International reserves and forex intervention in Peru

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Abstract

This paper reviews the Peruvian experience in using FX intervention and reserve requirements for macroprudential purposes, with the aim of limiting the financial risks associated with dollarisation. Peru is a successful market-driven case of de-dollarisation, which reflects both macroeconomic stability and prudential policies. Since the adoption of inflation targeting in 2002, core inflation has been on average 2.1%. During the same period, financial dollarisation has declined steadily, from levels close to 80% to less than 30%. Besides delivering low and stable inflation, the current monetary policy framework has also contributed to providing an effective response to the global financial crisis, by limiting its spillover effects on the domestic financial system.

Keywords: monetary policy, central banking, FX intervention, dollarisation.

JEL classification: E52, E58, F31.

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1. Monetary policy framework

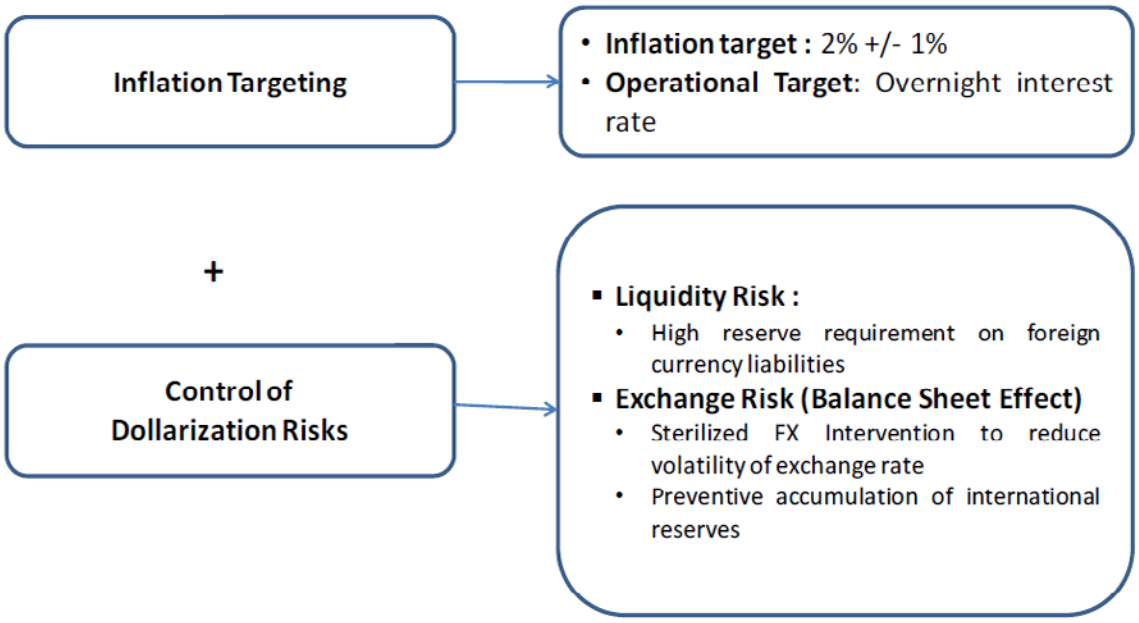
Monetary policy in Peru follows an inflation targeting scheme adapted to take into account the risks associated with financial dollarisation. This framework includes sterilised FX intervention to reduce the volatility of the exchange rate, preventive accumulation of international reserves and high reserve requirements on foreign currency liabilities to mitigate liquidity risk.

In parallel with the deepening of the FX derivatives market, the central bank has expanded its toolkit of FX intervention instruments. In addition to FX intervention through transactions in the spot market, the central bank introduced in 2002 the use of central bank securities indexed to the exchange rate and created in 2014 a currency swap. This set of indirect intervention instruments provides the banking system with an FX hedge, reducing pressures in the forward market, and consequently on the spot market.

Additionally, the central bank started a de-dollarisation program in 2013, based on additional reserve requirements to promote a reduction in credit dollarisation. As a result, dollarisation of credit to the private sector has dropped from 44% in December 2014 to 28% in November 2018.

This policy framework has been effective in maintaining inflation low and stable, within the target band, while at the same time keeping the financial system sound and reducing financial vulnerabilities. This note highlights the main characteristics of this policy scheme and describes the main measures taken, in particular from 2013 onwards.

The inflation targeting plus dollarisation risk control framework in Peru — Graph 1



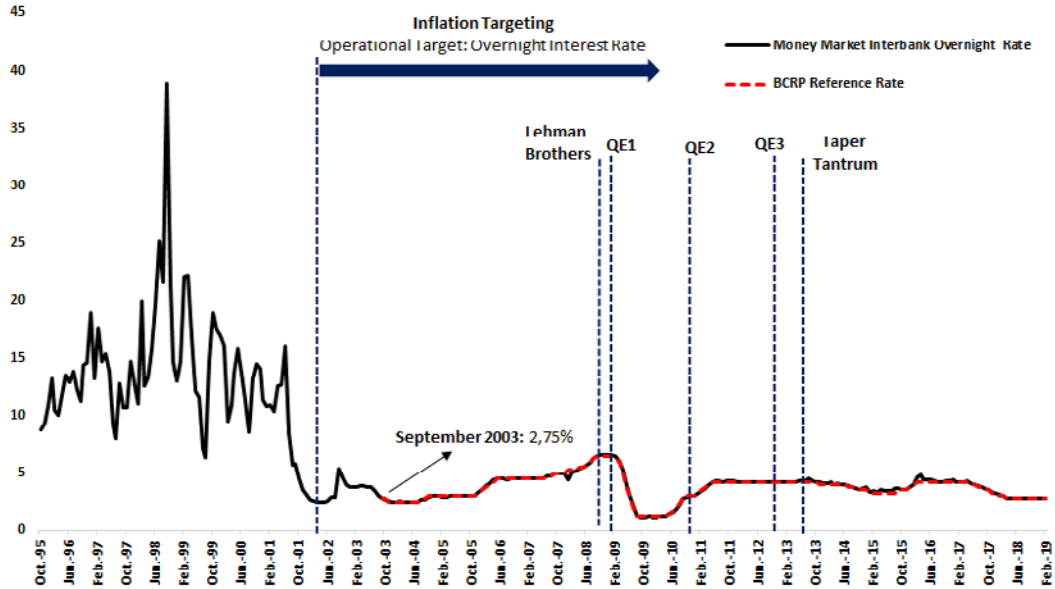
The operational target of monetary policy is the short-term interest rate. This operational target is used by the BCRP, just as it is by any other IT central bank, to deliver the stance of monetary policy to the market. During periods of high inflation

or output gap levels, the central bank tends to increase its policy interest rate to fight inflationary pressures; conversely, when inflation is below the central bank target and the output gap is negative, the central bank tends to cut its policy rate.

