the central bank smoothes out the path of the exchange rate with forex interventions. To reflect this policy, there is an inertia term in the exchange rate equation.

Monetary policy rule. It is well established that monetary policy actions affect inflation with a lag. This lag is estimated to be around one year in the Peruvian economy (Armas et al., 2001), while in countries with more developed financial systems and a longer record of low inflation rates the lag is greater (two years or more).

In the model, the central bank's operational target (interbank overnight interest rate) depends on two variables: the deviation of the inflation forecast from the inflation target (2.5 percent) and the output gap. When the inflation forecast is 2.5 percent and the output gap is closed, the operational target should be equal to the theoretical monetary policy neutral stance. There is also a smoothing term in the monetary policy rule.

The exchange rate, by contrast, is not included in the rule: the operational target only responds to exchange rate movements for inflation considerations. This does not mean that

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[8] The inclusion of the foreign currency interest rate in the IS curve acknowledges the fact that local and foreign currencies remain imperfect substitutes in the credit market.

potential nonlinear effects of large domestic currency depreciations are not taken into consideration by the Central Bank. The next section of this paper assesses these considerations.

3.2 Inflation Targeting in Practice, 2002-04

During the first three years of inflation targeting experience in Peru, economic activity has been recovering, so that the output gap has been negative but smoothly closing. Short-run CPI-inflation fluctuations have been driven mainly by supply shocks and imported inflation, while inflation expectations have been, in general, at the target level.

Monetary policy actions have followed a criterion of anticipation to inflationary or deflationary pressures using inflation forecasting systems conditioned to monetary policy stance scenarios. These forecasts have been disclosed to the public through the Inflation Report to communicate monetary policy actions and to contribute to anchoring inflation expectations.

This section describes Peruvian monetary policy under inflation targeting. It explains how inflation converged to the target, gradually rising from around zero percent in a context of economic recession in 2000 and 2001. It then comments on recent inflation trends.

Starting Point: Deflation Risk

When inflation targeting was adopted in 2002, the economy was in a recession (GDP growth was 0.3 percent in 2001) and there was a deflation risk (the inflation rate was zero percent in 2001 and negative during the first quarter of 2002). In this context, the monetary policy stance was expansive to circumvent deflationary pressures and achieve the inflation target. The loosening of the monetary policy stance was aggressive and began in the second half of 2001 (the interbank rate fell from 8.4 percent in July to 3.1 percent in December) and continued during the first half of 2002, when the interbank rate reached 2.5 percent (historically, the lowest rate in the money market[9]) with a spread of 50 basis points over Libor.

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[9] Between 1922 and 1930, the interest rate in the money market was 3.0 percent.

Figure 5. Consumer Price Index

(Annual percentage change)

Inflationary supply shocks (food and oil)
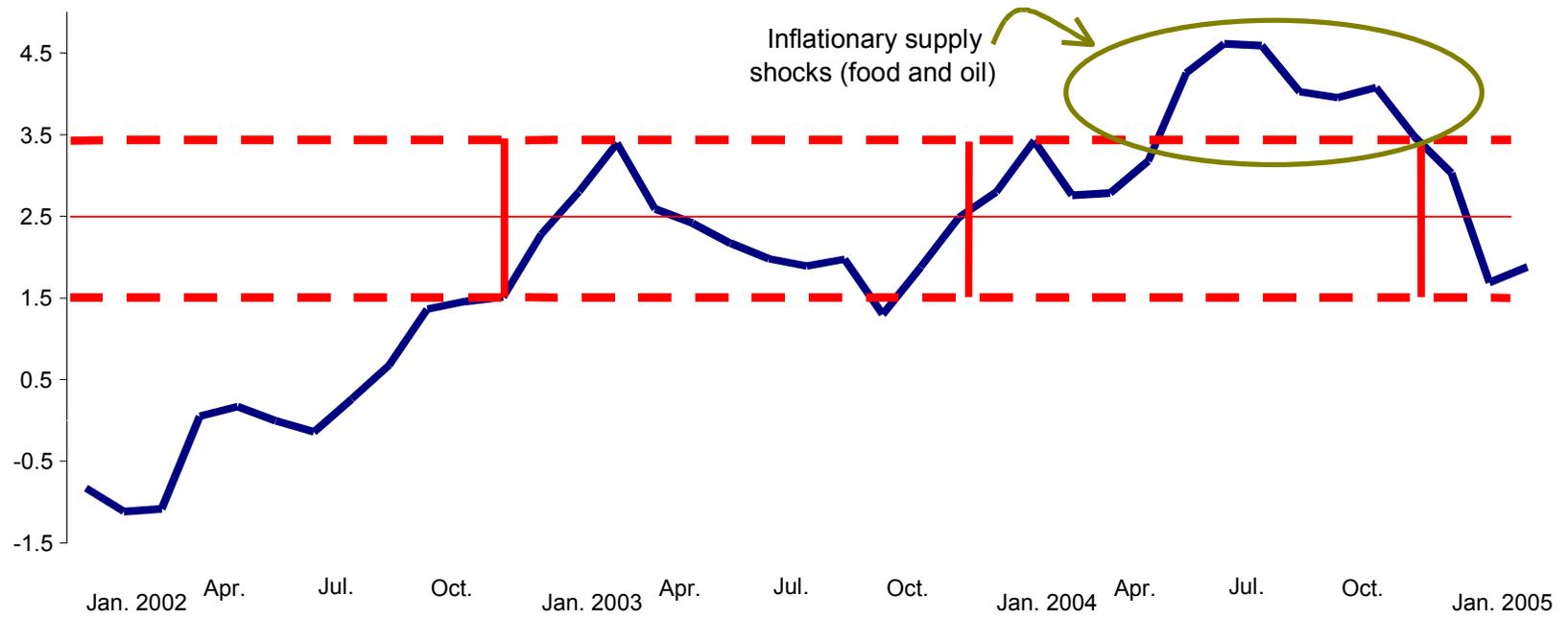
Given the lags on the effects of monetary policy, the year-on-year rate of inflation began to show an increasing pattern in the second half of 2002 (Figure 5). The reversal of deflationary pressures occurred in a context of economic recovery (the growth rate rose from 0.3 percent in 2001 to 4.9 percent in 2002). The rate of inflation rose from –0.1 percent in 2001 to 1.5 percent in 2002 (lower bound of the target range) to 2.5 percent in 2003 (target level).

