Monetary policy with risk and uncertainty management in Peru[1]

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"Plans are worthless, but planning is everything."
Dwight Eisenhower

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[1] Prepared for "Monetary policy decision-making and communication under high uncertainties".

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1. Introduction

The Central Reserve Bank of Peru (BCRP) has the explicit constitutional mandate to preserve monetary stability. For this purpose, since 2002, the BCRP has followed an inflation targeting regime framework, which includes risk management. The inflation targeting framework establishes a tolerance band for annual inflation of between 1 and 3%, with the interest reference rate to the interbank market as its operative target. Inflation may temporarily deviate from the target range due to supply side shocks or other transitory factors affecting the availability of goods and services. However, the effectiveness of monetary policy is assessed based on its ability to anchor inflation expectations within the target range, and to guide inflation back to the range within a reasonable time horizon following any deviation caused by economic shocks.

The risk management component of the monetary policy includes (i) preserving the pass-through of the policy rate to the structure of interest rates across the financial system and (ii) mitigating the risks associated with partial financial dollarisation (Florián et al (2022)). In an economy with partial financial dollarisation where the central bank is not a lender of last resort in foreign currency, the materialisation of dollarisation-related risks, such as abrupt and significant exchange-rate depreciation, can jeopardise financial stability and erode confidence in monetary policy.

Accordingly, monitoring, containing and preventing these risks is fully consistent with the BCRP's mandate to preserve monetary stability. Thus, the policy rate may be complemented, depending on shocks and financial conditions, by the use of other monetary policy instruments, such as long-run repo operations to ensure the proper functioning of markets, reserve requirements to avoid credit booms and reduce liquidity risk in foreign currency, and interventions in the foreign exchange market to reduce exchange rate volatility and therefore prevent the triggering of a negative balance sheet effect.

By using this approach, the BCRP is committed to anchoring inflation expectations at the centre of the inflation target range, ie 2%, reinforcing its long-term commitment to currency stability.

However, the success of fulfilling this commitment faces the challenge of different sources of uncertainty regarding the current state and future dynamics of inflation drivers. A critical component of the practical design and implementation of monetary policy is risk assessment on the path of future inflation. Monetary policy actions are inherently forward-looking and must be based on a robust evaluation of potential economic scenarios. Given the lags in monetary transmission, future outcomes of current policy decisions are subject to uncertainty and are contingent on the realisation of various factors.

Dwight Eisenhower once said, "Plans are worthless, but planning is everything." This insight applies perfectly to central banking. The BCRP operates in an environment of constant change, where risks to inflation arise from diverse and unpredictable sources.

To navigate this uncertainty, the BCRP adopts a comprehensive risk management framework that relies heavily on scenario analysis. A scenario acts as a contingency plan for a potential risk to inflation. It outlines the transmission mechanisms and effects of a shock and defines a prepared policy response. In this sense, scenario

analysis is similar to stress testing: it identifies vulnerabilities and helps determine how monetary policy should adapt to evolving conditions, such as shifts in the economic forces shaping inflation.

Ultimately, as shocks materialise, many scenarios may never occur or may become irrelevant. Yet the value of scenario analysis lies not in the permanence of the plan but in the discipline of planning. It provides a clear protocol for risk assessment and ensures readiness for larger, unexpected shocks.

To understand this, this paper reviews the forces that shaped inflation behaviour between 2021 and 2023 – a period in which Peru experienced its most pronounced inflationary surge since adopting an inflation targeting regime. Before the pandemic in 2020, inflation was stable and close to the 2% midpoint of the target range, registering 1.9% in 2019. However, a combination of global and domestic shocks subsequently pushed prices well above the 1–3% target band.

In March 2020, the unexpected outbreak of Covid-19 and the associated confinement measures reduced GDP by 30% in the second quarter, exerting downward risks on inflation. To stabilise the economy, policymakers implemented a mix of conventional and unconventional monetary, fiscal and regulatory measures. And as a result, between March and October 2020, inflation averaged 1.75%.

In the post-pandemic period, inflation began to rise rapidly and persistently, driven by global forces that pushed prices upward worldwide. The rapid post-pandemic global recovery created severe supply-demand imbalances, generating bottlenecks and igniting global inflation, which raised import costs. These pressures were further compounded by the Russia-Ukraine war in 2022, which drove up energy and grain prices, amplifying external inflationary forces.

Domestic factors also played a key role in exacerbating and prolonging the inflationary episode. Political uncertainty and capital outflows in 2021 weakened the Peruvian sol and increased imported inflation. In addition, droughts in 2022, the onset of El Niño in 2023, the bird flu outbreak and episodes of social unrest disrupted production and logistics, pushing food prices higher. Finally, synchronous global monetary tightening added financial volatility. As a result, during the period 2021–23, inflation averaged 6.0%. In this context, the BCRP adopted a tight monetary policy stance to influence long-term inflation, by progressively raising the policy rate from 0.25% in July 2021 to 7.75% in January 2023. In April 2024, the inflation rate returned to its target range.

There were five other periods, during this century, in which inflation breached the 1–3% band, yet effective monetary policy actions helped anchor inflation expectations and guide inflation back towards the target. These past experiences also underscore the risk of recurrences when adverse new shocks materialise. However, recurrence is not synonymous with persistence or continuation: the inflation targeting framework – grounded in a credible commitment to price stability, systematic use of the policy rate and transparent communication – is designed to navigate evolving uncertainty, adapt to new disturbances and contain second-round effects, thereby re-anchoring inflation expectations over time.

The BCRP's monetary policy framework has responded effectively and with sufficient flexibility to a dynamic and evolving economic environment. This framework, which integrates inflation targeting and the management of risks associated with financial dollarisation, has been tested over more than two decades

of implementation. During this period, the framework has demonstrated resilience and adaptability in response to a variety of domestic and external shocks, evolving in line with changes in the national and global economic environment.

This adaptability has been made possible through the BCRP's integrated macroeconomic forecasting system, which benefits from the contributions of its technical staff. This institutional arrangement enables the Bank to continuously refine its policy stance, ensuring that monetary policy remains forward-looking, data-driven and responsive to emerging risks and uncertainties.

2. Uncertainty and monetary policy flexibility

Uncertainty is inherently part of monetary policy management, and the BCRP has long operated in a changing environment, responding with a continuous process of adaptation. One of the defining characteristics of the BCRP's approach is its flexibility and capacity to evolve. This has been exemplified in the progressive adaptation of intermediate targets and operational instruments.

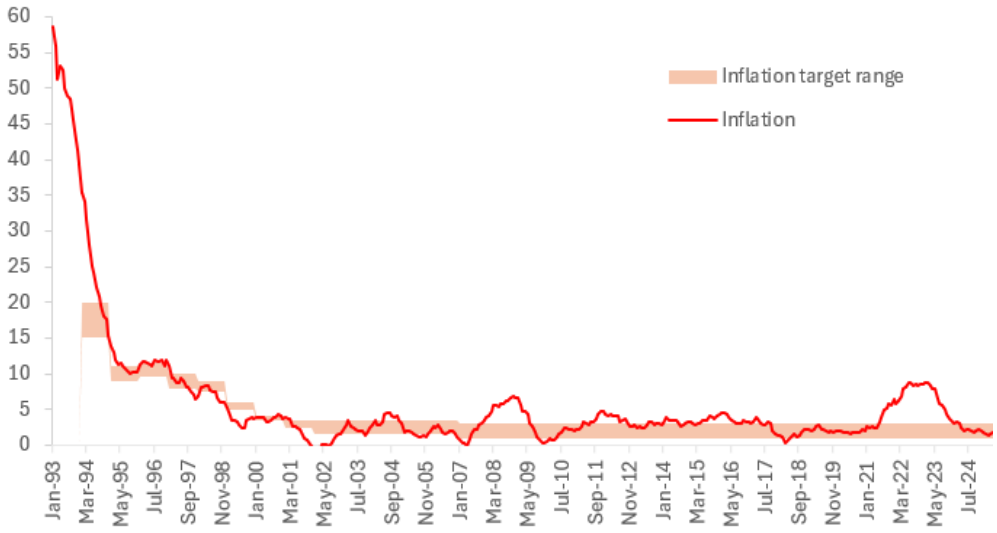
After the hyperinflation of the late 1980s and early 1990s, during the stabilisation programme that followed, the BCRP's disinflation strategy relied on monetary aggregate control. The stabilisation programme and the adoption of the monetary targeting framework unfolded in two key phases. First, in 1990, authorities implemented a critical measure, adopting an administrative floating exchange rate. Second, in 1993, a new constitutional chapter was approved, providing a strong institutional foundation for independent monetary policy by assigning the sole mandate for ensuring monetary stability to the central bank.

During this period, there was considerable uncertainty about the effectiveness of the monetary base targeting framework. The BCRP used estimates of base money demand as its operational target for monetary policy; however, these targets were not disclosed publicly. Aware of the uncertainty surrounding these forecasts in a highly dollarised economy – roughly 80% of deposits and loans were denominated in US dollars – the BCRP retained discretion to revise base money targets and adjust policy instruments as needed (de la Rocha (1998)). This flexible approach allowed Peru to avoid the difficulties faced by other countries that attempted to use base money forecasts as a nominal anchor for inflation expectations (Mishkin and Savastano (2001)).

From 1994 onward, the operational target shifted to the current account balances held by financial institutions at the BCRP, providing a daily measure of system liquidity. Furthermore, the BCRP complemented this approach with elements characteristic of inflation targeting, it began announcing annually declining short-term inflation ranges and enhanced communication about the operational target that would deliver those outcomes. These targets were progressively reduced, from 20% to 15% in 1994 to single-digit levels in subsequent years, reflecting the commitment to long-term price stability (Graph 1).[3] This arrangement helped to anchor expectations and prepare the ground for a full-fledged inflation targeting regime (Rossini (2001)).

[3] See Choy and Quispe (2022) and Armas and Gondo (2022).

Inflation during the period 1993–2025 Graph 1



Source: BCRP.

In 2002, the BCRP formally adopted an inflation targeting regime, initially setting a 2.5% target with a ±1% tolerance band, evaluated on an annual basis. From 2006 onward, the evaluation became continuous, aiming to always keep 12-month inflation within the target range. In 2007, the target was lowered to 2% with a tolerance range of ±1%. This adjustment sought to strengthen confidence in the domestic currency as a means of payment and store of value, and to reduce vulnerabilities associated with partial financial dollarisation.

At the same time, the BCRP strengthened its forecasting and analytical toolkit to support forward-looking decision-making under uncertainty. With inflation and inflation expectations declining and the projected path of inflation effectively serving as an intermediate guide for policy, the BCRP developed and continuously improved the Quarterly Projection Model (QPM, called Modelo de Proyección Trimestral (MPT) in Spanish) to capture salient features of the Peruvian economy and enhance the quality of inflation projections.