However, in the case of a financially dollarised economy, interest rate setting also has to take into account how dollarisation affects the transmission mechanism of monetary policy. The BCRP addresses this issue by using an inflation forecasting model (MPT) that explicitly takes into account the impact of dollarisation on credit market conditions and on the dynamics of exchange rate and inflation (Winkelried (2013)). In this model, dollarisation reduces the impact of monetary policy over inflation and the output gap, since a large depreciation not only generates a typically positive impact on exports but also triggers a negative impact on the financial position of firms with currency mismatches. So, with dollarisation, the typically expansionary effect of the exchange rate channel of monetary policy after a policy easing is muted. Also, the MPT takes into account the impact of both reserve ratio changes and exchange rate market interventions on the dynamics of interest rates and the exchange rate.

Even though this share has been declining in recent years, it is still an important source of financial vulnerability with respect to credit risks associated with abrupt movements in the exchange rate and risks associated with the availability of adequate levels of international liquidity. First, currency depreciation can increase the amount of non-performing loans and potentially induce a financial crisis. Second, banks dependence on foreign currency liabilities can put pressure on international reserves when central bank liquidity support is needed. These two vulnerabilities have been identified by the central bank as the main reasons for intervening in the foreign exchange market and for using higher reserve ratios on foreign currency liabilities.

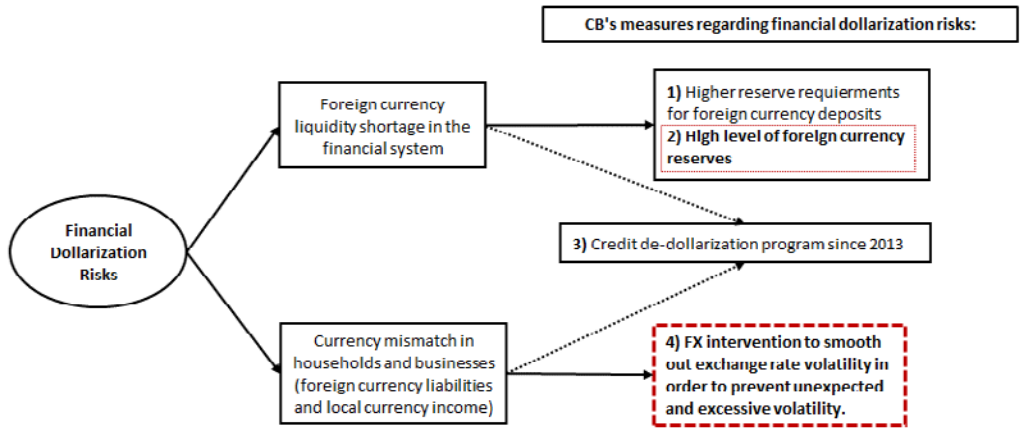
Peru: Interbank Overnight Rate and Central Bank Reference Rate — Graph 2



2. Forex intervention: motivation, strategic and tactics

As noted in the previous section, FX intervention is a complementary tool, in the context of an inflation targeting regime, for preserving macro-financial stability in a partial dollarised economy. Financial dollarisation generates two potential problems: (i) a liquidity shortage in foreign currency, and (ii) a currency mismatch risk. The existence of these financial vulnerabilities called for action by the central bank (see Graph 3).

Financial dollarization risks and central bank policy tools — Graph 3

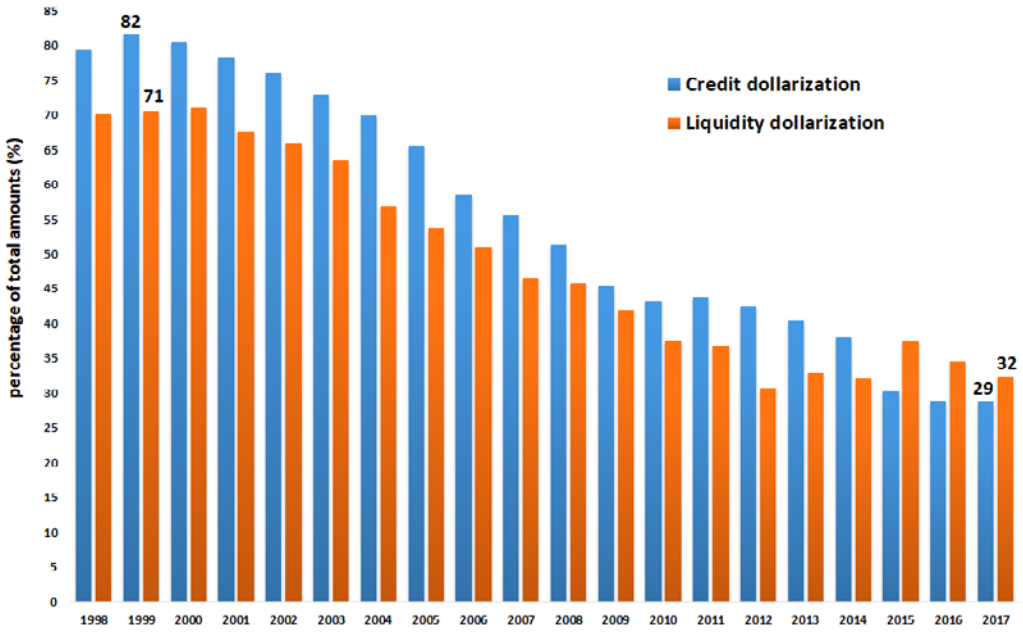


FX intervention is used to manage the current state of dollarisation risk in the Peruvian economy, while the credit de-dollarisation programme is used to address the causes now and in the future. As the persistent path of de-dollarisation in the Peruvian economy continues, enhanced by the dollarisation programme since 2013, FX intervention may be less required. However, this process will take time.

Financial dollarisation is one of the key driving forces behind the contractionary effects of exchange rate depreciations. In short, the contractionary effects are due to currency mismatches in the balance sheets of non-tradable firms and households. On occasion, these contractionary effects can be larger than the usual textbook expenditure-switching effects of depreciations, which are expansionary. Mostly, periods of sharp and large depreciation may imply overall contractions due to large-scale balance sheet effects.