In the second half of 2002, the Central Bank tightened its monetary policy stance and the interbank interest rate rose from 2.6 percent in June to 3.8 percent in December. This tightening of the monetary policy stance occurred in a context of upward pressures on the exchange rate due to increased risk perceptions in the region from the electoral process in Brazil and the increasing trend in the rate of inflation.

In 2003-04, the variability of the inflation rate was mainly explained by supply shocks. These shocks had a transitory impact on a specific set of goods but they did not affect the growing trend of prices. Therefore, the Central Bank did not respond to these shocks but emphasized their temporary nature in its Inflation Reports in order to guide economic agents' inflation expectations.

Indeed, the Central Bank published in the balance of risks in the January 2003 Inflation Report the possible impact on the inflation forecast of an increase in the international oil price due to the war in the Middle East:

> "The possibility of a war conflict in the Middle East. This would affect the international oil market, which would impact on oil prices. The magnitude of the impact would depend on the duration of the conflict. In the short run, raw oil prices would rise above projections, pushing the general price level upwards. However, this increase could be transitory and would not get transmitted to other prices, which would not require any change in the monetary policy stance."[10]

The rise in international oil prices due to the war in Iraq (WTI price rose from US$29 in December 2002 to US$36 in February 2003) caused a sharp increase in the rate of inflation, which increased from 1.5 percent in December 2002 to 3.4 percent in March 2003. Inflation expectations for 2003 (from a survey of financial institutions) increased from 2.0 percent in December 2002 to 2.5 percent in March and 2.9 percent in April 2003 (Figure 6).

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[10] Inflation Report of January 2003, p. 27.

Figure 6. Inflation Expectations of the Financial System for the Year-End 2003
(Percent)
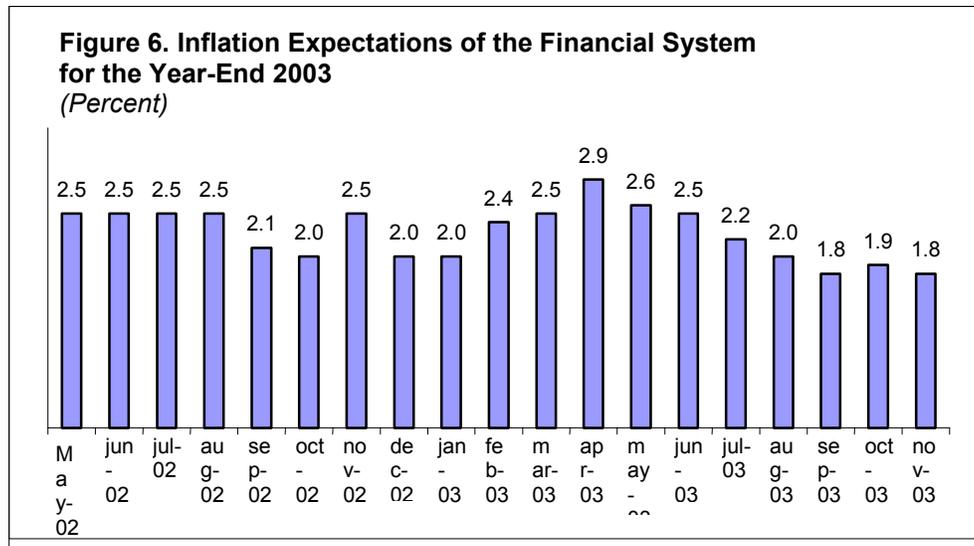
Once the impact of the increase in oil prices vanished, the Central Bank's inflation projections fell under the scenario of a constant interbank interest rate at 3.8 percent and the expected rate of inflation was in the lower half of the target range for 2003. The Inflation Report of May 2003 stated:

> "With respect to the January Report's projections, lower inflationary pressures are clearly observed. Thus, while in the January Report the projected rate of inflation was in the upper half of the target range (2.5-3.5 percent), in the present Report it lies in the lower one (1.5-2.5 percent). This update is due to lower depreciation expectations (from a 3.1 percent cumulative depreciation projection for 2003 in the January Report to 1.1 percent) and the reversion of transitory increases in international fuel prices for the rest of the year."[11]

Thus, the May Report's projections clearly communicated the temporary nature of the inflation increase, anticipated downward pressures on the rate of inflation and, therefore, helped to correct the interpretation of the subsequent loosening in the monetary policy stance.