2.1 The risk management approach to facing uncertainty

The Board of the BCRP determines the level of the policy rate on a monthly basis, following a pre-announced schedule that has been in place since 2003. For that purpose, the BCRP uses a monthly integrated macroeconomic forecasting system (see Box 1 and Graph 2). This system draws on the expertise, modelling tools, intuition and judgment as coordinated inputs of all technical departments. To ensure coherence among these inputs, the MPT serves as the central coordinating framework.

Box 1

The forecasting system of the Central Reserve Bank of Peru[4]

To ensure inflation remains within its target range, the Central Reserve Bank of Peru (BCRP) relies on a forward-looking monetary policy framework (Florián et al (2022)). This requires anticipating economic developments and assessing their implications for inflation over a projection horizon of at least two years. As a result, the BCRP has developed a comprehensive forecasting system based on economic models and expert judgment to guide policy decisions.

This forecasting system is a collaborative effort across the institution, especially within the Central Department of Economic Studies. It operates on a continuous basis, with monthly updates feeding into the monetary policy decision-making process. The forecasts also support the Board of Directors, which meets monthly to evaluate economic conditions and determine the appropriate policy stance. Public updates are provided quarterly in the Inflation Report.

The forecasting process involves gathering up-to-date information on domestic economic activity, conducting surveys on expectations (eg inflation, exchange rates and business confidence), and monitoring short-term indicators such as electricity usage and construction materials (see Graph B1). It also includes analysis of global economic trends, commodity prices, international interest rates, and Peru's fiscal outlook and potential output growth.

Since the pandemic period, significant enhancements have been made to improve knowledge of key statistics on the state of the economy, which constitute the initial point forecast. This is particularly true for total GDP and non-primary GDP growth, which are only available with a two-month delay. For that purpose, new statistical models have been implemented to predict the present or *nowcast* these variables. This process includes the incorporation of machine learning models and high-frequency indicators – such as electricity consumption, cement dispatches and import volumes, among others – that provide early signals of economic activity. These approaches combine advanced statistical techniques with daily and monthly data sources to improve the precision of nowcasting estimates, thereby strengthening the forecasting system's responsiveness and accuracy.

Inflation forecasts combine disaggregated price analysis, expert insights and time series models. In parallel, the Bank uses financial programming techniques to generate medium-term projections for key macroeconomic accounts – national output, external balances, fiscal outcomes and monetary aggregates.

All this information is integrated by the Department of Macroeconomic Modelling to produce inflation and output forecasts over a two-year horizon. The core tool is the Quarterly Projection Model, a semi-structural model tailored to the Peruvian economy. It is supported by satellite models such as Dynamic Stochastic General Equilibrium models and others used to estimate unobservable variables like potential output, the natural interest rate and the equilibrium exchange rate.

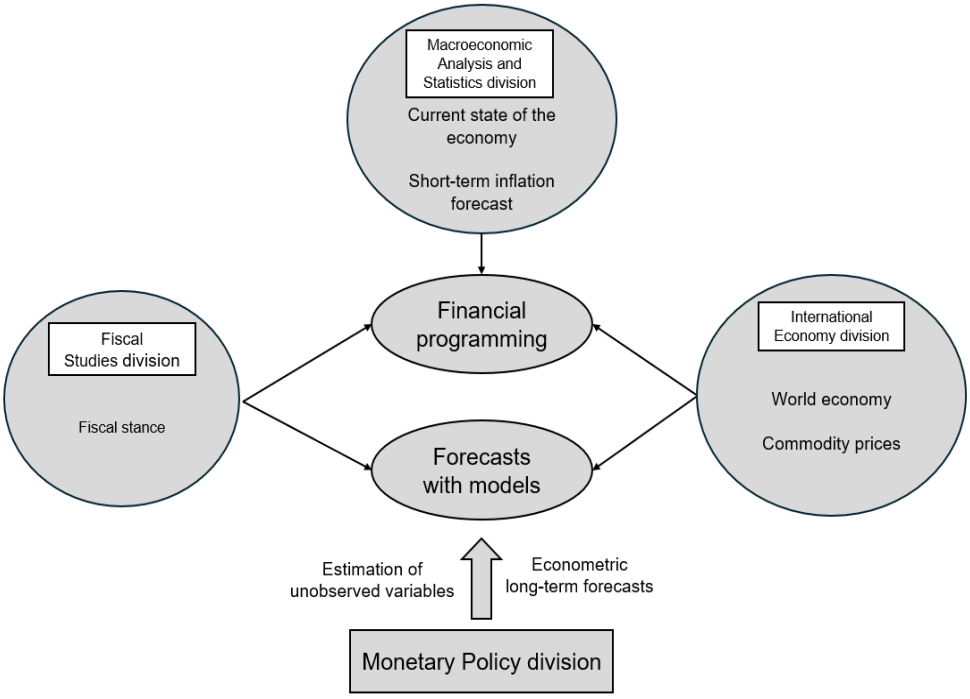
Short-term inflation dynamics are complemented by medium-term forecasts that simulate how different policy paths affect inflation outcomes. These simulations recognise that monetary policy works with lags, typically reaching peak effectiveness within one to two years.

Importantly, the forecasting system combines quantitative model output with expert analysis to improve the quality and credibility of projections. Monthly presentations summarising these projections are delivered to the Board, serving as a key input for monetary policy decisions and as a channel for technical feedback and discussion.

[4] Prepared by Alexander Melendez.

The BCRP forecasting process

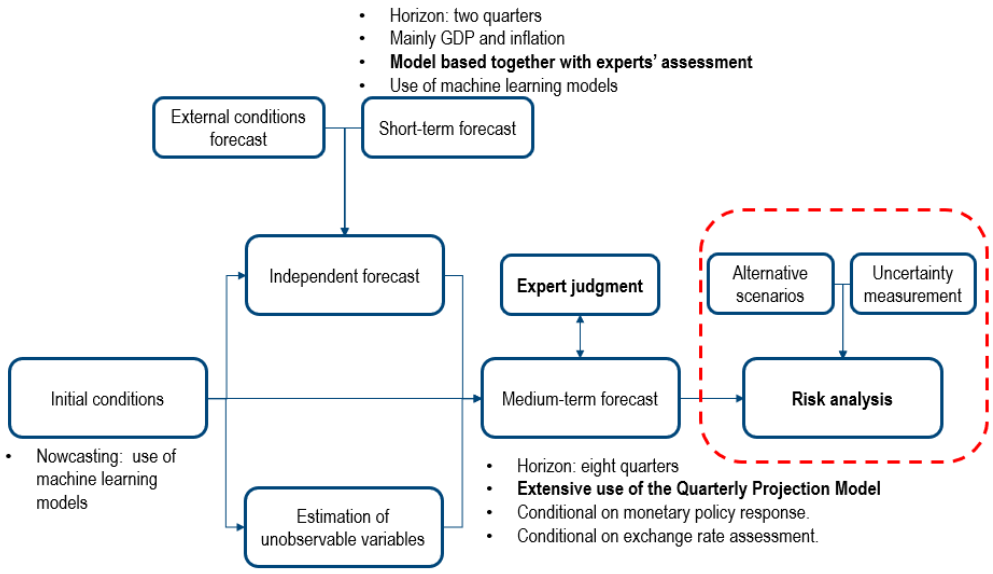
Graph B1



Source: History of the Central Bank and the Monetary Policy of Peru, Volume II.

The monthly BCRP integrated macroeconomic forecasting system

Graph 2



Source: BCRP.

Under the integrated macroeconomic forecasting system, the BCRP's technical staff consolidates all available information on the current state of the economy, along with macroeconomic projections conditional on the monetary policy stance, into a comprehensive presentation delivered to the Board of the BCRP on a monthly basis. This presentation serves as a key input for monetary policy decision-making and provides an important channel of communication between the technical staff and the Bank's Board. It facilitates the exchange of views and enables the Board to provide feedback on recent economic developments, thereby strengthening the analytical foundation of policy decisions.

This monthly presentation features a baseline medium-term forecast along with deviations presented as alternative scenarios. It also incorporates expert judgment on the likelihood of these scenarios. Together, these elements serve as key inputs for risk analysis.

Risk assessment plays a key role in quantifying the uncertainty embedded in the economic forecasting process, particularly regarding the trajectory of key macroeconomic variables. The BCRP forecasts are elaborated on the basis of a risk management approach that focuses on events with a low probability of occurrence, but which may have strong impacts on the economy. This is important because monetary policy decisions are based not only on the central scenario but also on a more comprehensive outlook on the future evolution of the economy. Under this approach, the baseline forecast scenario is the most likely future scenario, which is estimated considering all relevant information gathered at the BCRP.

In the presentation of forecasting to the Board, the technical staff integrates uncertainty explicitly into its macroeconomic analysis through a monthly risk assessment of inflation that combines two stages: (i) a central scenario, which is the most likely forecast for inflation and the economy; and (ii) a balance of risks, that explicitly presents the factors that could make the actual outcome deviate from the central scenario.

In the first stage, the central scenario or baseline projection of inflation and key macroeconomic variables are agreed based on a combination of data-driven forecasts informed by soft information and the judgment of specialists, which deliver the most likely assumptions about the domestic and international environment.

Then, in the second stage, the risks around the baseline are quantified based on risk scenarios, which are separate point forecast scenarios from the baseline. Risks treated as separate scenarios represent potential and important deviations from the baseline forecast due to different assumptions about the domestic and international environment, such as demand shocks, domestic supply shocks or financial shocks. They also represent positive or negative shocks to the main endogenous variables and capture low-probability, high-impact variations from baseline assumptions. Each risk includes both a qualitative description of possible shocks and a quantitative assessment of their probability and impact.

This way of describing risk as scenarios serves well for communication between the technical staff and the board of directors and the public, as they are portrayed as distinct possibilities rather than a continuous distribution. They become intuitive and easy to communicate as they simplify the overall risk spectrum into a few scenarios with clear and distinct narratives for each alternative. Thus, it allows the BCRP to communicate not only what it expects but also what could go wrong or better than expected and how likely that is.

The overall uncertainty of these risks is communicated using two tools: (i) the balance of risks of inflation, in which each risk is explicitly weighted by the subjective probabilities attributed to their occurrence; and (ii) fan charts, which show predictive distributions around the central forecast, whose variance and skewness are adjusted to communicate the view of the balance of risks.

The balance of risks includes both a qualitative description of possible shocks and a quantitative assessment of their probability and impact. It allows the BCRP to communicate not only what it expects but also what could go wrong or better than expected and how likely that is. This balance of risks is central to the communication strategy. It signals whether the risks are mostly upward (inflation likely to exceed the target), downward (inflation likely to fall below target) or balanced (neutral risks). This assessment helps markets, analysts and the public understand the possible direction of future monetary policy even if the central projection does not change.