The key rationale for FX intervention is to prevent financial vulnerabilities stemming from the dollarisation of the financial system. The financial stability literature points to the exchange rate as a key asset price that could trigger a financial crisis. On this basis, intervention aims to (i) accumulate reserves with a precautionary motive, and (ii) avoid excess exchange rate volatility that would trigger negative financial and real effects in the economy.

Credit* and liquidity** dollarisation of the financial system Graph 4



* Share of foreign currency credit in the total amount of credit.

** Share of foreign currency liquidity (mainly deposits) in the total amount of liquidity.

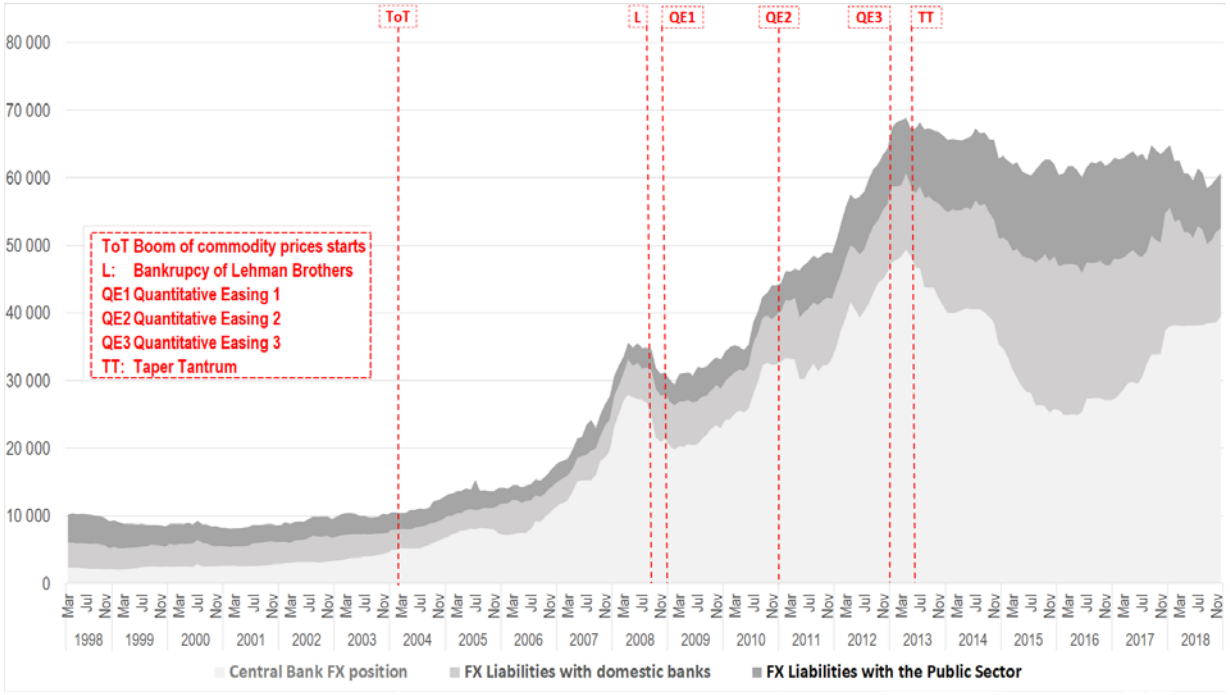
2.1 Reserve accumulation

International reserves are drawn from three sources: (i) the central bank's own FX position that can be affected by interventions in the foreign exchange market and the return on investing the reserves; (ii) FX liabilities with local banks related to reserve requirements; and (iii) FX deposits of the Treasury at the central bank.

In Graph 5, it is shown that the accumulation of international reserves is related to the central bank's FX interventions during periods featuring external shocks to the current and capital accounts of the balance of payments.

The central bank accumulates reserves to provide international liquidity in order to successfully address sudden stops in periods of heightened volatility in the international financial markets. Ample international reserves overcome a problem that financially dollarised economies face, namely, the lack of a US dollar-based lender of last resort. Furthermore, an adequate level of reserves gives credibility to the FX intervention and the central bank's monetary policy.

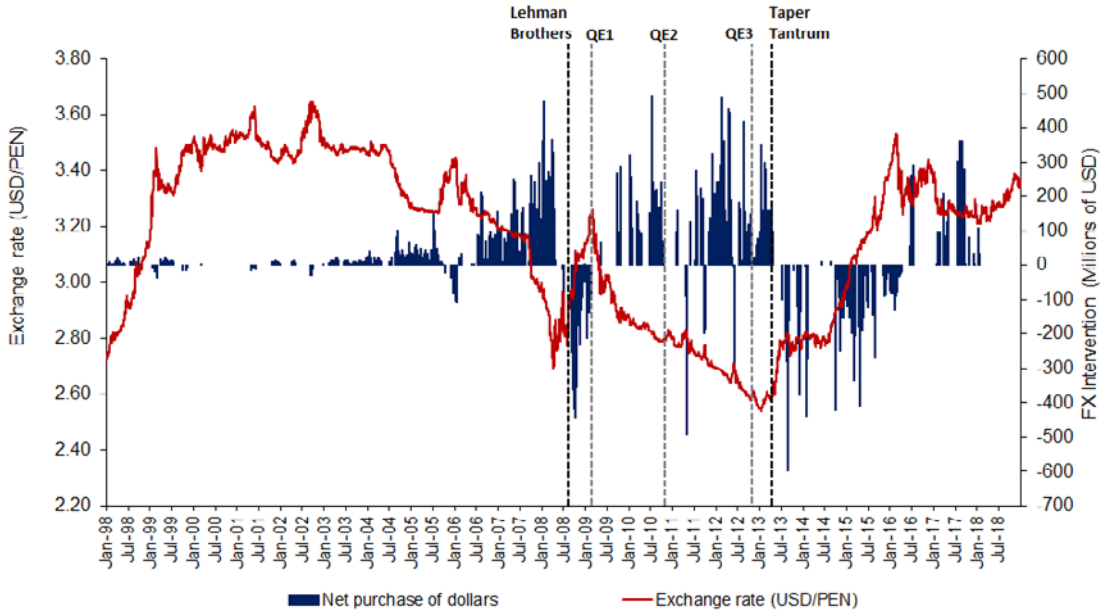
Sources of international reserves (USD millions) Graph 5



2.2 Reducing exchange rate volatility

The CRBP's aim in reducing exchange rate volatility is to mitigate any sharp and unexpected exchange rate depreciation, which would exacerbate the damaging effects of currency mismatches on the economy. Thus, to avoid low-risk but potentially damaging outcomes arising from balance sheet effects, the central bank uses sterilised forex interventions in order to reduce exchange rate volatility. On the other hand, the CRBP does not target any particular exchange rate, since the exchange rate should ultimately reflect local and international macroeconomic fundamentals.