In the first half of 2003, the Central Bank maintained a stable monetary policy stance with an interbank interest rate of 3.8 percent. In the second half of the year, the Central Bank loosened its monetary policy stance four times through reductions in its benchmark interest rates, which induced reductions in the interbank interest rate of 25 basis points in July, September and

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[11] Inflation Report of May 2003, pp. 23-24.

November, and of 50 basis points in August. Until July 2004, the interbank interest rate was 2.5 percent.

This loosening of the monetary policy stance was explained for the projections of a rate of inflation in the lower bound of the target range for 2003 and 2004 and a lower than projected rate of growth in domestic demand for these years. In December 2003, the annual rate of inflation was 2.5 percent, that is, at the announced target level.

Inflationary Pressures in 2004

For 2004, the Central Bank forecasted an inflation rate around the upper bound (3.5 percent) and a reverse trend to the target level for 2005. In this period, the dynamics of inflation have been influenced by aggregate demand and supply factors, the evolution of imported inflation and the nominal exchange rate.

The annual rate of inflation accelerated in the first half of 2004. After some months of increasing trend after November 2003, the annual inflation rate in August hit 4.6 percent, above the upper limit of the target range (3.5 percent). This higher inflation rate has been related mainly to supply shocks resulting from higher imported food inflation (wheat and oils) and lower domestic agricultural supply. These shocks were longer and stronger than in the previous year and the level forecast in the base line of the inflation report.

Because of the transitory nature of these shocks, the Central Bank did not react to them, as it did in the first quarter of 2003. The Inflation Report of January 2004 stated:

> "The central scenario foresees the recent increase in prices as a transitory effect, both in the evolution of international food prices and in conditions of domestic agricultural supply. For example, it has been considered for this scenario that future prices of wheat and soy oil would stay at high levels in the first case, and would slightly diminish in the second half of the year in the case of soy oil. Likewise, it has considered a reduction in rice crops, and its impact on prices, due to lower sowing explained by lower availability of water.
>
> However, there is a risk of higher imported food inflation or higher instability in weather conditions (rain) with respect to the central scenario."[12]

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[12] Inflation Report of January 2004, pp. 47-48.

With these foresights, a transitory acceleration of the rate of inflation and then a convergence to the target level was expected, without a modification of the Central Bank's monetary policy stance.

The central scenario for 2004 was revised upward twice in the next two Inflation Reports (May and August). The inflation forecast for 2004 approached the upper bound of the inflation target range (3.5 percent). This higher inflation forecast was due to stronger supply shocks (especially higher international prices) relative to those expected in the January Report. In this context and to prevent a rise in inflation expectations, Central Bank raised the interbank rate twice in August and October from 2.5 to 3.0 percent. By the end of 2004, the inflation rate was 3.5 percent (the upper bound); it decreased to 3.0 percent in January, following reversals of supply shocks (Figure 7).

Figure 7. Inflation Forecast

(*Annual percentage change in CPI*)
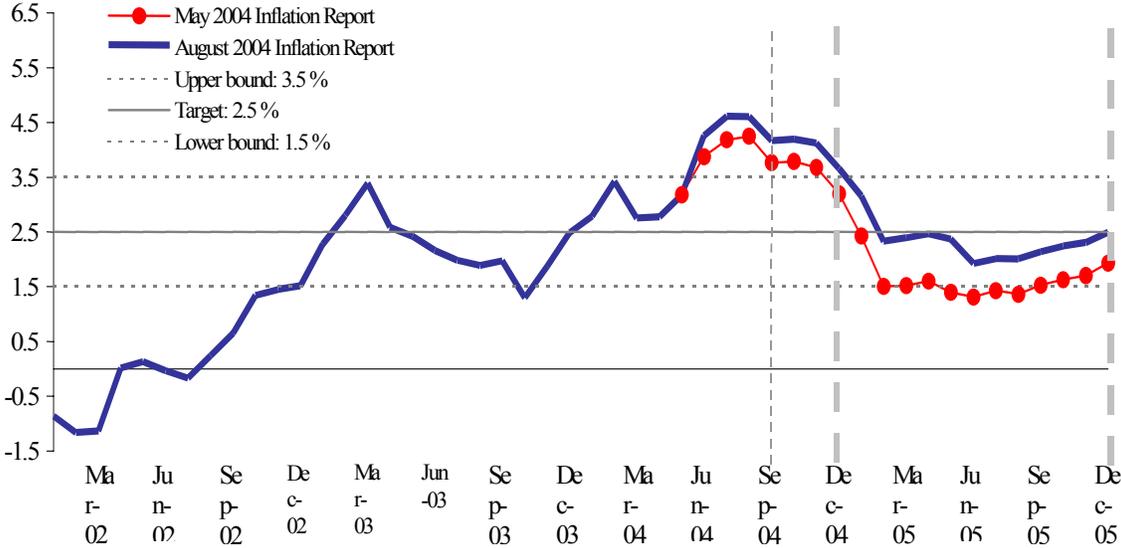
4.   Financial Dollarization Risk Control

The previous two sections of the paper showed that financial dollarization is considered for monetary policy design and implementation. However, even with financial dollarization, inflation targeting in Peru is not so different from that in countries without this phenomenon.

