

Peru

Economic Watch

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Economic Analysis

Peru

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Upward trending inflation in 2011: the 2008 story again?

- **The inflation outlook for this year appears to be complicated due to a strong economic growth and high commodities prices.**
- **We estimate the output gap to turn positive in 2011**, which would eventually reflect as demand pressures on prices.
- **The rally observed in food and energy commodities prices over recent months may have more significant impacts** on firms' costs onwards. Such transmission is more likely to occur in the expansion phase of the business cycle and could lead to second round effects.
- **We expect the Central Bank to react preemptively in order to avoid inflation expectations contagion.** In this context, the policy interest rate would be raised up to 4,0%-4,50% at the end of 2011 and reserves requirements would remain high.
- **With monetary tightening and inflation expectations within the target range, we expect inflation to reach a level around 3,0% at the end of 2011.** A timely policy reaction and increases in commodities prices that have been less marked than in 2008 curb the risks of higher inflation.

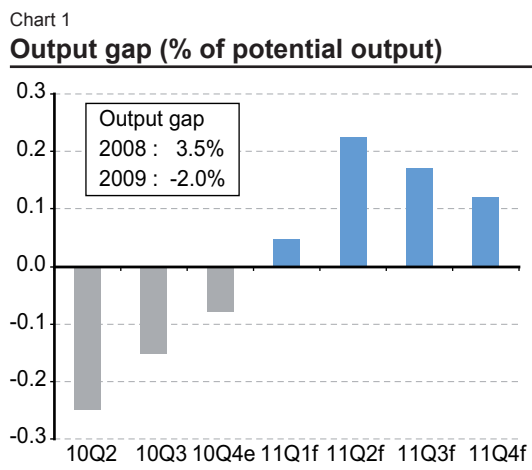
Both a strong economic growth momentum and high commodities prices are generating concerns of inflationary pressures that could turn to be significant in the coming months. This situation reminds us of that between mid-2007 and mid-2008, which resulted in an inflation expectations sizeable upwards correction, prices increasing at a pace that exceeded 6% year-on-year, and, in this context, a strong monetary policy tightening. Are we now facing a similar situation?

Economic activity will continue growing ahead of potential in 2011, creating demand pressures...

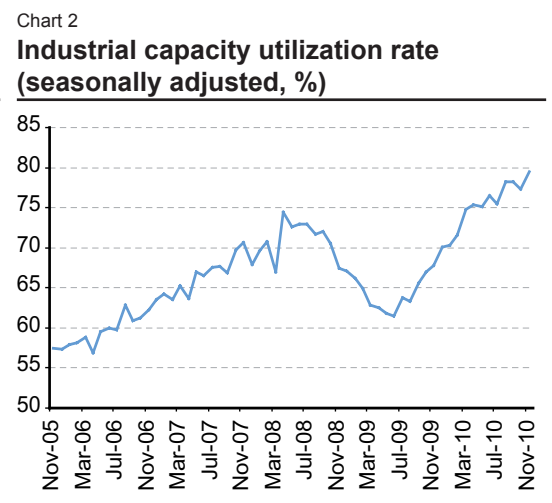
2010 saw a strong economic growth of around 9%. Private spending recovered, increasing its support for GDP and favoring the beginning of a gradual moderation in public spending. However, in spite of high growth, inflation remained contained around the centre of the Central Bank’s target range (2%, +/- 1pp), in part explained by an output gap that remained negative throughout the year.

Although leading indicators point to a slight deceleration in the fourth quarter of 2010, growth is still beyond potential (around 6%). As a result, we estimate the negative output gap to have closed at the end of last year and, based on our forecast for 2011 above 7%, it would become positive over the coming months (see **chart 1**). The industrial capacity utilization rate supports this view: it is currently at historically high levels (see **chart 2**) and trending upwards. Even though there is still some slack in the sector as a whole, sub-sectors such as dairy, beer and malt, and oil and fat industries are operating very close to full capacity. In this context, in 2011 85% of firms will increase wages, particularly for middle-managers, according to a survey by Apoyo Consultoría. Around half of these firms believe that these increases could be significant. In summary, the strength of demand in 2011 will exert higher upwards pressure on prices of final goods and services than last year.