Exchange rate and FX intervention Graph 6



FX intervention

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Spot														
Number of days	188	109	143	102	32	86	54	164	104	44	98	50	55	4
Volume* (millions USD)	3 560	4 654	10 306	14 712	2 405	8 963	5 929	14 531	10 415	4 248	8 064	3 394	5 246	184
Average (millions USD)	19	43	72	144	75	104	110	89	100	97	82	68	95	46
Forward														
Number of days	15	7	1	20	27	5	23	7	52	96	203	119	26	27
Net balance** (end of period, millions USD)	- 350			-1 421		160			-1 113	-6 468	-10 029	- 385	- 132	- 502

* Volume of total intervention (buy plus sell intervention)
** Negative/positive indicates net sale/buy stock position

2.3 FX intervention strategy

Traditionally, foreign exchange intervention has been performed mostly through transactions in the spot market. However, since 2002, the central bank has introduced a set of indirect intervention instruments in response to the ever-growing scale of the forward and derivative foreign exchange markets.

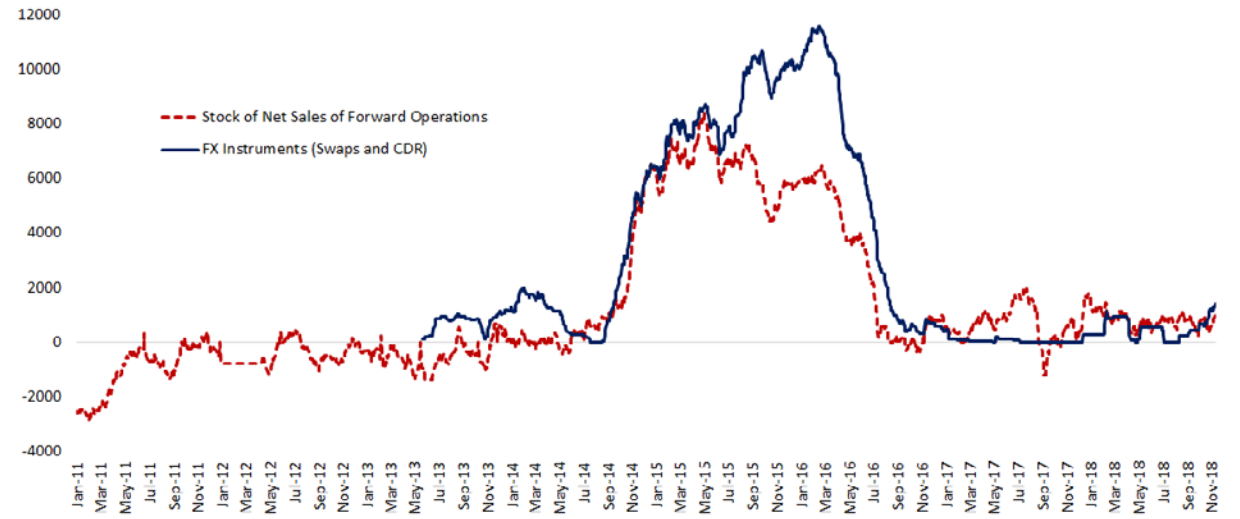
The period from 2013 onward, has been characterised as mainly negative for EMEs because of the Fed's tightening, falling commodity prices and trade tensions. This international macroeconomic context put pressure on their exchange rates and increased volatility in EME financial assets.

In addition, the local FX market saw a greater volume of forex derivative transactions, mainly forwards. In response, the central bank increased the use of a central bank security indexed to the exchange rate, (CDR, available since 2002) and created a currency swap (2014). These indirect instruments offer an FX hedge to the banking system, reducing pressures in the forward market and hence diminishing their effect on the spot market.

The main advantage of these instruments is that the CRBP can intervene in the FX market without using its reserves, when the pressure in the exchange rate comes from the derivatives market due to hedging or speculative motives and not from a real demand for foreign currency. The central bank currency swap does not affect liquidity in local currency since it is settled at the end of the contract on a net basis. Given that this instrument does not affect liquidity in local currency, no sterilisation or injection of liquidity is required.

FX forward net sales position of commercial banks and net issuance of CRBP's FX instruments (millions of US dollars)