For the inflation target to be credible, it should be perceived as the central bank's most important target. No other variable, such as the exchange rate, should overshadow it. This is, however, not necessarily inconsistent with forex interventions. Letting the exchange rate float freely in a financially dollarized economy involves considerable risks. This section describes the additional policies, beyond IT, that mitigate the risks posed by financial dollarization (BCRP, 2003). These policies aim to reduce the economy's vulnerability to large exchange rate movements by promoting financial dedollarization; attempt to induce economic agents to internalize financial dollarization risks; and attempt to prevent balance sheet effects, aiming at the same time at ensuring availability of liquid funds in foreign currency for a contingent financial sector liquidity shortage. Figure 8 summarizes the monetary policy framework in Peru.

Figure 8. Monetary Policy Framework in Peru

| Inflation targeting | + | Financial dollarization risk control |

Financial dollarization risk control → Dedollarization policies

Dedollarization policies →
- IT
- Short-term interest rate as operational target
- Yield curve in domestic currency

Financial dollarization risk control → Internalization of risks and policy responses to negative shocks

Internalization of risks and policy responses to negative shocks →
- Availability of foreign currency liquid funds:
  - High reserve requirements for foreign currency liabilities
  - High NIR level
- Exchange rate path smoothing:
  - Forex interventions
  - CDR
  - Escape clause for interbank interest rate

Financial dollarization considerations:

Phillips curve: low pass-through
IS: - foreign currency interest rate
    - balance sheet effect
UIP: exchange rate inertia

4.1 Dedollarization Policies

To reduce financial dollarization risks, the first policy to implement should be to reduce financial dollarization. Financial dollarization in Peru is significant. However, it has been decreasing over the past few years, as shown in Table 5. To illustrate this reduction, banking system broad money dollarisation has decreased by 12 percentage points (from 67 percent to 55 percent) since the adoption of IT; in the same way, dollarization of credit to the private sector fell 6 percentage points (from 80 percent to 74 percent) in the same period.[13]

Table 5. Financial Dollarization Indicators
(Percentage of total monetary aggregate)

Year	Banking system broad money	Banking system credit to the private sector	Financial system credit to the private sector
1993	69	76	77
1994	64	74	74
1995	63	71	72
1996	67	74	72
1997	65	77	75
1998	69	80	79
1999	70	82	82
2000	70	82	81
2001	67	80	78
2002	65	79	76
2003	62	77	73
2004	55	74	71

The fact that credit dedollarization has been slower than deposit dedollarization might be related to the fall in domestic currency depreciation expectations. If borrowers expect that the domestic currency will appreciate against the U.S. dollar, they will prefer to borrow foreign currency,[14] especially considering that financial institutions' interest rates for foreign currency loans are lower than those for domestic currency loans. However, the institutions might be

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[13] The valuation effect due to domestic currency appreciation in 2003 and 2004 explains around 1 percentage point of the reduction in financial dollarization indicators in these two years.

failing to internalize financial dollarization risks. The increase in mortgage loans in U.S. dollars during 2004 is an example.

In 2002-04, there was a high level of dynamism in credit to the private sector in domestic currency. The financial system increased its credit to the private sector in soles (including holdings of corporate bonds by institutional investors) at annual growth rates of more than 10 percent. Micro finance institutions (annual growth rates of 25 percent in 2003 and 32 percent in 2002) and institutional investors (32 percent in 2003) stood out among the other financial institutions.

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[14] The uncovered interest rate parity does not hold at every moment in time.

Table 6. The Financial Syetem's Credit to the Private Sector in Domestic Currency

	Millions of new soles				Percentage change		
	Dec01	Dec02	Dec03	Dec04	Dec.02/ Dec.01	Dec.03/ Dec.02	Dec.04/ Dec.03
Commercial banks1/	7,642	7,841	8,221	8,464	2.6	4.9	3.0
Banco de la Nación	222	434	511	1,051	95.6	17.6	105.9
Micro finance institutions	2,214	2,926	3,666	4,329	32.2	25.3	18.1
Institutional investors2/	1,688	1,653	2,180	2,307	-2.1	31.9	5.8
Leasing companies and others	247	393	247	306	59.1	-37.2	23.9
Total financial system	**12,014**	**13,248**	**14,824**	**16,457**	**10.3**	**11.9**	**11.0**

1/ Excludes micro finance credits.
2/ Mainly securities issued by the private sector

Financial system credit to the private sector in foreign currency fell in 2002 and 2003 (negative growth rates of 2 and 3 percent, respectively). Although institutional investors increased their credit in foreign currency (23 and 36 percent in 2002 and 2003, respectively), commercial banks reduced it (negative growth rates of 3 and 6 percent in 2002 and 2003, respectively).

Table 7. The Financial System's Credit to the Private Sector in Foreign Currency

	Millions of U.S. dollars				Percentage change		
	Dec01	Dec02	Dec03	Dec04	Dec.02/ Dec.01	Dec.03/ Dec.02	Dec.04/ Dec.03
Commercial banks1/	10,294	9,971	9,409	9,465	-3.1	-5.6	0.6
Banco de la Nación	36	36	22	22	-0.4	-38.1	-1.2
Micro finance institutions	428	410	511	665	-4.1	24.5	30.2
Institutional investors2/	653	800	1,091	1,333	22.7	36.2	22.2
Leasing companies and others	915	858	637	639	-6.2	-25.8	0.2
Total financial system	**12,326**	**12,077**	**11,670**	**12,124**	**-2.0**	**-3.4**	**3.9**

1/ Excludes micro finance credits.