Core inflation, which ended 2010 at 2,1%yoy, captures in a better way demand-driven inflation. According to our estimate of the Phillips curve (see **Methodology annex**), the core component of inflation will increase by between 0,5 pp and 0,6 pp by the end of 2011. A similar result is obtained by carrying out an autoregressive structural vector analysis using the methodology of Quah and Vahey (1995)¹, according to which the core component of inflation is that which has no effect on real output over the medium and long term. Based on our expectations for the output gap during 2011, core inflation will be around 2,7% at year end.



Source: BCR and BBVA Research Peru



Source: BCRP and BBVA Research Peru

It should be noted that there are a number of factors which will, to a certain extent, offset the increase in prices in 2011. Firstly, the appreciation of the PEN (around 4% by the end of the year) will in part offset increases in housing rentals and, in general, prices set in USD. This factor has been included in the estimated Phillips curve. In addition, the recent reduction in customs duties and some free trade agreements coming into effect will have some additional impact in the same way, particularly on prices of electrical appliances and textiles.

1: Quah D. and Shaun P. Vahey (1995). "Measuring core inflation", The Economic Journal, Volume 105, pp: 1130-1144.

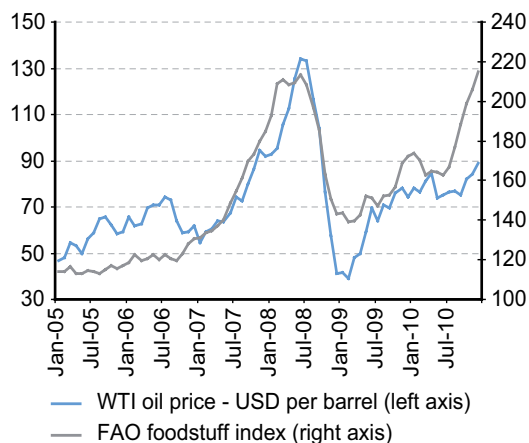
... high agricultural and oil commodities prices will have more significant impacts on costs this year...

The second component of inflation, in addition to the core measure, takes into account those changes in the most volatile prices of goods in the consumer basket. This measure of non-core inflation includes some foodstuffs, goods and services with administered prices (public tariffs and fuel) and transportation. This component of inflation –which has a weight of a little over one third of the total- includes the direct impact of international prices of food commodities and oil prices.

It should be remembered that these international prices reached their peaks around mid-2008. In the case of agricultural *commodities*, prices have returned to the levels of that period, according to the FAO food prices index, whilst oil prices recently broke through USD 90 per barrel, a level comparable to that of October 2008 (see **chart 3**). The common elements behind these trends include a more positive outlook for global economic recovery and high levels of international liquidity, together with inventories in some cases being at relatively tight levels.

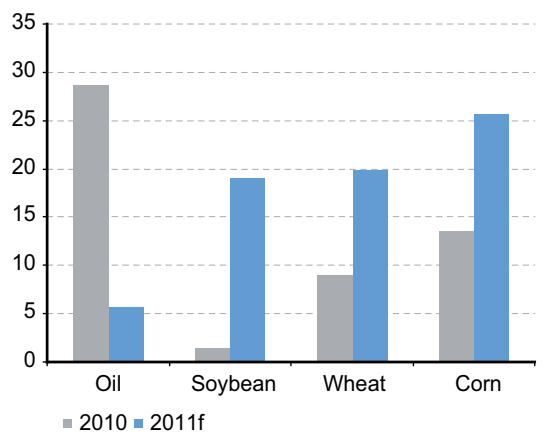
In this context, there are concerns about impacts on the non-core inflation component. In terms of locally produced foodstuffs which use imported commodities (soy, corn, and wheat), our forecasts suggest that such prices will increase to such an extent that jointly they will have an impact of 0,7 pp on overall inflation in 2011. This figure takes into account firstly that commodities prices will remain high this year (see **chart 4**). However, it is worth mentioning that the additional increase expected over the coming months is likely to be limited, with the trend being for a gradual reversal in the second half of 2011. This is based on some of the price increases to date being due to transitory supply problems (droughts, floods), which should start to be corrected over the coming months. Secondly, as suggested by the autoregressive vector estimates (see **Methodology annex**), the transmission to the prices of final goods is more significant around one year later, which means that the increases in *commodities* prices we have seen so far will have a more significant impact over the remainder of 2011. Finally, this increased transmission will be easier in a context of the output gap becoming positive.