Graph 7

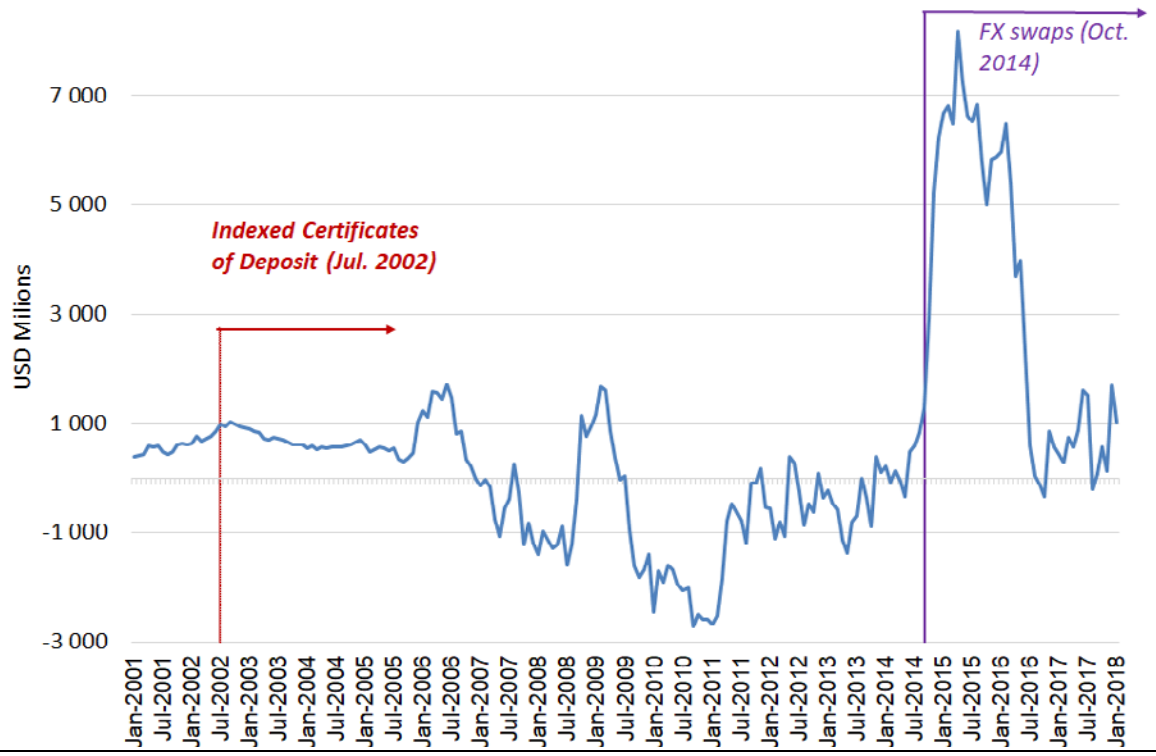


Graph 8 shows when these direct instruments were used, together with the net sale positions in the forward market. These outstanding net positions indicate if there are appreciation or depreciation pressures in the market. In July 2002, the central bank introduced indexed certificates of deposit. This instrument is like any certificate of deposit issued by a central bank, the difference being that payment in soles is indexed to the change in the exchange rate between the day of issuance and the day of maturity.

In October 2014, the central bank introduced a currency swap to reduce exchange rate volatility during depreciation and appreciation episodes. Like cross-currency swaps, these are agreements between the central bank and any agent to exchange interest payments and principals on loans denominated in both soles and US dollars.

Forex forward net sales position of commercial banks and adoption of alternative FXI instruments

Graph 8



FX intervention by type of instrument (millions of USD)

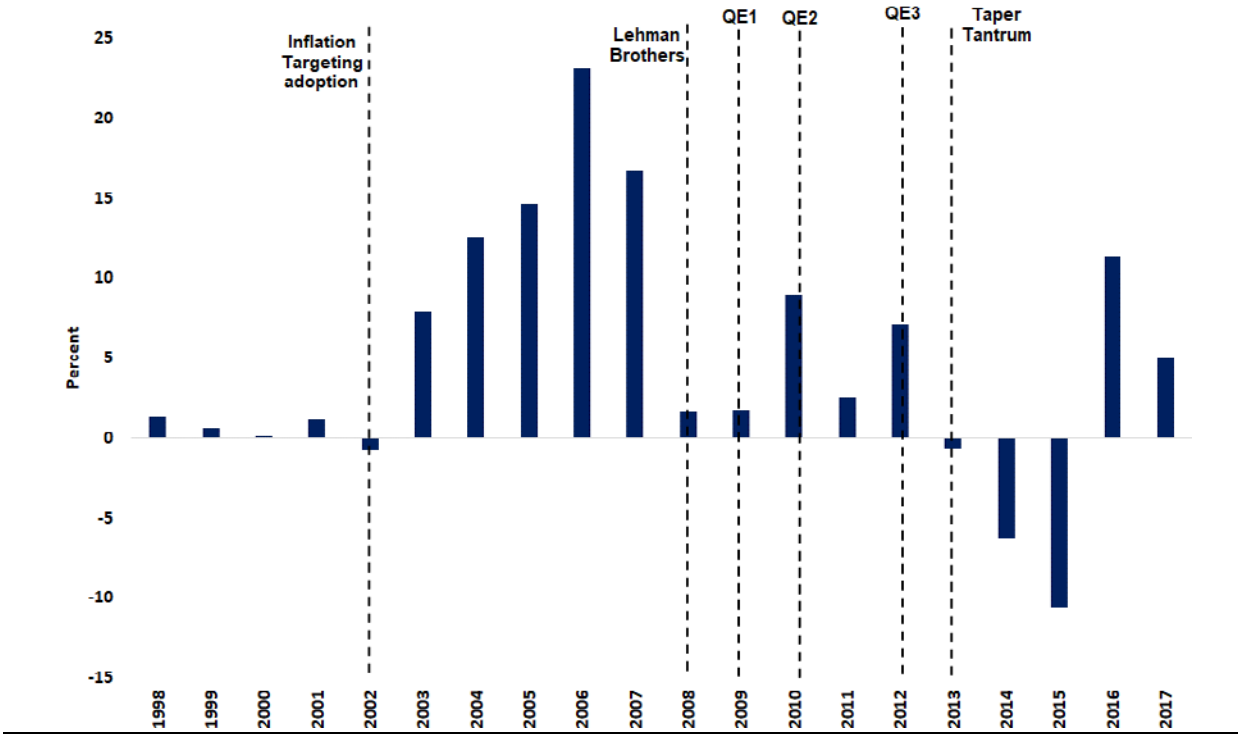
Table 1

	Net purchase of dollars*	Stock of derivatives and indexed securities			
		CDR	CDLD	Currency Swaps	Total Stock of Instruments
2014	-4 208	882	0	5 586	6 468
2015	-8 064	2 123	0	7 906	10 029
2016	786	236	0	149	385
2017	5 246	256	124	0	380
2018	184	0	0	502	502

* Negative/positive sign indicates net sale/purchase of dollars.

The scale of spot interventions as a share of market size is depicted in Graph 9. As can be seen, periods under stress feature sizeable spot foreign exchange intervention on the buying or selling sides. On the buying side, central bank purchases amounted to close to 25% in 2006, and selling amounted to about 13% of total spot market turnover between June 2008 and February 2009. During 2016, another selling episode, intervention reached 11% of turnover.

Net yearly purchases in FX spot market (as a ratio of interbank FX turnover) Graph 9



2.4 The empirical evidence for the effectiveness of intervention

The effectiveness of Peruvian forex interventions has been documented in several papers. All papers have used high-frequency data easily available from the central bank website, except for papers that use intra-day data such as those of Flores (2003), Lahura and Vega (2013) and Fuentes et al (2014). The central bank website also publishes the daily exchange rates,[2] a feature that has also been used for example in Mundaca (2011) and Tashu (2014). All papers that have tackled the issue of volatility have found that the interventions have been effective in reducing excess volatility.

One important reason why interventions have been effective is the amount of daily interventions relative to the size of the forex market (average local daily spot interbank transactions are around US$ 450–550 million). Were the forex market larger, the central bank would find it very difficult to have any impact on the exchange rate.

The level of financial integration and size of the FX market may explain the effectiveness of FX intervention in reducing exchange rate volatility. Graph 10 shows that the turnover in over-the-counter forex markets in Peru is still low, even compared with other that of countries in the Latin American region. In addition, Graph 9 shows that the size of spot forex intervention has reached, at some point, up to 20% of spot market turnover.

[2] The publication is made after the forex market closes.