Fan charts depict risk as probability bands. They characterise the full spectrum of risk around the central forecast using statistical distributions, which are adjusted judgmentally to reflect skewness (asymmetric risks) and variance (uncertainty magnitude). Although fan charts are more complex to communicate, they are useful to show the full spectrum of uncertainty, and how the uncertainty quantification is predicted to manifest in the forecast horizon (see Box 2).

This process shows that the BCRP forecasts are elaborated on the basis of a risk management approach that focuses on events with a low probability of occurrence, but which may have strong impacts on the economy. Under this approach, the baseline forecast scenario is the most likely future scenario, which is estimated considering all relevant information gathered at the BCRP.

2.2 Constructing risk scenarios

Constructing scenarios is critical for central banks operating in an environment of constant change, where inflation risks arise from diverse sources. Scenarios serve as contingency plans that outline transmission mechanisms and prepared responses to potential shocks. While many scenarios may never materialise, the process of planning strengthens risk assessment and ensures flexibility in monetary policy, enabling central banks to respond coherently and effectively to evolving economic conditions.

In the forecasting process, the central projection represents the most probable path for key macroeconomic variables, particularly inflation. However, to account for uncertainty and potential deviations from this baseline, risk scenarios are constructed. These scenarios incorporate a variety of shocks – often more than one – and are categorised based on their distinctive effects on the economy. Specifically, each scenario is built around specific assumptions that, while unlikely, could have a significant impact on inflation. For example, the following four risk scenarios have typically been categorised and discussed:

Box 2

The BCRP fan chart and balance of risks[5]

Since 2002, the Central Reserve Bank of Peru (BCRP) has used fan charts in conjunction with the balance of risks in its Inflation. Reports to convey uncertainty surrounding its macroeconomic forecasts (BCRP (2008, 2011, 2019) and Winkelried (2012)). These tools are core elements of the monetary policy communication strategy and were adapted from the methodology originally designed by the Bank of England (see Britton et al (1998)).

The fan chart visually represents the range of possible outcomes around a central projection using a probability distribution. The darkest central band marks the mode (the path with the greatest probability density), while lighter surrounding bands indicate progressively lower probabilities for alternative paths. Each fan chart has a forecast range up to 24 months. Each period specifies an asymmetric probability distribution characterised by three parameters: the mode and two standard deviations (σ_1 and σ_2), which capture variability to the left and right of the mode.

The fan chart displays cumulative probability bands – typically 18 bands covering 90% of the probability mass – rendered from darker (central) to lighter (outer) shades (see Graph B2).

To model the distribution of the projected variable we use a split normal distribution with the mode μ at the centre and two standard deviations – one on the left, σ_1, and one on the right, σ_2. Its density is:

$$f(x;\mu,\sigma_1,\sigma_2) = \begin{cases} \sqrt{\frac{2}{\pi}}\left(\frac{1}{\sigma_1+\sigma_2}\right)\exp\left[-\frac{1}{2}\left(\frac{x-\mu}{\sigma_1}\right)^2\right], x \le \mu \\ \sqrt{\frac{2}{\pi}}\left(\frac{1}{\sigma_1+\sigma_2}\right)\exp\left[-\frac{1}{2}\left(\frac{x-\mu}{\sigma_2}\right)^2\right], x > \mu \end{cases}$$

This collapses into a symmetric normal distribution when $\sigma_1=\sigma_2$; in general, the asymmetry arises because $\sigma_1 \neq \sigma_2$, as this signals upward or downward bias.

The mode μ of the fan coincides with the baseline (central), while the mean μ is calculated as the weighted average of alternative scenarios, using the probabilities provided by expert judgment. The asymmetry of the fan thus arises because the "side" with the biggest standard deviation would contain the mean. Then, the two side-specific standard deviations are obtained by the differences between the mean μ and the mode μ (which signals the skewness) and the variance Ω of x:

$$\bar{\mu} - \mu = \sqrt{\frac{2}{\pi}}(\sigma_2 - \sigma_1), \qquad \Omega = \left(1 - \frac{2}{\pi}\right)(\sigma_2 - \sigma_1)^2 + \sigma_1\sigma_2$$

Because a distribution is constructed for each future period, the collection of distributions forms a three-dimensional "mountain range" over time; and when viewed from above, it becomes the two-dimensional fan chart. The volatility of the distribution is increasing over time by a parameter of persistence.

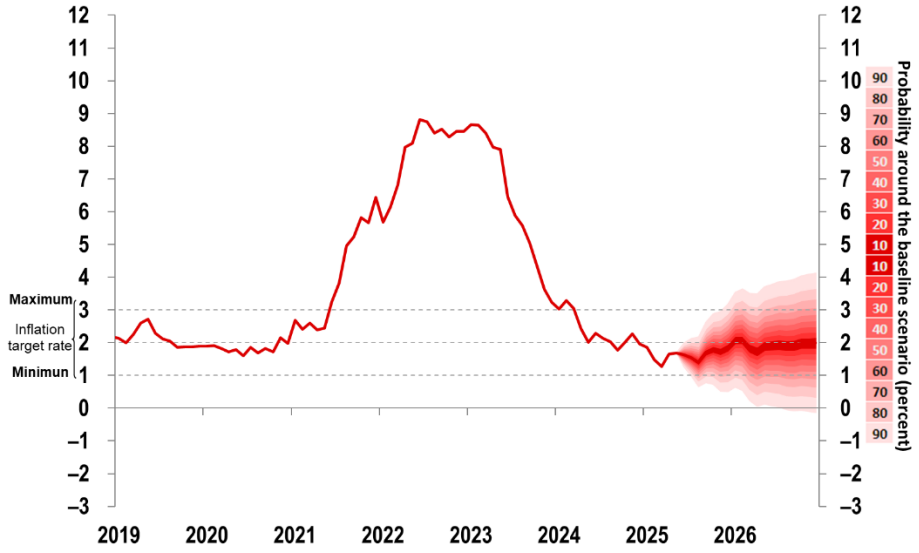
The widening of the fan with the forecast horizon reflects the calibrated persistence of forecast errors and the higher uncertainty embedded at longer horizons.

The shape of the fan chart visually reflects the balance of risks. The balance of risks is a structured assessment of potential events, or "shocks," that could cause inflation to deviate from the central forecast. These risks are categorised (eg internal/external demand, financial and supply side) and weighted based on their perceived probability and potential impact (see Graph B3). The net effect of these weighted risks determines the overall "bias" or "tilt" of the forecast. Therefore, while the width of the fan chart illustrates the overall level of uncertainty (variance), any asymmetry or "tilt" directly reflects the balance of risks. An upward tilt, for instance, indicates that upside risks predominate.

[5] Prepared by Luis Zapata.

BCRP inflation forecast fan chart

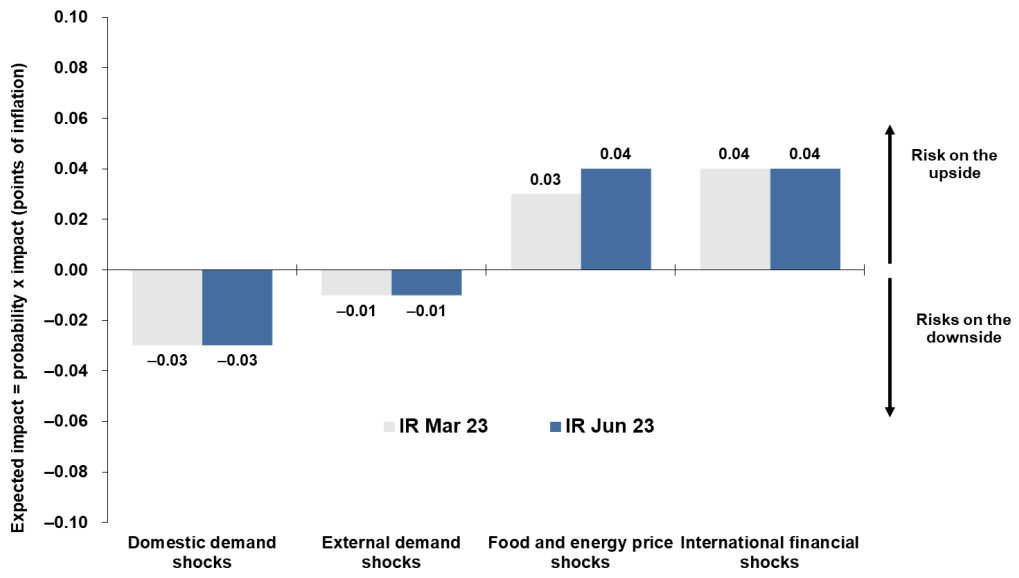
Graph B2



Source: Inflation Report BCRP June 2025

BCRP balance of risks for inflation forecast

Graph B3



Source: Inflation Report BCRP June 2023.

Based on a uniform methodology and consistent presentation projections, via the fan chart and the balance of risks, the BCRP can communicate the range and likelihood of possible outcomes for inflation, and it helps to align market expectations with the central bank's inflation target.

1. **Supply shock scenario**. This scenario considers potential supply side disruptions, both domestic and external, that could affect energy and food prices.

Examples include natural disasters, supply chain breakdowns and other unexpected events. The MPT is prepared to capture both the direct impact on inflation and the indirect effects through second-round impacts on other components of inflation.

2. **Financial shock scenario**. This scenario simulates a stressed financial environment, such as exchange rate pressures triggered by a loss of confidence in Peru's economic performance, a rise in country risk or disturbances in external financial markets. These conditions can amplify inflationary pressures through currency depreciation and tighter financial conditions.
3. **External demand shock scenario**. This scenario reflects a global economic slowdown that reduces demand and prices for Peru's export products. Its transmission channel results in a decline in domestic growth prospects and an increase in country risk, which can have deflationary effects.
4. **Domestic demand shock scenario**. This scenario outlines a weakening of domestic growth expectations, often linked to internal instability. The slowdown in economic activity and rising country risk can produce deflationary pressures, depending on the nature and persistence of the shock.

Each scenario can push inflation either upward or downward, depending on the characteristics of the shocks involved. The expected impact on inflation is calculated as the deviation from the central projection, weighted by the probability of each scenario occurring. Aggregating these weighted impacts provides both the Board and the public with an overall sense of the bias these risks introduce into the inflation forecast.

3. Robustness of the framework to different sources of uncertainty

The BCRP's risk assessment framework is designed to remain robust under different sources and types of uncertainty by using a combination of structural macroeconomic models, time series forecasting tools and expert intuition and judgment.

Statistical uncertainty. One common source is statistical uncertainty, which arises because key variables are not directly observed but estimated, often with imperfect models and limited data. To address this, the BCRP combines model estimations with observable indicators and judgment. For example, to estimate unobservable variables – such as the output gap and the natural rate of interest – the common practice is to consider a wide range of methodologies. This diversity reduces the risk of model misspecification and provides a richer basis for discussion about what might be driving changes in these estimates. In addition, the BCRP complements such estimates with signals from macroeconomic, microeconomic, financial and credit market indicators, which are directly observable. This combination of models and indicators, together with expert judgment, helps prevent any single estimate from dominating the analysis. In practice, this approach produces wider predictive intervals, but more realistic outcomes.