Chart 3
Food and energy commodities prices



Source: Bloomberg and FAO

Chart 4
Imported commodities prices (% change of average levels)



Source: Bloomberg and BBVA Research

In terms of fuel, we estimate that its direct impact on overall inflation will be around 0,3 pp in 2011. In this case, we expect international oil prices to tend to increase over the year, with the average price going up by 6%. This upwards forecast is supported by factors of a more permanent nature, unlike food commodities, with demand increasing as advanced economies continue to recover, whilst OPEC supply will not be able to keep up the pace. The estimated impact also includes a correction in 2011 of the lag local fuel prices already have compared to international prices, although adjusted for the maximum increase the regulator allows in the price bands. Changes to excise taxes have not been considered.

In turn, higher domestic fuel prices will have an upwards effect on transportation prices, which are another component of non-core inflation. Based on our previous result, the increase in prices for this item will have an effect on overall inflation of somewhat more than 0,4 pp.

In conclusion, the non-core inflation components most closely linked to commodities prices will have a joint effect of a little over 1,4 pp on overall inflation in 2011. Whilst significant, this joint impact is not as large as in 2007/8, during the last rally in commodity prices. In that period, the accumulated price

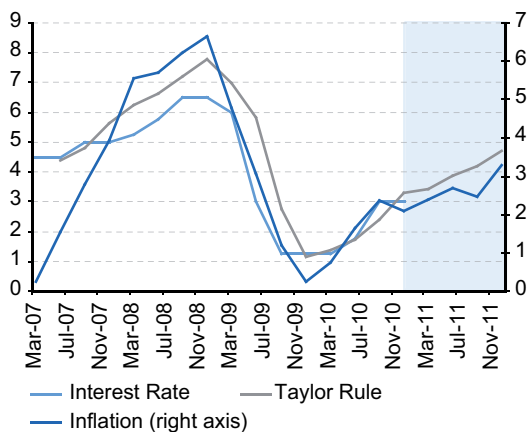
increase in the same set of goods on total inflation was almost double. In part this is because, although commodities prices have returned to their peaks, the rates of change have been less intense. For example, the FAO's food commodities price index reached a maximum of 60% year-on-year in 2008, whilst the maximum this time has been 25%; likewise, oil prices increased by 100% year-on-year in 2008 compared to 15% at present.

The monetary stance will be heading towards neutral in order to avoid any exacerbation of inflationary expectations

As a result of the estimates made, overall inflation in 2011 will stand between 3,0% and 3,4%. This is higher than the inflation rate of 2,1% in 2010, but we do not expect it to reach 2008 levels (6,7%).

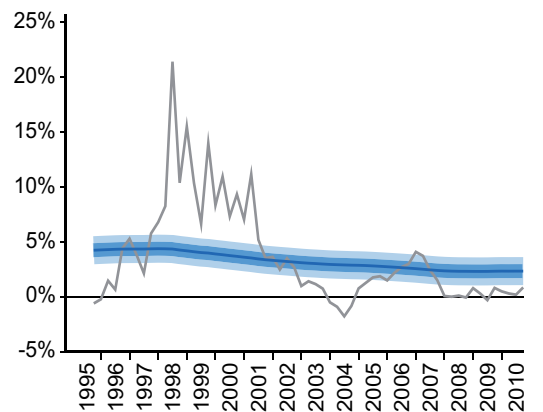
In spite of higher inflation being largely based on transitory increases in commodities prices (particularly foodstuff), we expect that over the coming months the Central Bank will maintain monetary policy tightening heading for a more neutral stance, thus acting preemptively. This would seem to be adequate in a context of an output gap which will soon become positive, and in which increased pressures on prices may have second round effects that could exacerbate inflationary expectations.

Chart 5
Inflation and policy interest rate (%)



Source: BCRP and BBVA Research Peru

Chart 6
Policy interest rate: neutral and actual level (in real terms)



Source: BCRP and BBVA Research Peru

As a result, we expect the policy interest rate to be gradually raised to a level between 4,0% and 4,5% at year-end, as suggested by a Taylor rule (see **chart 5**), close to neutral (see **chart 6**), and that reserves requirements shall remain high.

It should be noted that this scenario is consistent with a negative fiscal impulse in 2011 and with a positive, but slight, output gap (significantly lower than in 2008), whilst inflationary expectations will remain within the target range. Less favorable conditions, on the other hand, such as inflation expectations misaligning, would lead 2011 inflation in the same direction.