2/ Mainly securities issued by the private sector

This dedollarization process has been encouraged by some of the policies the Central Bank has implemented. inflation targeting is in itself one of these policies, given that it favors anchoring long-run inflation expectations, a necessary condition to build healthy local financial and capital markets in domestic currency.

Figure 9. Inflation Target and Expectations, 1995-2005

Source: Consensus forecast.
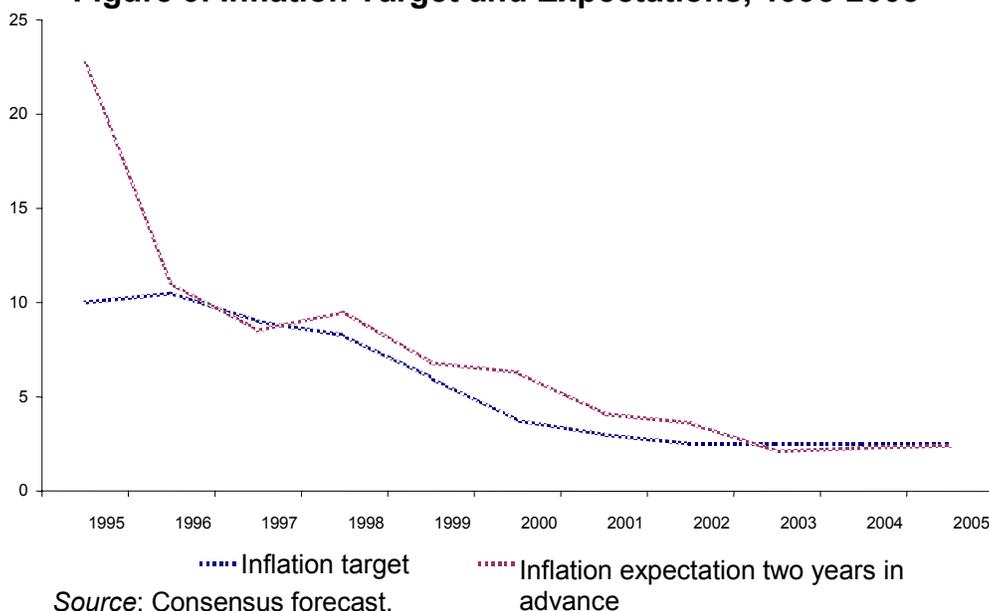
From Figure 9 it seems that the difference between inflation expectations and the inflation target has tended to decrease. Inflation expectations in the medium run have been anchored: they are similar to the inflation target (2.5 percent). For example, in February 2004, expected inflation for December 2005 was 2.4 percent. This might have contributed to price setting in the economy.

This fact may be related to the reputation the Central Bank has as an institution seriously committed to its inflation target. Comparing the performance of accomplishment of inflation targets, Albagli (2004) shows that the relative deviation of inflation from its target has been lower in Peru than the average deviation for inflation targeting countries, over the past ten years. When inflation has deviated from the target in Peru, this deviation has usually been negative

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(actual inflation was lower than the inflation target), especially during the disinflation process (Armas et al. 2001).

Although the medium-run inflation expectation seems to be anchored around the inflation target, the long-run inflation expectation is more relevant for long-run savings and borrowing decisions. It is possible to get an idea about this by looking at the yields in the domestic currency bonds market. Table 8 shows that the spread between the yield of Treasury bonds in nominal domestic currency for a maturity of 7 years (the current longest term) and the yield of Treasury inflation indexed bonds in domestic currency for the same maturity, that is, expected inflation, is gradually approaching the inflation target.

Table 8. Treasury Bond Interest Rates in the Local Capital Market

Date	_7-year T-bond_ (in nominal domestic currency)	(inflation indexed)	_Spread_	_Inflation_ (accumulated over the last year)
Aug. 2004	12.63	6.81	5.82	4.59
Sep. 2004	11.31	6.10	5.21	4.03
Oct. 2004	9.94	5.93	4.01	3.5
Nov. 2004	9.72	5.90	3.82	4.08
Dec. 2004	9.60	6.05	3.55	3.48
Feb. 2005	8.26	5.81	2.45	1.68

Part of the reduction in long-run inflation expectation could also be due to the reputation of commitment to low inflation the Central Bank has gained since it adopted inflation targeting: it has always achieved its target since 2002. Table 8 shows that market recognition of the Central Bank's commitment to its inflation target (last column) helped to reduce long-run inflation expectations (third column in the table). This proxy for the long-run inflation expectation (7 years ahead) was by February 2005 similar to the inflation target: 2.45 percent.

A second explanation for the dedollarization process is the greater stability of real returns of assets denominated in domestic currency. Financial dollarisation is reduced when real returns on these assets become more stable than returns on assets in foreign currency (Ize and Levy-Yeyati 1998). Inflation targeting has helped reduce inflation variability. However, it is also crucial that the variability of nominal interest rates in domestic currency is low.

The operational target was gradually changed from banking reserves to the interbank overnight interest rate. This change reduced the variability of the latter, and has helped to

increase the stability and predictability of the short-term interest rate in domestic currency. A stable and predictable short-term interest rate favors the development of long-term financial instruments, inducing financial dedollarization and thus reducing the vulnerability of the economy to the balance sheet effect of large exchange rate movements.