Another source of statistical uncertainty is the imperfect knowledge of the initial state of the economy. To address this, significant improvements have been made to enhance the accuracy of key statistics at the starting point of the forecast and in short-

term projections. In particular, new statistical models have been implemented to nowcast these variables and to improve short-term forecasting. These models incorporate machine learning techniques combined with high-frequency indicators – such as electricity consumption, cement dispatches, import volumes and financial variables – that provide early signals of economic activity. By integrating advanced statistical methods with daily and monthly data sources, these approaches have improved the precision of nowcasting and short-term forecasts, thereby strengthening the forecasting system's responsiveness and accuracy.

Known unknowns uncertainty. Another category represents identifiable risks whose transmission channels are understood, but whose timing and magnitude remain uncertain. Examples include external demand shocks, commodity price swings, political uncertainty or shifts in global financial conditions. These risks are incorporated through alternative scenarios, each adjusting one or more assumptions – for instance, lowering trading-partner growth to simulate weaker external demand, raising oil prices to model a supply shock or changing the expected path of US interest rates to capture global financial tightening. This is important because monetary policy decisions are based not only on the central scenario, but also on a more comprehensive outlook on the future evolution of the economy under different assumptions, which provides a quantitative measure of each risk's impact. The balance of risks aggregates these scenarios by assigning subjective probabilities and evaluating their weighted effect on the forecast. This assessment is communicated visually by the fan chart bias to reflect asymmetry in risks.

Unknown unknowns uncertainty. Finally, monetary policy also faces an unknown unknowns type of uncertainty, which refers to events that cannot be precisely anticipated or modelled, such as sudden natural disasters, pandemics or global crises. These events can only be described qualitatively but not quantitively in terms of probabilities (Kay and King (2020)).[6] While these cannot be included in formal probability-based scenarios, the BCRP addresses them qualitatively and through preventive macro-financial policies, such as maintaining adequate international reserves and ensuring financial system liquidity, to safeguard the monetary transmission mechanism. In addition, the BCRP sporadically conducts stress tests for very severe implausible scenarios. These scenarios serve as a complement to the probabilistic toolkit, allowing policymakers to explore extreme regimes and nonlinear dynamics beyond typical distributions. One example of this is the so-called Armageddon scenario, although no probability is attached to its occurrence, it informs about possible macro-outcomes and the extent of policy responses after a catastrophic economic event.[7]

[6] Kay and King (2020) define unknown unknowns as states of the world to which we cannot attach probabilities because we cannot conceive of these states. Even if we anticipate them, expressing such events in probabilistic terms is misleading. Instead, we can only frame them through narratives.

[7] This scenario serves as a stress test designed to simulate extreme and catastrophic economic conditions. It is constructed around a coherent narrative that combines multiple severe shocks, each of which has historically represented a maximum observed change in key exogenous variables. For instance, the scenario may include an exceptionally intense El Niño event, a sharp increase in risk premiums, a significant currency depreciation, cost-push inflationary pressures and a deep global financial crisis. While each of these shocks is individually extreme, the Armageddon scenario integrates them into a single, compounded narrative. The objective is not to assign a probability to its occurrence, but rather to explore the macroeconomic consequences and assess the resilience of the economic structure and policy framework under the most adverse conditions imaginable.

When dealing with these sources of uncertainty in risk analysis and forecasting, priors are essential for decision-making. They serve as anchors to guide analysis when data are incomplete or risks are hard to quantify. Priors can take two complementary forms: quantitative probabilities and qualitative narratives. A prior as a probability offers a quantified judgment about the likelihood of a risk scenario. This probabilistic prior is useful when facing known unknowns uncertainty as it can provide a numerical starting point for risk modelling and scenario analysis.

However, when uncertainty runs deeper and unknown unknowns emerge, data are scarce and a prior as a narrative becomes essential. The narrative prior is a qualitative story built from historical experience, expert judgment and intuition about how a risk scenario may unfold. The full narrative view may be incomplete and partial, but using narrative priors not only supports model development but also enhances interpretability and fosters discussion around underlying assumptions. For instance, narrative priors proved invaluable during the early stages of implementing the inflation targeting regime during the period 2001–02, when calibrating the forecasting model was necessary due to the monetary policy regime change and the unprecedented low inflation levels not seen for decades.[8]

It is important to note that unknown unknowns uncertainty can eventually evolve into a form of known unknowns uncertainty. Once these unforeseen events occur and new information becomes available, their transmission mechanisms are reassessed to gauge their magnitude and impact. At that point, they transition from being completely unpredictable to partially understood risks.

A clear example is the global Covid-19 pandemic. Before the outbreak in March 2020, historical experience with events such as the 1918 influenza pandemic or Ebola provided some basis to construct a prior to anticipate potential economic effects. Early scenarios considered localised impacts in China and possible spillovers through international trade. However, these assumptions proved inadequate when an unprecedented global pandemic struck, causing severe disruptions worldwide.

Covid-19 triggered a sudden and profound shock to both global and domestic economies. On the demand side, it caused a global contraction, reduced household purchasing power and heightened uncertainty; on the supply side, it disrupted supply chains and required strict social distancing measures that constrained production. These combined effects led to sharp income losses for households and liquidity shortages for firms, limiting their ability to meet financial obligations. In Peru, GDP contracted by 30% in the second quarter of 2020. In this context, credit risk and non-performing loans increased, restricting access to financing and amplifying the disruption of the payments chain. Accordingly, the uncertainty surrounding the pandemic's economic effects and the required policy actions became a source of uncertainty and a central challenge for decision-makers.

To manage uncertainty surrounding the economic impact of Covid-19, the analytical framework was enhanced by integrating new models and refining existing ones with additional variables and mechanisms. These improvements allowed for the inclusion of epidemiological dynamics, systemic financial risks, abrupt expectation shifts and mobility restrictions.

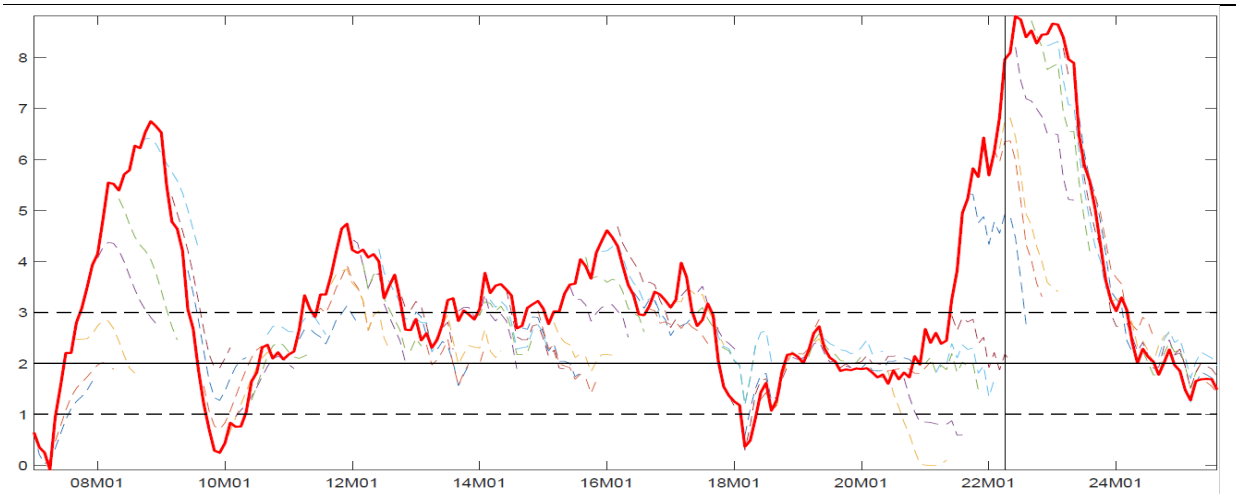
[8] In 1997, after 27 years, inflation reached a single-digit level of 6.4%, a rate not observed since 1972, when inflation was 4.3%. In 2001 and 2002, inflation fell below 3% (at –0.13% and 1.5%, respectively), levels not seen since 1960, when inflation stood at 2.4%.

To address the impact, the BCRP implemented a mix of conventional and unconventional measures aimed at: (i) preventing a credit crunch; and (ii) providing sufficient liquidity to the financial sector to mitigate the impact of external and domestic shocks on financial stability (Montoro et al (2020)).

A key unconventional measure was the launch of the Reactiva-Perú programme. Its design required careful planning to address uncertainty and ensure effective implementation. The process began in mid-March 2020, alongside other actions such as reducing the policy rate to a historic low of 0.25% and lowering reserve requirements. On 26 March 2020, the BCRP Board approved a new liquidity injection instrument: credit repos guaranteed by the national government (see Montoro et.al (2025)). Initially set at PEN 30 billion (4.1% of GDP) and later expanded to PEN 60 billion (8.2% of GDP), Reactiva-Perú provided government-backed credit guarantees to ensure broad coverage. The programme successfully prevented a collapse of the payments chain, reduced defaults and supported economic recovery (Acurio et al (2023); BCRP (2021a,b)).

Other unforeseen shocks are also constantly present in the economy. Even though the forecasting framework is designed to measure various sources of uncertainty, it remains vulnerable to these sudden shocks. Graph 3 illustrates this by comparing the actual inflation outcomes with the baseline forecasts published in each Inflation Report from 2007 to 2025. Significant deviations between forecasts and realisations highlight the materialisation of different sources of uncertainty, often driven by unexpected events that were not anticipated at the time of the initial projection. Box 3 shows how the different tools to measure uncertainty were adapted after the unexpected El Niño shock.

Inflation projections and realised inflation — Graph 3



[1] Note: x-axis is labelled year- first month of year (M01)

Sources: BCRP Inflation reports.