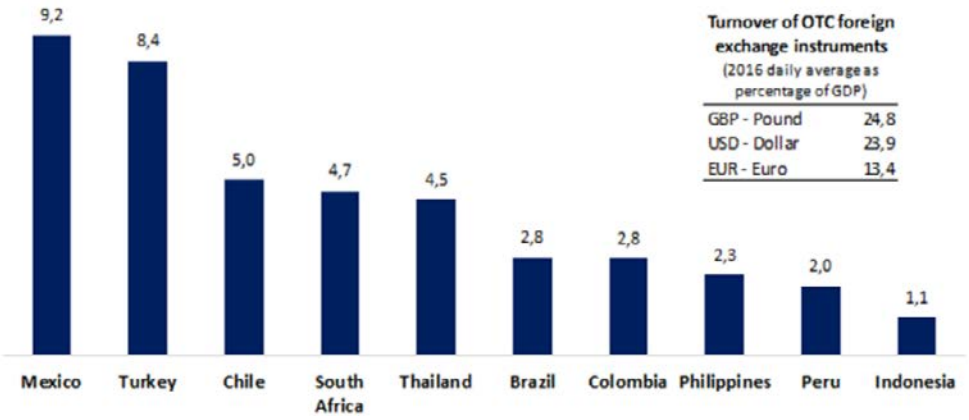
Literature about the effectiveness of forex intervention in Peru

Table 2

	Level	Expected depreciation	Volatility	Asymmetric	Data
Arena and Tuesta (1999)	yes		Yes		Daily, 1994–98
Flores (2003)			Yes	Purchases >> Sales	Intra-daily January 1999–June 2001
Shiva (2003)			Yes		Daily, Jan. 1997–Jan. 2004
Rossini, Quispe and Gondo (2008)			Yes	No	Daily, Jan. 2004-Dec. 2007
Humala and Rodríguez (2010)			Yes		*Intraday 1994 to 2007*
Mundaca (2011)	yes		Yes		2004–09
Lahura and Vega (2013)	yes			Sales >> purchases	Intraday, 5 Jan. 2009 to 27 Apr. 2011
Fuentes et al (2013)	yes		mild		Intraday, 5 Jan. 2009 to 27 Apr. 2011
Rossini, Quispe and Serrano (2014)		yes			
Tashu (2014)	yes		Yes	Sales >> purchases	Intraday, Jan. 2010–Dec. 2013
Durán-Vanegas (2016)			Yes		Daily, 2003–15

Turnover of OTC foreign exchange instruments (2016)

Graph 10



Source: BIS Triennial Survey.

Another important point that adds to the effectiveness of Peruvian forex intervention is the central bank's long experience (more than 25 years) of conducting operations in the spot market. Both the forex market and central bank procedures have evolved and adapted together. In the process, the central bank has gained a reputation of being an effective agent due to its strong balance sheet, high level of reserves, and its status as an informed market participant.

To conduct forex intervention with all available market information is key. This comprises knowing the microstructure of the market in terms of the main flows

coming from other market participants such as non-residents, pension funds, banks and mining companies.

2.5 Peruvian sol volatility vis-à-vis that of other regional currencies

To put the Peruvian sol volatility in context, the parameters beta are estimated to measure the volatility of a currency (Peruvian sol) or a group of currencies (other Latam-five currencies) in comparison with the overall volatility of the FX market.

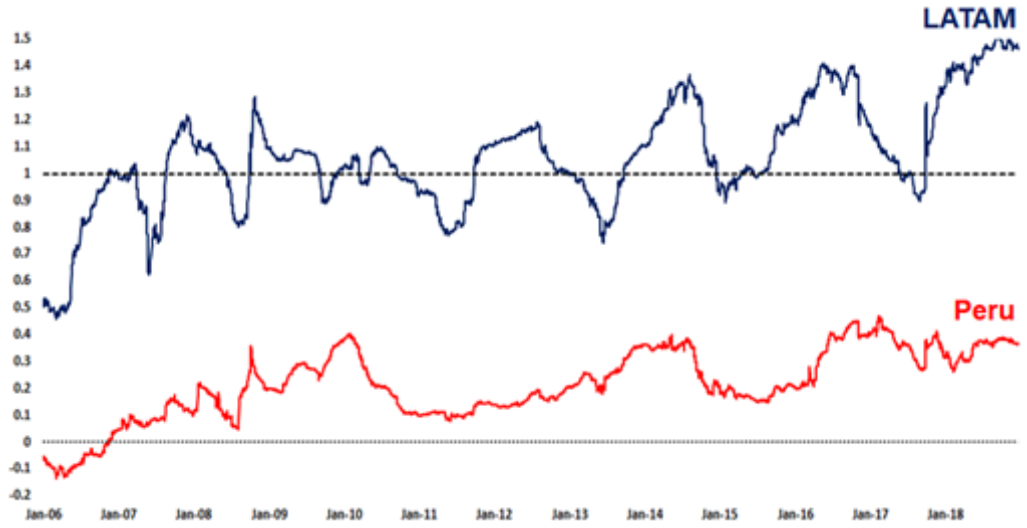
$$\text{The expression for beta is: } \boldsymbol{\beta} = \frac{\boldsymbol{Cov\,(i,M)}}{\boldsymbol{Var(M)}}$$

Where "$\boldsymbol{i}$" is the daily return of a currency (Peruvian sol) or group of currencies (Latam); while "$\boldsymbol{M}$", is the daily return of the whole FX market.[3]

The beta coefficients estimated are interpreted as:

- If $\boldsymbol{\beta} > \mathbf{1}$; volatility higher than volatility of the whole FX market.
- If $\mathbf{0} < \boldsymbol{\beta} < \mathbf{1}$; volatility lower than volatility of the whole FX market