Table 9. Securities Balances and Average Bond Terms

| Year | Securities balances (S/. million) | | | Bonds' average term (in years) | |
	Private sector[1/]		Government		
	Total	In domestic currency (nominal terms)	In domestic currency	Private sector bonds[2/]	Treasury bonds
1998	2,265	60	-.-	-.-	-.-
1999	2,705	60	-.-	-.-	-.-
2000	4,005	88	-.-	2.0	-.-
2001	4,598	792	1,200	2.0	2.2
2002	5,088	756	1,933	2.0	2.1
2003	6,956	1,124	2,660	2.8	3.0
2004	8,629	1,226	3,751	2.9	4.4
Jan. 2005	7,789	1,329	3,928	2.9	4.5
Feb. 2005	7,846	1,396	4,138	2.9	4.6

1/ Includes only non-financial firms
2/ Includes financial and non-financial firms

The gradual development of the local government bonds market in domestic currency has made it possible to build a yield curve in soles that acts as a benchmark for long term private sector bonds (Table 9, Figure 10).[15]

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[15] Before 2001 there were no benchmark interest rates for the issuance of nominal securities in domestic currency. Since 2001, the Treasury began to issue nominal bonds in soles with maturities of two and three years. The government bonds market grew slowly, but it was not until 2003 when it showed its largest expansion, with the implementation of the primary dealers system. At the end of 2004, there were nominal Treasury bonds in domestic currency with maturities up to 7 years. Private sector firms have followed these Treasury bonds issues: corporate bonds have been issued at terms of four and five years.

Figure 10. Interest Rates for Domestic Currency Treasury Bonds
(Percent)
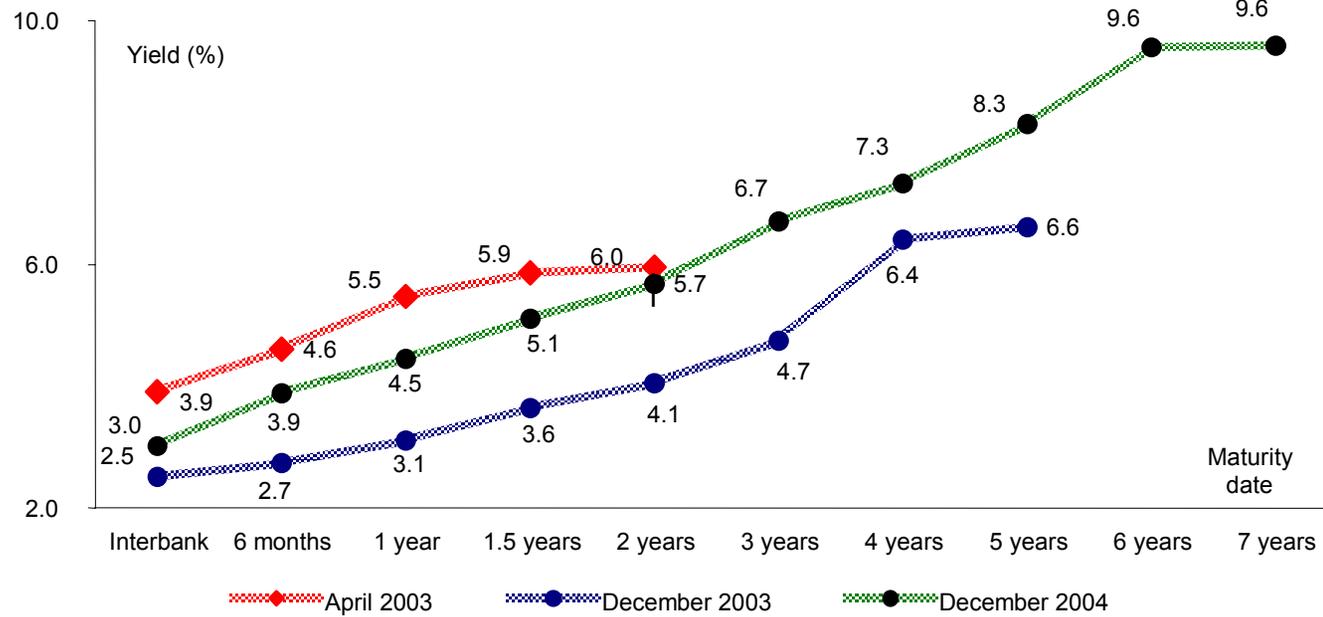
As a result, securities denominated in domestic currency amounted to 33 percent of fixed-income securities issued by the private sector in 2004 (22 percent in 2000). It is important to notice that the share of nominal soles bonds has rapidly increased over the last few years, as shown in Table 10, while the share of inflation indexed bonds has remained relatively constant.

Table 10. Composition OF Fixed Income Securities Issued by the Private Sector [1/]
(Percent)

Year	Domestic currency			Foreign currency
	Nominal	VAC	Total	
1998	1	26	27	73
1999	1	22	23	77
2000	2	20	22	78
2001	11	17	28	72
2002	13	17	30	70
2003	16	18	34	66
2004	16	17	33	67
Jan. 2005	18	18	36	64
Feb. 2005	18	18	36	64

1/ Includes bonds and short-term instruments issued by private financial institutions.