Box 3

Navigating through uncertainty after large shocks[9]

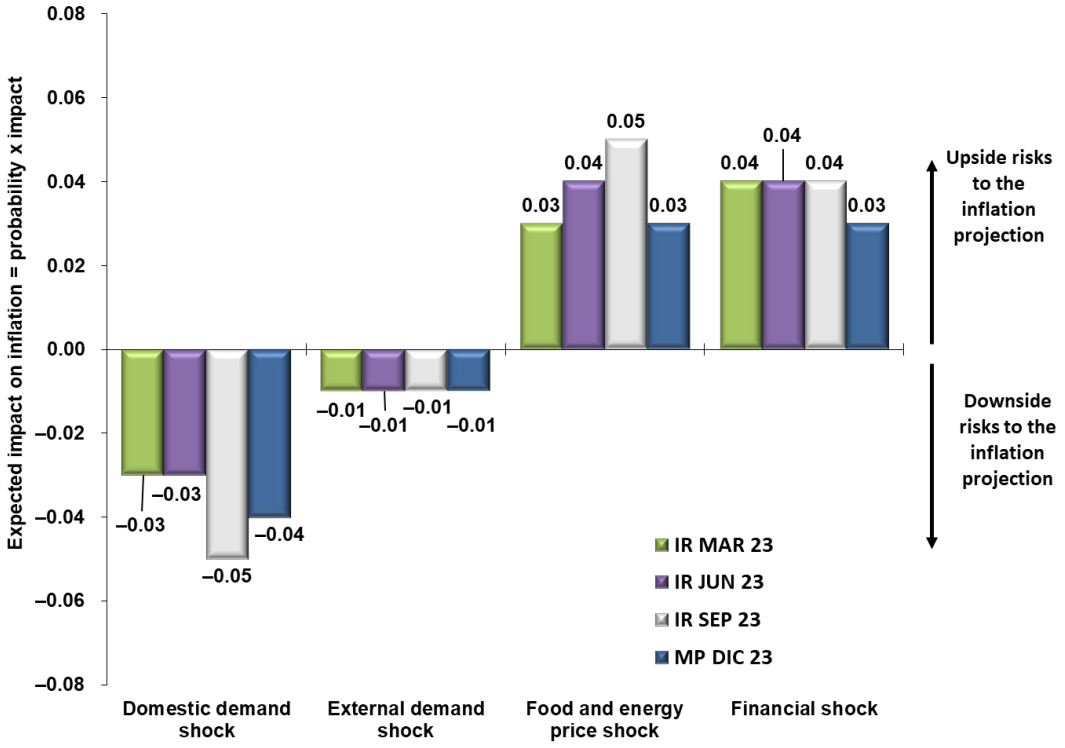
When a sudden unexpected large shock appears, the forecast and the assessment of risk are revised accordingly as new updates and more information about the event are gathered. This box presents the evolution of the uncertainty communication after the 2023 El Niño surprise realisation.

The 2023 El Niño surprise

The period between March and December 2023 provides an example of this framework in action (see Graph B4). During this period, the Central Reserve Bank of Peru (BCRP) adapted its diagnosis, projections and communication in response to a "surprise" shock: a coastal El Niño phenomenon (El Niño Costero, FEN) whose intensity and economic impact were greater than initially anticipated.

Balance of risks during 2023

Graph B4



Source: Inflation Report BCRP 2023.

At the beginning of the year, the main concerns shaping the BCRP's forecast were the lingering effects of social conflicts and political instability. While climatic events were mentioned as a potential risk, they were not yet the dominant feature of the analysis.[10]

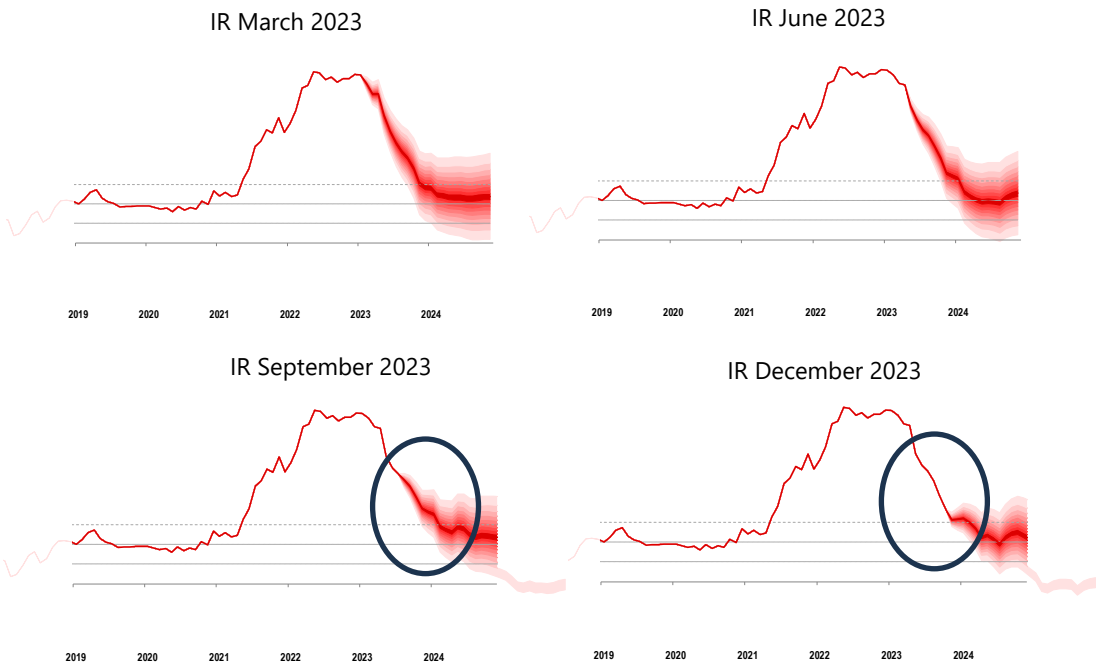
[9] Prepared by Luis Zapata.

[10] The first notable floods started by the end of March 2023.

By the June 2023 report, the picture had begun to change. The end-of-year inflation forecast was revised upwards to 3.3%, explicitly due to the "effect of adverse climatic events". The upside bias in the balance of risks increased, driven by a larger expected impact from "food and energy price shock".

Changes to the fan chart of inflation in 2023

Graph B5



Notes: Inflation projection fan charts (year-on-year, %), IR = Inflation Report.

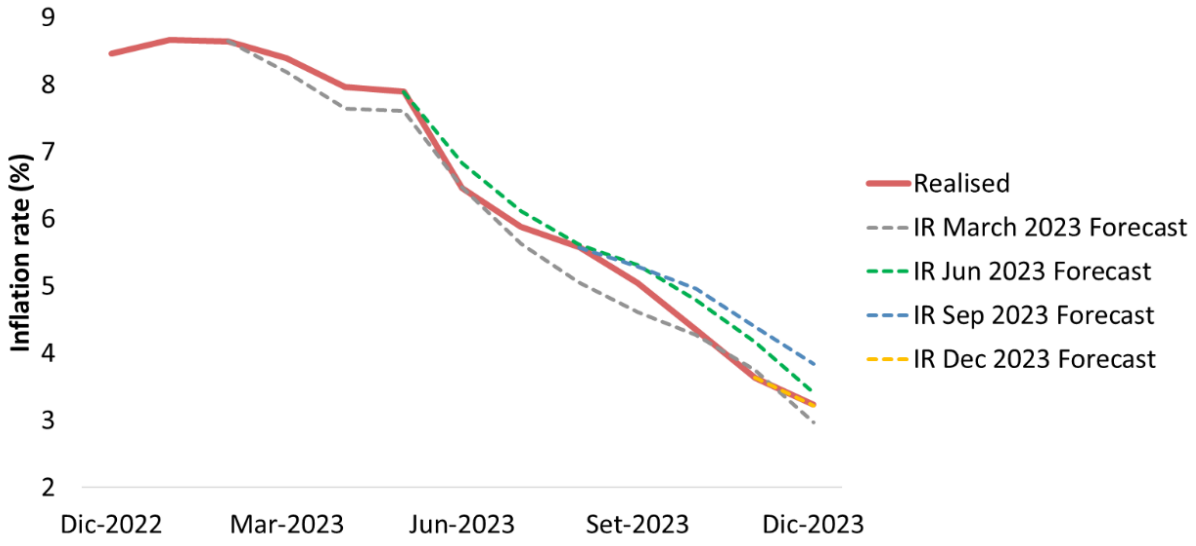
The September 2023 report marked an increasing turning point (see Graph B5). The BCRP made a significant downward revision to its 2023 GDP growth forecast, from 2.2% in June to just 0.9%. The report's wording explicitly acknowledged the surprise, stating that the supply shocks "had a greater than anticipated impact". The FEN was no longer a background risk; the baseline scenario was updated to assume a "moderate" FEN, with with communications from the Multisectoral Commission for the National Study of the El Niño Phenomenon (Comisión Multisectorial encargada del Estudio Nacional del Fenómeno El Niño, ENFEN)" communications now considering a "moderate to strong" event to be almost certain. The primary upside risk to the inflation projection was now clearly identified as a potential "strong or severe FEN event in the summer of 2024".

The December 2023 report presented the final diagnosis of the year's shocks. The 2023 GDP forecast was revised down again to a contraction of 0.5%. The report's box 1, "Shocks that affected the Peruvian economy in 2023" quantified the magnitude of the surprise. It estimated that the series of shocks subtracted a total of 2.7 percentage points from GDP growth. The FEN alone was responsible for a –1.1 percentage point impact, making it the single largest shock of the year. The balance of risks for the inflation projection noted a reduced upside bias compared with September, but the primary risk remained the potential for a strong FEN in early 2024.

This episode demonstrates how the BCRP's analytical framework is designed not for perfect foresight but for adaptation (see Graph B6). The sequential changes in the balance of risks, the fan charts and the official wording of the reports allowed the BCRP to transparently communicate its evolving assessment of the economy, providing a clear rationale for its policy decisions in a period of significant and unexpected disruption.

Realised inflation and baseline forecasts of inflation during 2023

Graph B6

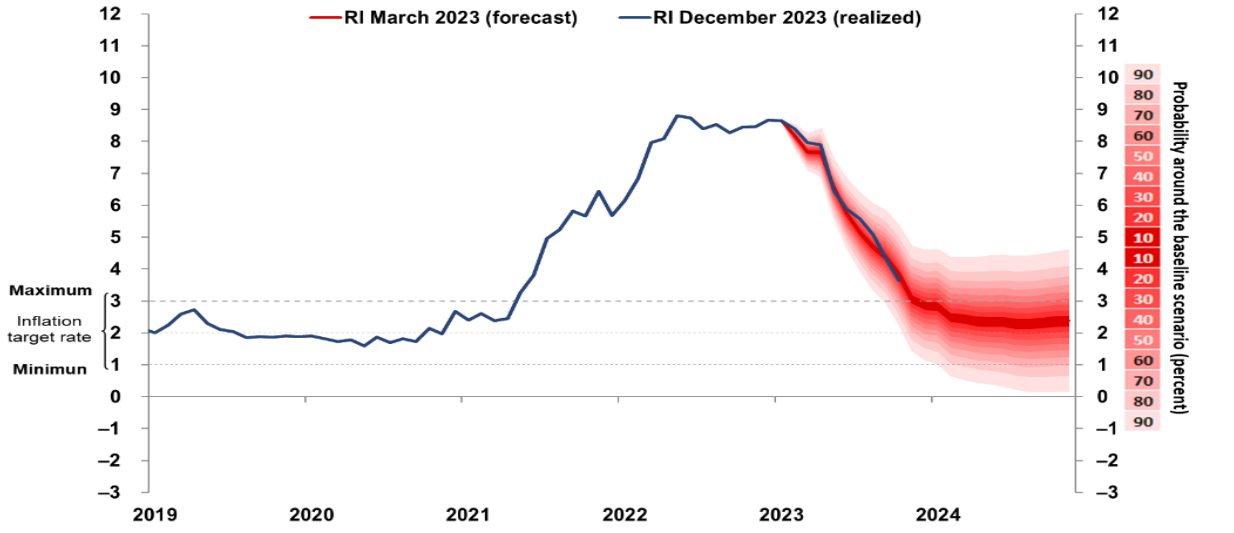


Note: IR = Inflation Report

While the observed inflation at the close of 2023 ultimately aligned with the initial annual forecast, the projection itself was subject to volatility throughout the year. Inflation was sometimes higher than expected (particularly in September) due to inflationary pressures stemming from a greater-than-anticipated impact of El Niño, which necessitated mid-year forecast revisions (see Graph B7).