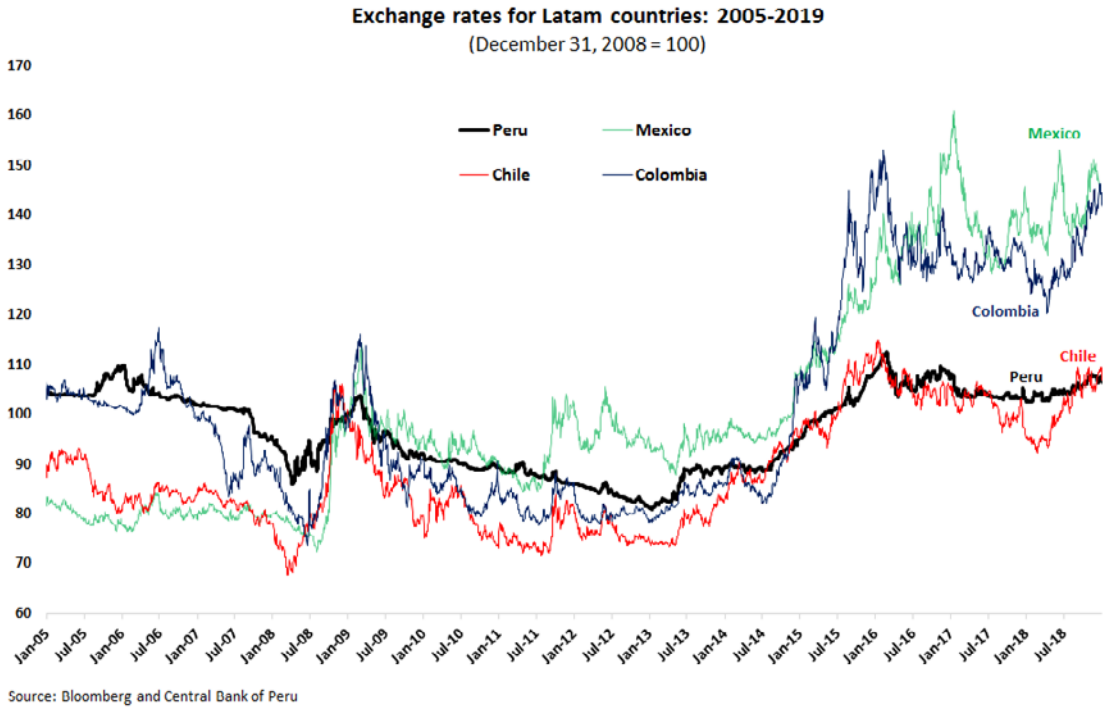
Estimated betas* in the FX market: Latin America and Peru — Graph 11



* Estimated in moving early periods.

The volatility of Latin American currencies fluctuates at around 1 (the average beta for these currencies is 1.1) which implies that, on average, those currencies have a volatility similar to that of the whole FX market. However, the Peruvian sol volatility is always lower.

[3] For the whole forex market, an equally weighted index was created using 26 currencies from developed and emerging economies, all against the US dollar. In the case of the Latam index, the currencies of Mexico, Brazil, Chile and Colombia only were used.



Source: Bloomberg and Central Bank of Peru

Coefficient of Variation

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Chile	4,6	1,7	2,8	13,9	6,6	4,4	4,1	2,6	4,1	3,9	5,7	3,0	2,5	5,2
Colombia	1,3	4,2	5,3	10,7	9,5	3,4	3,4	1,9	3,0	6,6	10,8	4,8	1,8	4,8
Mexico	2,0	3,8	1,9	17,5	7,8	3,6	11,4	5,5	4,3	5,6	8,5	8,4	9,7	6,0
Peru	1,8	2,1	3,0	4,9	4,8	1,0	1,6	1,8	4,0	2,3	3,3	1,9	1,0	1,4

3. Reserve requirements as a macroprudential instrument

3.1 Dampening the credit cycle

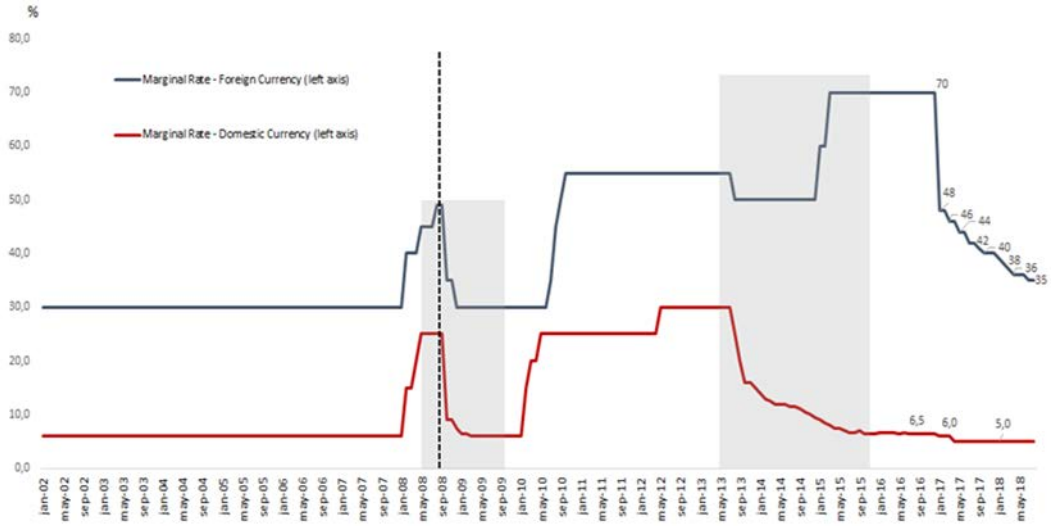
Reserve requirements (RRs) are used as an active monetary control tool to moderate the impact of capital flows over domestic credit conditions denominated in both domestic and foreign currency. The BCRP has also set high RRs on foreign currency liabilities as a prudential tool vis-à-vis liquidity and foreign currency credit risk. These additional policy tools have relaxed the trade-offs that the BCRP faces when implementing standard monetary policy within an inflation targeting regime that also takes into account financial stability considerations. The ready use of RRs in the Peruvian monetary policy framework has allowed the BCRP to induce the necessary quantitative tightening (QT) required to counter the domestic spillover effects of the quantitative easing (QE) policies in developed countries.

Since 2008, RRs have been changed frequently to complement policy rate changes. The main reason was the unprecedented monetary expansion in developed economies, and the implementation of QE. Emerging economy central banks have had to deal with the spillover effects of these ultra-easy policies, as manifested in capital inflows and low international interest rates.