Finally, the Parliament issued a law in mid-2004 ordering all prices to be listed in domestic currency. However, the option of listing prices also in foreign currency was left open. This law increases the transparency of price information. It might also encourage financial dedollarization in the long run, given that before the law was issued durable goods prices were being set in foreign currency. This might have been related to the fact that one of the reasons why people demand foreign currency is as a store of value, and buying a durable good or a house (which were also priced in foreign currency) are ways of storing value.

4.2 Internalization of Financial Dollarization Risk and Policy Responses to Negative Shocks

Financial dollarization causes two types of mismatches in the balance sheet of economic agents (Baliño et al. 1999): maturity and currency mismatches. Regarding the latter mismatch, it causes

the private nonfinancial sector to face an exchange rate risk. This is because its income is basically denominated in domestic currency, while it has debts in foreign currency. Thus, an unexpected large domestic currency depreciation may trigger the alarm on the solvency of the private nonfinancial sector, thereby increasing the financial sector's credit risk.

The financial sector, on the other hand, has a maturity mismatch that is related to the fact that it has short-term liabilities in foreign currency, while its assets in the same currency have a longer average maturity. Although this type of liquidity risk is common to banking systems, the risk in a financially dollarized economy is higher because the central bank does not issue foreign currency.

High Level of International Reserves

If the economy suffers a negative shock, liquid funds in foreign currency will be necessary to reduce its effects, that is, to reduce an excessive exchange rate volatility that could trigger the balance sheet effect on the economy, a speculative attack on the domestic currency or even a bank run. If a bank run on foreign currency denominated deposits occurs, a high level of net international reserves would be a buffer stock for supporting the financial system.

The availability of a high level of international reserves may in itself be an insurance against negative shocks:[16] if people perceive that the financial system has or is able to obtain liquid foreign currency funds (from the central bank's international reserves) in a bank run situation in order to back its liquid foreign currency liabilities, the probability of the bank run itself occurring in the first place will be very low.

According to Gulde et al. (2004), in the case of a bank run, foreign currency liabilities need to be paid at par against foreign currency, which inhibits any equilibrating adjustment through the exchange rate. Thus, central banks need international reserves to provide foreign currency lender of last resort support to distressed banks if these do not have enough liquid foreign currency assets to back their liquid foreign currency liabilities. This idea could be rounded out by saying that international reserves are also important to prevent a bank run in the sense that they insure against the effects of negative shocks.

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[16] The estimation of an optimal international reserves level as "self insurance" for a financially dollarized economy goes beyond the scope of this paper. Clearly, this optimal level should depend on the degree of financial dollariation, fiscal and banking solvency, and degree of openness of the economy, among other variables.

International reserves are also necessary for the central bank to carry out eventual forex interventions aimed at smoothing the path of the exchange rate, particularly in an unexpected large domestic currency depreciation episode.

Gulde et al. (2004) point out that international reserves covered nearly all foreign currency deposits in the Peruvian banking system during 2002. Together with sound fundamentals, this explains the stability of foreign exchange deposits in Peru during the last Argentine crisis, when Paraguay, Uruguay, and (to some extent) Bolivia, all of which are financially dollarized South American economies like Peru, suffered a contagion effect that triggered runs on foreign currency liabilities.

Since the beginning of 2003, the Central Bank has purchased around US$4.5 billion (as of March 31, 2005) in the foreign exchange market. This has allowed the strengthening of the Central Bank's international reserves position and its accommodation of portfolio movements in a context of steady financial dedollarization (BCR 2004). The Central Bank has accumulated US$4.0 billion in net international reserves, with respect to December 2002. Thus, the stock of international reserves reached a balance of more than US$13.5 billion in March 2005, the highest ever recorded. It is an important buffer stock against any disruption in the economy, considering that it is more than twice the stock of the due-in-one-year external debt. The coverage ratios of short-term external liabilities and broad money show that international liquidity indicators have improved in the last two years.

Table 11. International Liquidity Indicators

	2000	2001	2002	2003	2004
NIR / Short-term external liabilities	1.5 times	1.7 times	2.2 times	2.2 times	2.3 times
NIR / imports of goods and services	13 months	14 months	16 months	15 months	15 months
NIR / banking system broad money	61 percent	61 percent	65 percent	67 percent	69 percent

High Reserve Requirement on Dollar Liabilities

A criticism of keeping a high level of international reserves is the moral hazard that is present in every insurance system. Given that economic agents know that there is a high probability that the central bank would use the international reserves to provide liquidity in a "bad state of nature," the financial system may fail to internalize dollarization risks. To prevent this, the financial

system has a high reserve requirement on foreign currency liabilities, which reduces this perverse incentive.

There is a 6 percent reserve requirement on commercial banks' domestic currency liabilities. For foreign currency liabilities, the reserve requirement is higher: 30 percent. In this way, there is an incentive for economic agents to internalize the potential costs (exchange rate and liquidity risks) of financial dollarization.

High reserve requirements on foreign currency banks' liabilities also have a second purpose: these funds can be used by the central bank if there is a liquidity shortage, allowing the Central Bank to act as a lender of last resort in a currency it does not issue but that is widely used as store of value. Actually, they are part of international reserves.

Exchange Rate Smoothing in a Flexible Exchange Rate Regime

Last, but not least, the Central Bank has a policy of moderating excessive exchange rate volatility in order to minimize the negative effects of large exchange rate movements in a financially dollarized economy. Since the adoption of inflation targeting in 2002, the standard deviation of the exchange rate has on average been similar to the average of the previous three-year period (Table 12).