Realised inflation in 2023 and 2023 March Inflation Report fan chart

Graph B7



3.1 Measuring uncertainty with the core model

The MPT is a semi-structural model and serves as the core of the forecasting framework (see Box 4). This model framework ensures the coherence of the initial point, different forecasts of exogenous variables, estimation of unobservable variables and expert judgment.

Given its important role, the MPT is designed to be versatile and flexible, capturing various forms of structural uncertainty, such as: (i) the nature of shocks (whether they are temporary or persistent, and whether they disrupt other model relationships); (ii) parameter uncertainty (for example, the slope of the Phillips curve or the degree of inertia in expectations); and (iii) model misspecification (such as linearity versus nonlinearity or the omission of mechanisms like occasionally binding constraints).

For instance, adjustments have been made to the MPT to account for shifts in Phillips curve inertia, changes in expectation dynamics and the introduction of a two-stage treatment for unanticipated shocks. These modifications ensure that the model remains relevant as the nature of shocks evolve. Therefore, alternative central scenarios are generated under coherent changes to the model's framework, maintaining internal consistency. For example, to simulate a risk scenario that captures the non-linear and state-dependent behaviour of inflation during a period of high inflation within the MPT framework, the modelling strategy consisted of increasing the inertia parameters for the persistence of core inflation and inflation expectations. To ensure rigour, the calibration exercise set the persistence parameters in the Phillips curve and the inflation expectation formation equation to the upper bound of the estimated parameter range (the 90% confidence interval), as reported in Aguirre et al (2023).

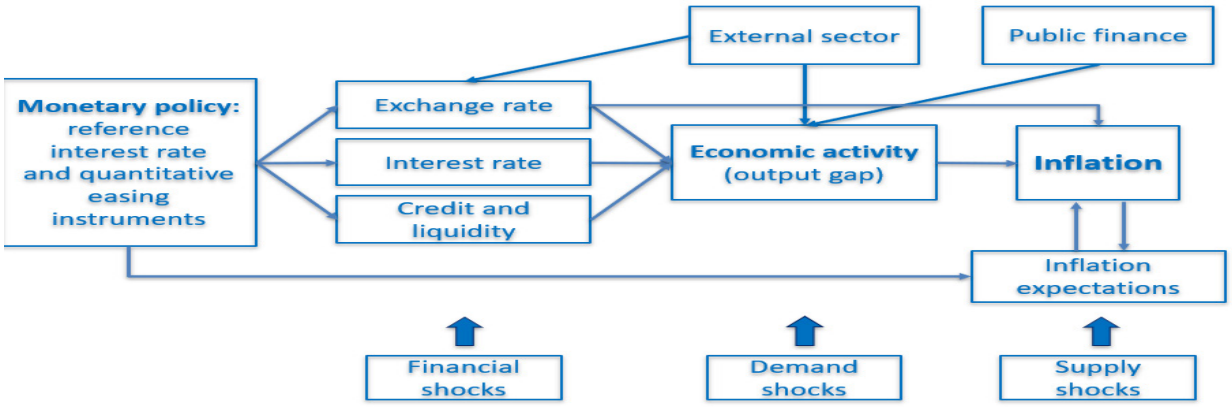
Further, by systematically altering exogenous assumptions and shock paths within the MPT, the BCRP can quantify their effects on inflation and economic activity. This process adds discipline and coherence to forecasting and strengthens the assessment of uncertainty. For example, economic and policy uncertainty plays a critical role in shaping business investment and confidence, which in turn influences overall economic growth. Private investment, in particular, is closely linked to business confidence (see Graph 4). Moreover, there is a strong correlation between non-residential investment, and the two-quarter lagged value of the business confidence index. During periods of heightened domestic or external uncertainty, shocks to business confidence weaken aggregate demand and exert downward pressure on inflation. To capture these dynamics, the MPT framework accommodates confidence shocks by adjusting their projected paths and their impact on future aggregate demand. The judgment of the staff about the duration and intensity of these shocks are disciplined by the structure of the MPT, ensuring coherence in both baseline and risk scenario forecasts.

Box 4

The BCRP Quarterly Projection Model[11]

The Quarterly Projection Model (QPM or MPT in Spanish) is one of the models that the Central Reserve Bank of Peru (BCRP) uses to monitor the economy and prepare projections. It is a semi-structural model, inspired by the New Keynesian tradition, which combines theoretical models with micro foundations and the flexibility of empirical approaches. This versatility allows it to capture relevant mechanisms for monetary policy and adapt to changes in the economic environment. Various versions of the QPM have been documented by Vega et al (2009), Winkelried (2013) and Aguirre et al (2023). A simplified version of its main characteristics is presented in Graph B8.

Determinants of inflation and monetary policy transmission mechanisms — Graph B8



Source: Inflation Report BCRP 2023.

Main relationships

- Inflation

$$\pi_t = c_{sae}\pi_t^{sae} + (1 - c_{sae})\pi_t^{ae}$$

In the QPM, inflation (π_t) is divided into the inflation excluding food and energy(π_t^{sae}), as the trend measure, and the food and energy inflation (π_t^{ae}) , which is more volatile.

The inflation excluding food and energy (π_t^{sae}) follows a Phillips curve for an open economy that incorporates imported inflation in soles, an inertial component, four-quarter-ahead expectations, and the output gap.

$$\pi_t^{sae} = b_m\Pi_t^m + (1 - b_m)[b_{sae}\pi_{t-1}^{sae} + (1 - b_{sae})\Pi_t^e] + b_y\left[c_y y_t + \left(1 - c_y\right)y_{t-1}\right] + \varepsilon_t$$

In this way, trend inflation is determined by three main forces: the pass-through of the exchange rate and international prices, the impact of the output gap on costs and margins, and the role of expectations, which can amplify shocks or help anchor them.

The food and energy inflation (π_t^{ae}) reflects transitory supply shocks with inertial persistence.

$$\pi_t^{ae} = \rho_{\pi_t^{ae}}\pi_{t-1}^{ae} + \left(1 - \rho_{\pi_t^{ae}}\right)[b_s\pi_t^{sae} + (1 - b_s)\pi_t^m] + \varepsilon_t$$

Its dynamics depend on domestic inflation inertia itself, four-quarter-ahead expectations, and changes in external relative import prices. Thus, it reflects an incomplete and persistent exchange rate pass-through, associated with nominal rigidities and market segmentation. Given its predominantly transitory nature, more volatile inflation usually arises from supply shocks which, in general, do not require monetary policy responses.

[11] Prepared by Luis Yepez.

- Output gap

$$y_t = a_{y^e}[y_{t-1} + x^e_{t+1}] + a_y y_{t-1} - a_\psi \psi_{t-1} + a_{\tau^{px}} \tau^{px}_t - a_{\tau^{pi}} \tau^{pi}_t + a_q q_t + a_{y^*} y^*_t - a_t t_t + a_g g_t + \varepsilon_t$$

The output gap (y_t) is modelled with an demand curve structure for open economies, where activity responds to both domestic and external factors. Its dynamics are explained by expectations about future developments, its lags, financial conditions summarised in the Real Monetary Conditions Index (RMCI), the real exchange rate gap as a measure of external competitiveness, and the activity of trading partners. The model also separates the effects of export and import prices and distinguishes between fiscal shocks from spending and revenue, which allows the estimation of specific multipliers and a more precise measurement of how different shocks – domestic or external – are transmitted to the economy.

- The monetary policy rule

$$i_t = \rho_i i_{t-1} + (1 - \rho_i)[i^n_t + f_\pi \, \hat{\Pi}^e{}_{t+4} + f_y\big[c_{fy} y_t + \big(1 - c_{fy}\big) y_{t-1}\big] + \varepsilon_t$$

The monetary policy rule (i_t) is forward-looking: the policy rate responds to the deviation of expected inflation, excluding food and energy, four quarters ahead from the target, as well as to the current and lagged output gap. It is calibrated relative to the natural interest rate, which allows evaluating the monetary stance, and incorporates an inertial component that moderates the adjustment pace to avoid abrupt changes that could generate financial instability or excessive volatility.

- Real Monetary Conditions Index (RMCI)

$$\psi_t = c_{rmn} r^{mn}_t + c_{rme} r^{me}_t$$

The RMCI (ψ_t) summarises the impact of financial conditions on aggregate demand. It combines the gaps of domestic and foreign interest rates in soles, together with the exchange rate risk premium, which reflects the effects of depreciations on agents with foreign currency liabilities, particularly relevant in economies with dollarisation and currency mismatches. A tightening of financial conditions – whether through higher real interest rates or an increase in the risk premium – makes financing more expensive and restricts consumption and investment, reducing economic activity; weaker financial pressures generate the opposite effect.

- Fiscal sector

$$t_t = \rho_t t_{t-1} + \varepsilon_t$$
$$g_t = \rho_g g_{t-1} + \varepsilon_t$$

The model distinguishes between the fiscal shock from public spending (g_t) and from tax revenue (t_t), which allows for the estimation of specific multipliers instead of assuming a single net fiscal shock. This disaggregation provides a more precise view of the impact of each instrument on aggregate demand: public spending generates a faster stimulus, while tax collection exerts a more gradual contractionary effect.