Methodology annex

Core Inflation

The core inflation component is forecast using the following Phillips curve using minimum ordinary least squares:

$$\pi_t^{core} = (1-\alpha) \pi_{t-1}^m + \alpha [0.8 \pi_{t-1}^{core} + 0.2 E_t(\pi_{t+1})] + \beta \gamma_{t-1}^{gap} + \varepsilon_t^{core}$$

where π_t^{core} is the year-on-year core inflation rate (end of period), $E_t(\pi_{t+1})$ is the one-year inflation expectations, γ_t^{gap} is the output gap and π_t^m is imported inflation (end of period). The latter is considered to behave as follows:

$$\pi_t^m = \delta \pi_{t-1}^m + \Phi \pi_{t-1}^{fuel} + (1-\delta-\Phi)(4\Delta e_{t-1} + \pi_{t-1}^{usa}) + \varepsilon_t^m$$

where π_t^{fuel} is fuel inflation, e_t is the nominal exchange rate and π_t^{usa} is foreign inflation (in the United States). The coefficients estimated (see table 1) are significant and have values similar to those found in earlier studies².

Table 1

Phillips curve

Coefficient	Estimated	Significance
Core Inflation		
α	0.98	1%
β	0.12	5%
Imported Inflation		
δ	0.59	1%
Φ	0.28	1%

Source: BBVA Research Perr

Pass-through of agricultural commodities to prices of final products

The analysis of the transmission of changes in agricultural commodities prices to local final products prices uses an autoregressive vector model based on the methodology of McCarthy (1999)³:

$$\pi_t^{fao} = E_{t-1}(\pi_t^{fao}) + \varepsilon_t^{fao}$$

$$\gamma_t^{gap} = E_{t-1}(\gamma_t^{gap}) + \alpha_t \varepsilon_t^{fao} + \varepsilon_t^y$$

$$\Delta e_t = E_{t-1}(\Delta e_t) + \beta_1 \varepsilon_t^{fao} + \beta_2 \varepsilon_t^y + \varepsilon_t^{\Delta e}$$

$$\pi_t^m = E_{t-1}(\pi_t^m) + \delta_1 \varepsilon_t^{fao} + \delta_2 \varepsilon_t^y + \delta_3 \varepsilon_t^{\Delta e} + \varepsilon_t^m$$

$$\pi_t^p = E_{t-1}(\pi_t^p) + \gamma_1 \varepsilon_t^{fao} + \gamma_2 \varepsilon_t^y + \gamma_3 \varepsilon_t^{\Delta e} + \gamma_4 \varepsilon_t^m + \varepsilon_t^p$$

$$\pi_t^c = E_{t-1}(\pi_t^c) + \Phi_1 \varepsilon_t^{fao} + \Phi_2 \varepsilon_t^y + \Phi_3 \varepsilon_t^{\Delta e} + \Phi_4 \varepsilon_t^m + \Phi_5 \varepsilon_t^p + \varepsilon_t^c$$

where π_t^c is consumer price inflation, π_t^p is producer price inflation (approximated by wholesale prices), π_t^m is inflation of imported prices, Δe_t is the change in the nominal exchange rate, γ_t^{gap} is the output gap (using an HP filter) and π_t^{fao} is foodstuff inflation based on the FAO index.

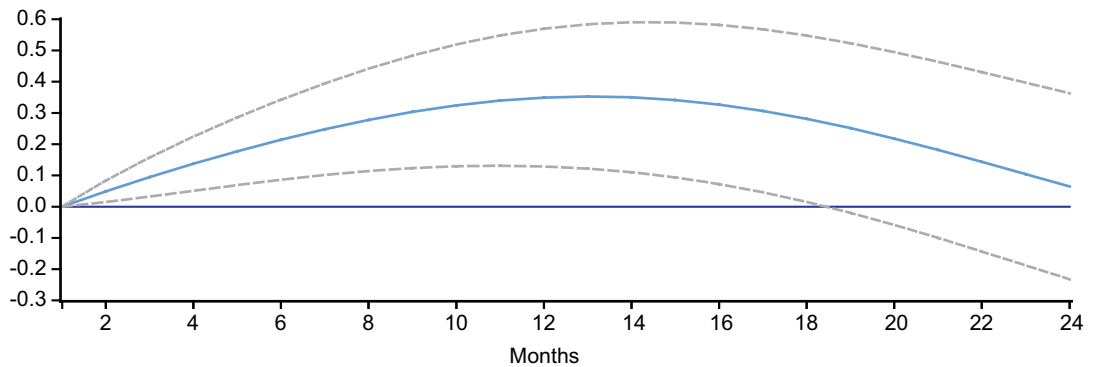
The main assumptions in this are: i) supply shocks are identified through the dynamics of global agricultural prices; ii) demand shocks are identified through changes in the output gap after taking into account the effect of the contemporaneous supply shock; and iii) external shocks are identified by the appreciation of the local currency after taking into effect contemporaneous demand and supply shocks. It is further assumed that imported and wholesale inflation can have a contemporaneous effect on consumer inflation, but not the other way round, and that the exchange rate affects all prices. Finally, it is assumed that expectations conditioned in the system can be replaced by linear forecasts of lags in system variables. As a result, the VAR is estimated using a Cholesky decomposition. The estimation period goes from January 2000 to December 2010, and takes into account a lag in accordance with the Schwarz information criterion. The confidence intervals for the impulse-response were obtained through 1000 Monte Carlo simulations.