Reserve requirements rate in domestic and foreign currency: 2002–18

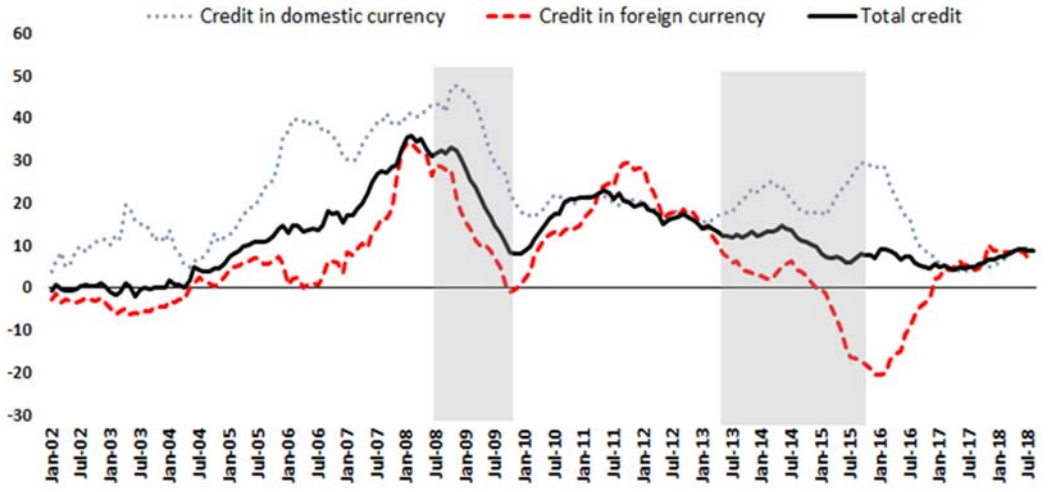
As % of total deposits

Graph 13



Credit growth (yoy change)

Graph 14



Starting in 2008, changes in the marginal and the average RR rates have been used cyclically. RRs have been raised in response to capital inflow episodes, such as those of Q1 2008 and since the second half of 2010, following the announcement of QE2. This RR tightening had the aim of limiting the impact of capital inflows on credit, particularly credit denominated in foreign currency. This also increased the BCRP's capacity to inject foreign currency liquidity in the case of a sudden capital flight.

An active use of reserve requirements can limit the impact of the global credit cycle on domestic credit, increasing the BCRP's scope for implementing countercyclical monetary policy even during periods of high financial market volatility. In Peru, the cyclical use of reserve requirements have helped to reduce the financial risks associated with credit cycles.

4. De-dollarisation programme 2013–16[4]

In 2013, the BCRP implemented additional reserve requirements to induce a more rapid reduction in credit dollarisation. Financial institutions with dollar-denominated-loan growth rates above certain thresholds set by the BCRP were subject to these requirements. Reducing financial vulnerabilities in a timely manner is crucial to maintaining financial stability and effectively implementing monetary policy, particularly under the current external conditions of high volatility in financial markets. In dollarised economies, the need to limit the effects of foreign currency liquidity shocks and unexpected large exchange rate movements on liquidity conditions and credit spreads is crucial for the stability of the financial system.

As a permanent feature, the BCRP has set higher reserve requirements for deposits in foreign currency than for those in domestic currency. This difference increases the cost of financial intermediation in foreign currency, thus reducing the incentives for dollarisation.

In December 2014, the BCRP set additional reserve requirements in foreign currency to speed up the reduction in credit dollarisation. Banks were given until June 2015 to reduce their stock of total credit in foreign currency (excluding foreign trade operations as well as operations with terms longer than four years and amounts over US$ 10 million) to at most 95% of their September 2013 levels. Otherwise, banks would face additional requirements on their total liabilities in foreign currency proportional to the gap between their current stock and the desired balance. A similar set of rules applied for car and mortgage loans denominated in foreign currency. In this case, by June 2015 banks had to reduce their stock for this type of credit to at most 90% of the balance as of February 2013.

In order to support the de-dollarisation programme, the BCRP launched two new liquidity facilities:

- Repos for credit substitution

  In this operation, banks purchase dollars from the BCRP and simultaneously perform a currency repo using these same dollars as collateral, these constituting a restricted deposit at the BCRP. As a result, bank customers obtain loans in soles, while the banks maintain the same amount of assets in dollars. The repo for credit substitution provides banks with a dollar-denominated asset (the restricted deposit in US dollars that serves as collateral for the repo) and a sol-denominated liability (the repo itself). These cancel the effect of credit substitution on banks' dollar exposure, by increasing their assets in soles and reducing dollar assets.

- Repos for credit expansion

  Through this instrument, banks can use part of their reserve requirements in foreign currency (up to an amount equivalent to 10% of their total liabilities subject to these requirements, extended to 20% in December 2015) to conduct currency repos with the BCRP, obtaining long-term funding in domestic currency.

  After the implementation of this programme, aggregate dollarisation levels for bank lending dropped from 44 to 32% from December 2014 to December 2015

[4] This section is based on Castillo et al (2016).

(Table 3). The reduction of dollarisation was widespread across different credit market segments.

Ratio of dollarisation of credit to the private sector — Table 3

	Percentage		
	Dec. 10	**Dec. 14**	**Dec. 15**
Credit to firms	**55.9**	**48.5**	**38.7**
Corporation and large firms	69.4	59.9	46.4
Medium firms	67.4	59.3	47.5
Small firms	19.3	11.5	8.5
Household Credit	**26.5**	**20.0**	**15.9**
Consumer loans	10.8	9.5	7.8
Car loans	64	68.9	44.9
Credit cars	7.2	6.6	6.4
Rest	8.4	5.9	5.8
Mortgage loans	52.2	33.9	26.8
Total	**46.1**	**38.3**	**30.5**

5. Concluding remarks

Peru's monetary policy framework, which has aimed since 2002 at inflation targeting combined with control of the dollarisation risks, has been successful in keeping the headline inflation rate and its expectations anchored to the target range of 1–3%. To achieve this target, the BCRP sets the interbank overnight reference rate to be consistent with the inflation forecast. Moreover, it provides enough liquidity to the banking system to ensure that the effective interbank rate is in line with the reference rate. The control of risks is achieved by the setting of reserve requirements to monitor the credit cycle (with higher reserve requirements for foreign currency than for the domestic one) and by using sterilised foreign exchange interventions to mitigate exchange rate volatility. Both measures take account of the economy's partial dollarisation, a feature that potentially exposes the financial system to external shocks. Such shocks can affect inflation expectations (eg the exchange rate pass-through and the balance sheet effect), thus potentially hindering the achievement of the inflation target. In particular, since 2013, the BCRP has been working on the implementation of different measures to effectively de-dollarise the financial system, by reducing the share of foreign currency-denominated credits below 30%. The latter policy has been crucial, since it has created room to undertake an independent monetary policy, and to reduce the frequency of foreign exchange interventions (which are now more associated with swaps), given that the financial system is now more resilient to external shocks.

The future agenda focuses mainly on the additional policy actions that could be taken in order to better anchor inflation expectations and reduce their persistence. This is in line with the monetary policy communication, and the use of different instruments to reduce uncertainty in the financial system.

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