- External sector and exchange rate determination

$$\tau^{\mathrm{px}}_t = \left(a_{\tau_{\text{largo}}} + a_{\tau_{\text{carto}}}\right)\tau^{\mathrm{px}}_{t-1} - a_{\tau_{\text{largo}}} a_{\tau_{\text{carto}}} \tau^{\mathrm{px}}_{t-2} + \left(a_{\tau_{\text{largo}}} - a_{\tau_{\text{corto}}}\right)\frac{\pi^{x\$}_t - \pi^*}{4} + \varepsilon^{\mathrm{pc}}_t$$
$$\tau^{\mathrm{pi}}_t = \left(a_{\tau_{\text{largo}}} + a_{\tau_{\text{carto}}}\right)\tau^{\mathrm{pi}}_{t-1} - a_{\tau_{\text{largo}}} a_{\tau_{\text{corto}}} \tau^{\mathrm{pi}}_{t-2} + \left(a_{\tau_{\text{largo}}} - a_{\tau_{\text{carto}}}\right)\frac{\pi^{ms}_t - \pi^*}{4} + \varepsilon^{\mathrm{pi}}_t{}^{\mathrm{pi}}$$

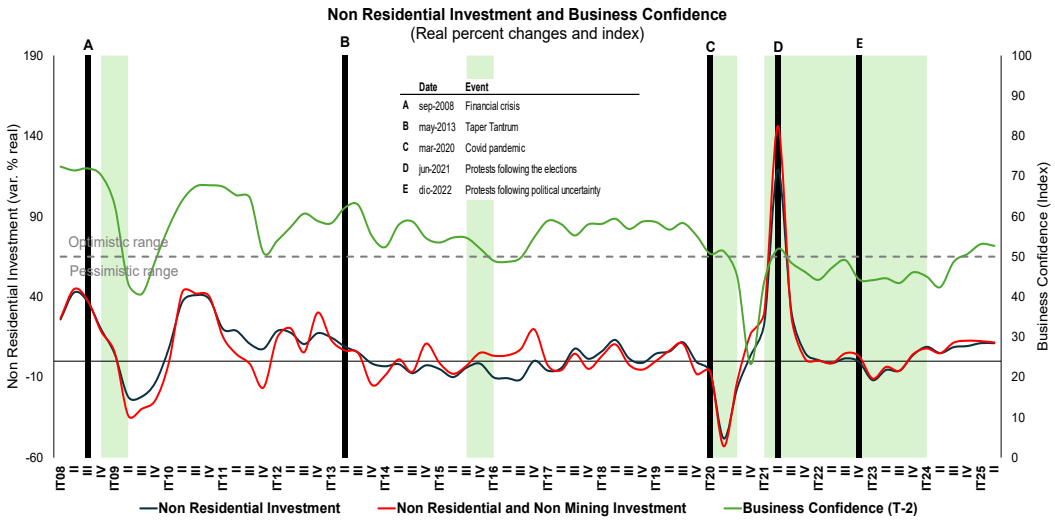
Export (τ^{px}_t) and import (τ^{pi}_t) prices are modelled as autoregressive processes that capture their persistence and intrinsic dynamics. Imported inflation arises when nominal depreciation or higher international prices make imported goods more expensive, reducing purchasing power. However, nominal rigidities and market segmentation make the exchange rate pass-through incomplete and persistent, extending inflationary pressures well beyond the initial shock. Moreover, an increase in export prices strengthens the external position and stimulates domestic demand.

$$\lambda_t = \rho_\lambda E_t \lambda_{t+1} + (1 + \rho_\lambda)[i^{m\epsilon}_t + \xi_t - i^{mn}_t + \varepsilon_t]$$

Uncovered interest rate parity (λ_t) determines nominal depreciation as a function of expected depreciation, the interest rate differential and a risk premium – composed of country and exchange rate risk – that responds to external shocks and to the evolution of export prices. An increase in export prices strengthens the external position, reduces the risk premium, moderates nominal depreciation and limits exchange rate pass-through to inflation. In this way, parity links external conditions with internal stability, contributing to the reinforcement of both macroeconomic and financial stability.

Private investment and business confidence

Graph 4



Correlations with Business Confidence

	IT. 2008-IVT. 2019	IT. 2008-IT. 2024
Private Investment (T+1)	0,81	0,28
Residential Investment (T)	0,51	0,08
Investment Non Residential (T+2)	0,84	0,38
Investment Non Residential and Non Mining (T+2)	0,74	0,27

[1] Green bars denote periods during which the three-month business confidence index remained in the pessimistic range (below 50).

Sources: BCRP Inflation Reports.

4. Monetary policy decisions and uncertainty

To address data uncertainty, the Board reviews the evolution of various sectoral and granular indicators that relate to key macroeconomic aggregates. For example, to assess inflation trends, the Board examines inflation expectations derived from macroeconomic surveys of financial and non-financial firms, as well as economic analysis. These are reviewed alongside core inflation indicators and the year-on-year variation of the different components of the Consumer Price Index (CPI). A similar approach is taken for evaluating economic activity, using sectoral data to validate broader trends.

As previously discussed, the MPT faces two main sources of uncertainty: statistical and misspecification. The first relates to the possibility that the model fails to capture all underlying relationships between variables – such as nonlinearities – or omits important variables due to data limitations. The second concerns the risk that estimated coefficients deviate from their true values, as they are derived from limited historical data. In light of these limitations, sensitivity scenarios are developed to evaluate how monetary policy should respond to different macroeconomic conditions and projections.

Additionally, to support the process of monetary policy decisions under uncertainty, the forecasting framework incorporates simulations of alternative policy scenarios. These simulations begin with a set of baseline assumptions and explore how different policy responses might influence macroeconomic outcomes. This approach allows the Board to assess the robustness of their decisions and anticipate potential trade-offs.

A common reference point in these simulations is the Taylor rule, which provides a systematic guideline for setting the policy interest rate based on deviations of inflation from its target and output from its potential. Deviations from the Taylor rule are explicitly modelled to evaluate their implications for inflation, output and financial stability.

Policy scenarios can also account for potential nonlinearities in the economy, which can significantly alter the effectiveness of policy responses. These can include deviations from the uncovered interest parity condition, reflecting shifts in investor sentiment as well as changes in country risk or external shocks. These factors help to assess the impact of exchange rate dynamics on inflation and monetary transmission. They also include high- versus low-inflation regimes, to account for adjustments in expectations and potentially greater persistence in core inflation, as well as negative interest rate differentials, when domestic interest rates fall below external rates, which may weaken the transmission of monetary policy.

5. Monetary policy in times of high uncertainty: flexibility, predictability and communication

During periods of heightened volatility, the formulation of monetary policy decisions involves a complex set of considerations. A primary requirement is that the Board operates based on a comprehensive information set, supported by analytical models capable of generating alternative policy paths and delineating uncertainty bounds. This modelling framework is complemented by expert judgment and insights drawn from international experience, thereby enhancing the robustness and credibility of the decision-making process.

This analytical foundation is inseparable from the communication strategy and the challenges that uncertainty imposes on it. The BCRP is characterised by a data-dependent approach to policy decisions, which provides greater flexibility. Consistent with this approach, the Bank's forward guidance has traditionally been qualitative, avoiding explicit thresholds for changes in the policy stance.[12] Monetary policy statements, however, include reference projections regarding the convergence of inflation towards the target range – typically around the midpoint – without specifying a precise horizon.

A key feature of this qualitative guidance is the inclusion of a paragraph in the monetary policy statement in which the Board commits to remaining vigilant and

[12] See Contreras (2014). Herrada et al (2020) include summaries of forward guidance practices in South America. According to Evdokimova et al (2023), the practice of qualitative forward guidance is common among emerging market economy central banks and reflects the need for flexibility under high volatility.

taking all necessary measures to achieve its price stability objective. This formulation compensates for the absence of explicit commitments on the future path of the policy rate by reinforcing the credibility of the inflation target.

This strategy – emphasising inflation projections while refraining from explicit statements on the policy rate path – has proved effective in anchoring expectations and maintaining price stability. The rationale for this approach is closely linked to Peru's monetary policy experience during major global crises. Unlike central banks in advanced economies, which reached the zero lower bound during the Great Financial Crisis and resorted to quantitative easing and explicit forward guidance, the BCRP stabilised the economy using instruments familiar to the market. These included policy rate reductions, adjustments to reserve requirements, liquidity provision through repos and foreign exchange interventions.

It was only during the Covid-19 crisis in 2020 that the policy rate reached 0.25%, a situation that proved short-lived. Inflation that year stood at 1.97%, close to the 2% midpoint of the target range. This outcome reinforced the effectiveness of the existing framework and validated a communication strategy aligned with pre-global crisis norms – one that prioritises flexibility, clarity and a strong commitment to the inflation target without reliance on explicit numerical guidance.

5.1 Communicating uncertainty

The BCRP communicates uncertainty mainly through its Inflation Report, which is published quarterly. In this report, the BCRP presents a baseline macroeconomic scenario together with fan charts for inflation and GDP growth, which explicitly show the probability distribution of future outcomes. By doing so, the BCRP acknowledges the uncertainty around its projections and highlights that actual results may differ depending on domestic and external shocks.

Additionally, monetary policy statements, press releases and other publications often emphasise the balance of risks surrounding the inflation forecast, identifying upside and downside risks such as commodity price volatility, capital flow reversals or domestic supply shocks. This combination of quantitative tools (fan charts) and qualitative assessments (risk balance discussion) allows the BCRP to clearly express to markets and the public that monetary policy decisions are made under uncertainty. This analysis is made in each process of monetary policy decision-making.

The BCRP applies qualitative guidance in its monetary policy decision statements. They are characterised by not explicitly mentioning projections of the reference interest rate. Examples of BCRP communications include the following statements:

- *"Future reference rate adjustments will be conditional on new information about inflation and its determinants"* (August 2025).
- *"The Board is particularly attentive to new information on inflation and its determinants, including the evolution of core inflation, inflation expectations, and economic activity, to consider, if necessary, changes in the monetary stance. The Board reaffirms its commitment to adopt the necessary actions to maintain inflation within the target range"* (September 2025).

Examples during turning points (starting to raise or lower the policy rate):

- *"The Board considers it appropriate to maintain an expansionary stance as long as the negative effects of the pandemic on inflation and its determinants persist and*

is especially attentive to new information referring to inflation expectations and the evolution of economic activity to consider, if necessary, changes in the monetary policy position. The BCRP will continue to take the necessary steps to sustain the payments system and credit flows. Financial markets were highly volatile in a context of uncertainty and the BCRP's actions were intended to mitigate this volatility" (August 2021).

- *"This decision does not necessarily imply a sequence of interest rate reductions. Future reference rate adjustments will be conditional on new information about inflation and its determinants"* (September 2023).
- *"The Board is particularly attentive to new information on inflation and its determinants, including the evolution of inflation expectations and economic activity, to consider, if necessary, additional changes in the monetary stance. The Board reaffirms its commitment to adopt the necessary actions to ensure the return of inflation to the target range over the forecast horizon"* (September 2023).