Table 12. Exchange Rate Variability

Period	*Exchange rate*	
	Average mean (S/.)	*Average standard deviation (S/. cents)*
1999-2001	3.460	1.3
2002-2004	3.470	1.2

The average standard deviation is an average for monthly standard deviations in each of the two periods considered in the table.

However, forex interventions are not committed to a fixed or stable exchange rate because that would be inconsistent with the inflation targeting framework. Moreover, it would probably lead to a moral hazard problem: economic agents may fail to internalize the inherent currency risk of financial dollarisation if they perceive that the central bank is providing them with implicit foreign exchange insurance through forex interventions targeting an exchange rate level.

Ize and Levy-Yeyati (1998) present a portfolio model of financial intermediation in which currency choice is determined by hedging decisions on both sides of a bank's balance sheet. The authors show that dollarization hysteresis occurs when the expected volatility of the inflation rate is high in relation to that of the real exchange rate.

Thus, although excessive exchange rate movements are risky in a financially dollarized economy (because of the balance sheet effect), it is convenient to let the exchange rate float because that is an incentive for economic agents to dedollarize. In turn, lower dollarization reduces the risks of high exchange rate variability. The reduction in financial dollarization in Peru might allow the Central Bank to let the exchange rate float more.

The standard deviation of the interbank overnight interest rate, by contrast, shows a sharp reduction. This is consistent with the Central Bank's desire to enhance the role of the interbank overnight interest rate as an indicator of the monetary policy stance.

Table 13. Interest Rate Variability

Period	Interbank overnight interest rate	
	Average mean (%)	Average standard deviation (pp)
1999-2001	12.3	2.8
2002-2004	3.1	0.2

The average standard deviation is an average for monthly standard deviations in each of the two periods considered in the table.

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The Central Bank can also issue exchange rate–indexed securities (CDRs) to smooth the path of the exchange rate, in particular when there are domestic currency depreciation pressures. These CDRs are denominated in domestic currency but adjusted for foreign currency price movements. Thus, they are aimed at providing the market with a hedging asset; in this way, they reduce the upward pressure on the exchange rate. This market instrument is also used in Brazil and Chile.

The design of the operational target of monetary policy, explained in section 2, also works as a mechanism to smooth the exchange rate path in extreme situations. As in the case of CDRs, the purpose is to reduce domestic currency depreciation pressures.

5. Concluding Remarks

Peru is the only financially dollarized economy that has adopted an inflation targeting framework for monetary policy. Thus, the country's inflation targeting design and implementation differs in some respects from other nondollarized inflation targeting countries. This paper describes those differences.

With respect to the design of monetary policy, the inflation target in Peru is the lowest in Latin America (2.5 percent, +/- 1 percentage point). With strict price stability, similar to U.S. long-run inflation, the domestic currency is in a better position to compete against the U.S. dollar. Thus, there is a higher probability of being able to maintain current low real and payments dollarization in the economy.

The operational target has changed from a monetary one to the interbank overnight interest rate, favoring financial dedollarization. In extreme situations, the operational target for the interest rate may transitorily increase to prevent a large domestic currency depreciation that could be harmful for the financial system.

The implementation of monetary policy is different from other non-dollarized ITs in terms of the principal model used for inflation forecasting and the policies that the Central Bank implements to deal with financial dollarisation risks. These policies can be divided into three types: dedollarization, internalization of financial dollarization risks by economic agents, and measures to prevent a contingent crisis scenario. The last sort of policies aim at smoothing the exchange rate path and the availability of foreign currency liquid funds.

Although excessive exchange rate movements are risky in a financially dollarized economy (balance sheet effect), it is convenient to let the exchange rate float because that is an incentive for economic agents to dedollarize. In turn, lower dollarization reduces the risks of higher exchange rate variability.

The first three years (2002-04) of inflation targeting implementation in a financially dollarized economy like Peru provide encouraging results and lessons. In the first place, the empirical evidence shows that financial dollarization does not preclude an independent monetary policy oriented at maintaining a low and stable inflation rate. Peru's announced annual inflation target has been achieved every year since inflation targeting was adopted: 1.5 percent in 2002, 2.5 percent in 2003, and 3.5 percent in 2004 (basically related to supply shocks). Output variability was moderate in these years.

Second, changing the operational target from a monetary aggregate to the interbank overnight interest rate has improved the transparency and predictability of the monetary policy stance. It has also favored the issuance of long-term financial instruments by the private sector, thus inducing financial dedollarization.

Third, a gradual dedollarization process has been observed in the Peruvian economy during the last years in the financial system's assets and liabilities. This process has been encouraged by the explicit inflation targeting framework, with more predictable inflation and domestic currency interest rates, and by the development of the local government debt market in domestic currency, which is useful for setting a benchmark for issuance of private sector nominal domestic currency securities.

Fourth, the Peruvian monetary policy framework (inflation targeting plus financial dollarization risk control) has managed to keep the economy away from suffering the contagion effect of the Argentine crisis, which affected other South American financially dollarized economies (2001-02).

Finally, the short Peruvian inflation targeting experience still cannot provide a definite answer on how to completely restore long-run confidence in the local currency: the degree of financial dollarization is still high and its risks remain. However, inflation targeting seems to be the appropriate approach to the complex phenomenon of a dual currency economy like Peru.

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