2: See: Macroeconomic Models Department (2009) "Central Bank of Peru Quarterly Forecast", Central Reserve Bank of Peru, Working Document N° 2009-006; and Salas, Jorge (2010), "Bayesian Estimation of a Simple Macroeconomic Model for a Small Open and Partially Dollarized Economy", Central Reserve Bank of Peru, Working Document N° 2010-007.

3: McCarthy, Jonathan (1999) "Pass-Through of Exchange Rate and Import Prices to Domestic Inflation in Some Industrialized Economies", BIS Working Paper N° 79, Bank for International Settlements

Chart 7

Impulse-response for a shock (of one standard deviation) in agricultural commodities prices on overall inflation (percentage points)



Source: BBVA Research Peru

Taylor Rule

The Taylor rule was simulated using parameter values similar to those obtained by DMM (2009) and Salas (2010):

$$i_t = 0.8i_{t-1} + 0.2 * [i^{neutral} + 1.5 (\pi_t - \pi^{meta}) + 0.5 (0.5 y_t^{gap} + 0.5 y_{t-1}^{gap})]$$

As can be seen in the data, it was assumed that the Central Bank aims to smooth changes in the policy interest rate, which is expressed in the component i_{t-1} . The rule complies with the Taylor principle (i.e. the weight which the Central Bank gives to inflation is greater than one), which means that a 1 pp increase in inflation is accompanied by an increase policy interest rate in excess of 1 pp so that the real interest rate increases.

Neutral real interest rate

The neutral real interest rate is estimated using a state-space model based on the following VAR model (2):

$$r_t = \alpha_{1t} + \sum_{j=1}^2 \beta_{1,jt} r_{t-j} + \sum_{j=1}^2 \delta_{1,jt} y_{t-j}^{gap} + \sum_{j=1}^2 \gamma_{1,jt} \pi_{t-j}^{gap} + \varepsilon_{1t}$$

$$y_t^{gap} = \alpha_{2t} + \sum_{j=1}^2 \beta_{2,jt} r_{t-j} + \sum_{j=1}^2 \delta_{2,jt} y_{t-j}^{gap} + \sum_{j=1}^2 \gamma_{2,jt} \pi_{t-j}^{gap} + \varepsilon_{2t}$$

$$\pi_t^{gap} = \alpha_{3t} + \sum_{j=1}^2 \beta_{3,jt} r_{t-j} + \sum_{j=1}^2 \delta_{3,jt} y_{t-j}^{gap} + \sum_{j=1}^2 \gamma_{3,jt} \pi_{t-j}^{gap} + \varepsilon_{3t}$$

where r_t is the real ex-post interest rate (defined as the difference between the average interbank interest rate and current inflation), y_t^{gap} is the output gap and π_t^{desv} is the inflation gap. The gaps are obtained by applying a Hodrick-Prescott filter to seasonally adjusted GDP and inflation data, with a smoothing parameter of 1600. Quarterly data is used. The neutral rate is obtained from the states of the first VAR equation (2) in equilibrium with $\gamma_t^{gap} = \pi_t^{gap} = 0$:

$$r_t^* = \frac{\alpha_{1t}}{1 - \sum_{j=1}^2 \beta_{1,jt} r_{t-j}}$$

The states α_{1t} , $\beta_{1,1t}$, $\beta_{1,2t}$ are estimated using a smoothing factor on the states which is endogenous to the estimation.

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