With respect to communication on uncertainty, monetary policy statements include, when appropriate, a paragraph on risks arising from different events that generate uncertainty. Examples of such paragraphs include:

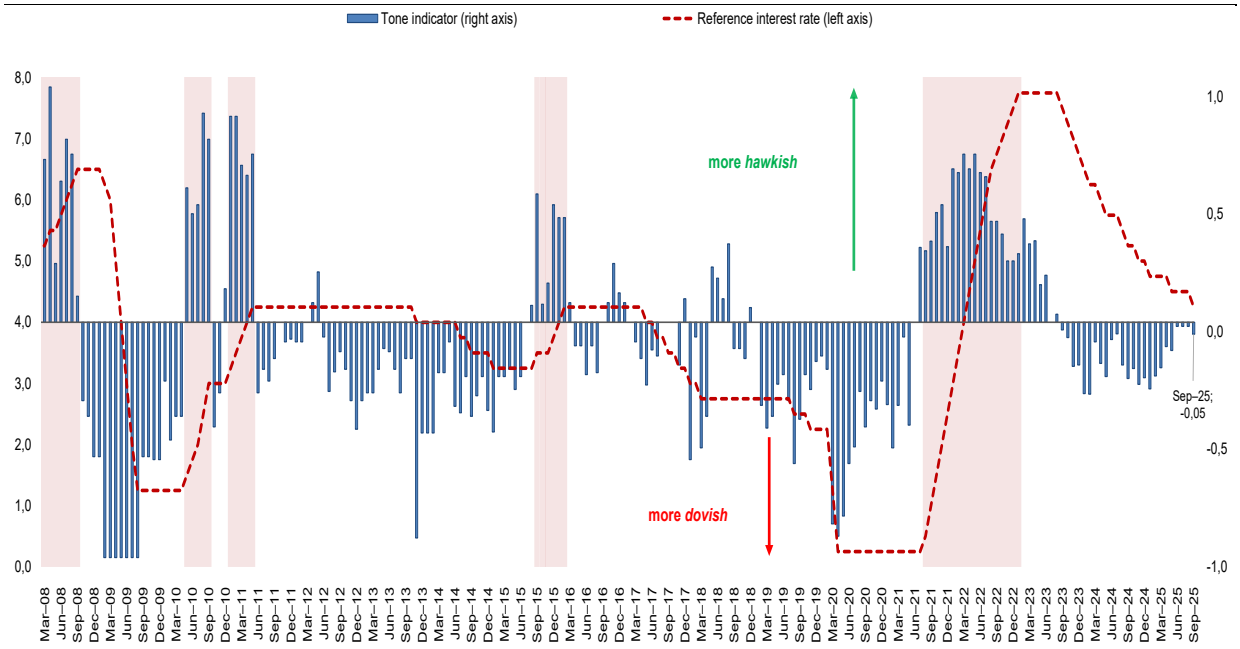
- *"The outlook for global economic activity continues to be affected by the restrictive measures on international trade, with a downward bias in the medium term given the high uncertainty about its effects on the global economy"* (September 2025).
- *"The outlook for global economic activity points to moderate growth as a gradual monetary policy normalization continues in most advanced economies. Uncertainty persists regarding the impact of trade policies, as well as the risks arising from international conflicts"* (January 2025).

Additionally, in each quarterly Inflation Report, the BCRP publishes a section that explains its decision-making process. This communication strategy seeks to reinforce the reasoning behind its decisions. It also includes the Monetary Policy Tone Indicator (Graph 5), where policy statements are assessed as hawkish, dovish or neutral. This index captures signals of changes in the BCRP's stance by considering actual data, outlook, expectations and the international context within which concerns about uncertainty are incorporated. The frequency of estimation of this index is aligned with the monetary policy decision process and the publication of the monetary policy statement.

Other indices more closely related to uncertainty that are analysed in the BCRP's decision-making process are the Trade Policy Uncertainty Index (TPU Index based on Caldara et al (2020)) (Graph 6) and the Cboe Volatility Index (VIX) (Graph 7). While these indices are representative of the international context, they are useful in assessing monetary conditions and how they might affect Peru, given that it is an economy exposed to external shocks.

Reference interest rate and monetary policy tone indicator*

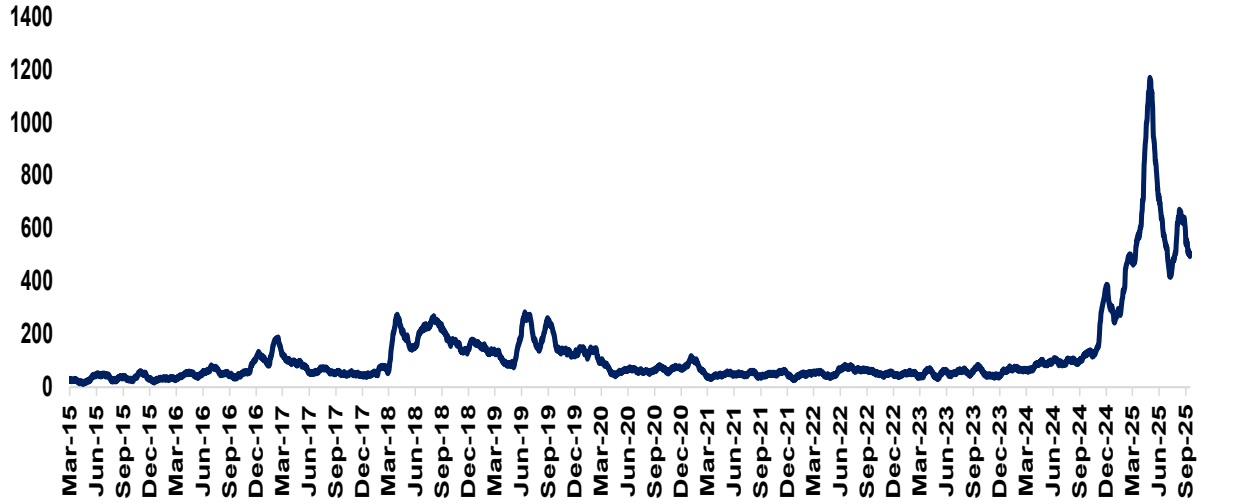
Percentage and index value — Graph 5



* For the monetary policy tone indicator, positive index values indicate a tone in favour of a contractionary stance, while negative values imply communication with an expansionary stance. The light red shaded areas correspond to periods of interest rate hikes.

Trade Policy Uncertainty Index (TPU Index)*

30-day moving average of the index at daily frequency — Graph 6



* As of 15 September 2025.

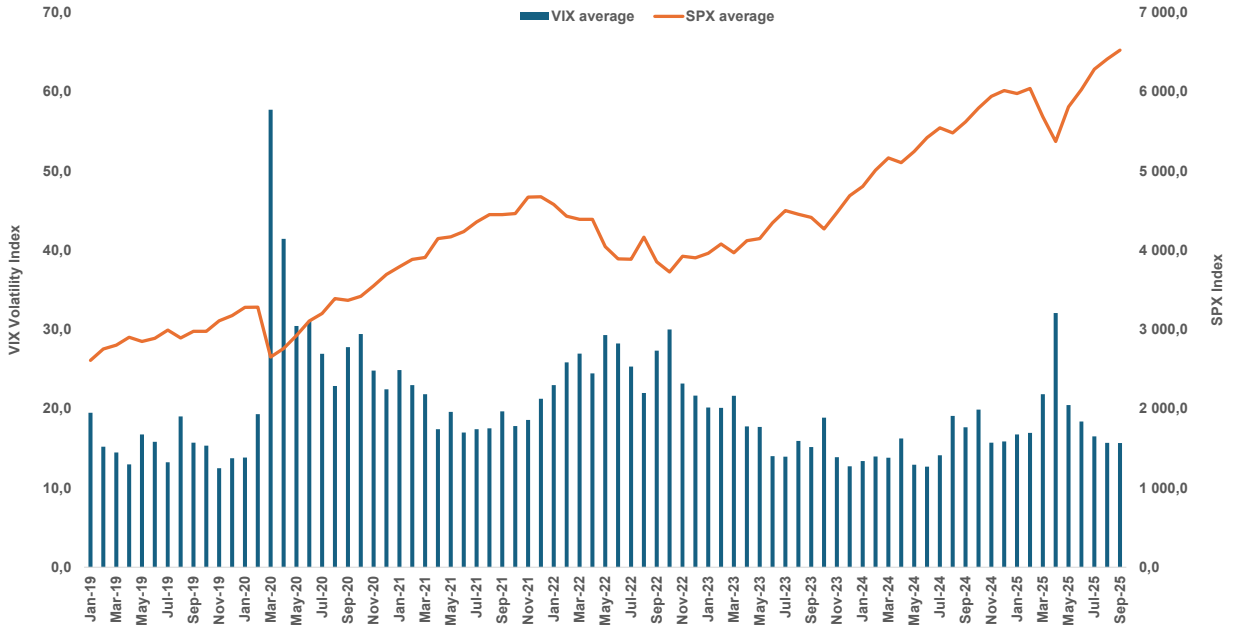
Source: Caldara et al (2020).

Retrieved from matteoiacoviello.com/tpu_files/tpu_web_latest.xlsx.

Cboe Volatility Index (VIX) and the US stock market (S&P 500)*

Monthly average

Graph 7



* As of 17 September 2025.

Source: Bloomberg.

5.2 Communicating alternative scenarios

Alternative scenarios are highly useful for the BCRP, as the Peruvian economy is particularly exposed to external shocks (eg commodity prices, global financial conditions) and domestic supply shocks (eg climate events such as El Niño). By presenting alternative scenarios, the BCRP helps market participants and the public understand how monetary policy could respond under different conditions, thereby strengthening the credibility of its mandate to maintain price stability. For instance, scenarios that consider higher commodity prices, more restrictive global financial conditions or stronger-than-expected domestic demand allow the BCRP to illustrate the potential impact on inflation and output, and explain how its policy stance might adjust. This not only improves the transparency of monetary policy but also manages expectations by showing that the BCRP has a systematic framework to respond to different shocks.

In the quarterly Inflation Report, scenarios are presented in various ways. There is a baseline projection scenario over the horizon that is established by the report across all sectors (external, balance of payments, real sector, fiscal sector and monetary sector). Additionally, for some variables such as inflation and output, fan charts are shown to illustrate the probability that the outcomes of these variables will differ from the baseline scenario. Finally, in the risk balance, the potential impact of certain shocks on inflation over the projection horizon is presented. Therefore, the presentation of these scenarios reinforces the BCRP's commitment to act under different circumstances, which supports the monetary policy communication process.

6. Conclusions

The BCRP's risk management strategy is designed to enhance the pass-through of the policy rate across the financial system and mitigate risks associated with financial dollarisation. By employing a hybrid approach that combines the benchmark rate with other monetary policy instruments, such as injection and sterilisation operations, reserve requirements and foreign exchange market interventions, the BCRP ensures market functioning and reduces excessive volatility.

The BCRP's monetary policy framework is designed to be flexible and adaptable to a dynamic and evolving economic environment. This adaptability is supported by an integrated macroeconomic forecasting system that continuously refines the policy stance based on new information.

The BCRP's success in managing monetary policy is contingent upon effective risk assessment and the ability to navigate various sources of uncertainty. This involves evaluating potential economic scenarios and incorporating expert judgment into policy design and implementation

Finally, the BCRP's communication strategy, which includes the use of fan charts and qualitative assessments of risks in its Inflation Report, plays a crucial role in helping markets and the public understand the possible direction of future monetary policy.

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