The risk of negative inflation is real but does not necessarily signal deflation

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Since mid-2012, inflation has been falling regularly in the Eurozone, from +2.6% in August 2012 to +0.3% in November 2014. The fall has been fairly general, in terms of both the sectors and countries concerned. The effect has been stronger in the peripheral economies in the zone, but also marked in Germany and France.

Several reasons may explain this fall in inflation, notably low production capacity utilisation rates, the high unemployment level, an overall supply surplus in the economy and the fall in import prices driven by the past rise in the value of the Euro and the fall in oil prices. These factors are empirically significant and explain more than half of the disinflation observed in the Eurozone. A significant portion of that disinflation remains difficult to explain, however.

In the light of the existence of nominal rigidities and of the inflation expectation measurements that are available, the unexplained portion of past disinflation has not been carried forward in the forecast. In this hypothesis, core inflation should be relatively stable in France through to mid-2015, positive but very low. Analysing the historic breakdown of the differences between successive Conjoncture in France forecasts and the actual inflation figures, the probability of core inflation being negative in mid-2015 would seem to be around 30%. There is therefore a genuine risk of core inflation becoming negative on a sustained basis, although that is not the most likely scenario.

In the short term, this disinflation would be good news in that it should bolster purchasing power and hence domestic demand. Also, as it is affecting the Eurozone economies more specifically, the fall in prices in the zone relative to those of its competitors should allow gains in competitiveness similar to those when the Euro falls in value. Spain and France would thus be the main beneficiaries, as their exports are more sensitive to exchange rate variations than those of Germany, in particular.

Conversely, low inflation weighs down on those agents that are in debt and represents a risk of triggering a deflationary spiral, a risk that increases the longer it lasts. However, the risk of an episode of falling prices leading into such a spiral is difficult to forecast, in the absence of indicators to predict it. ■

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At the end of 2014, inflation is at a very low level in France and the Eurozone

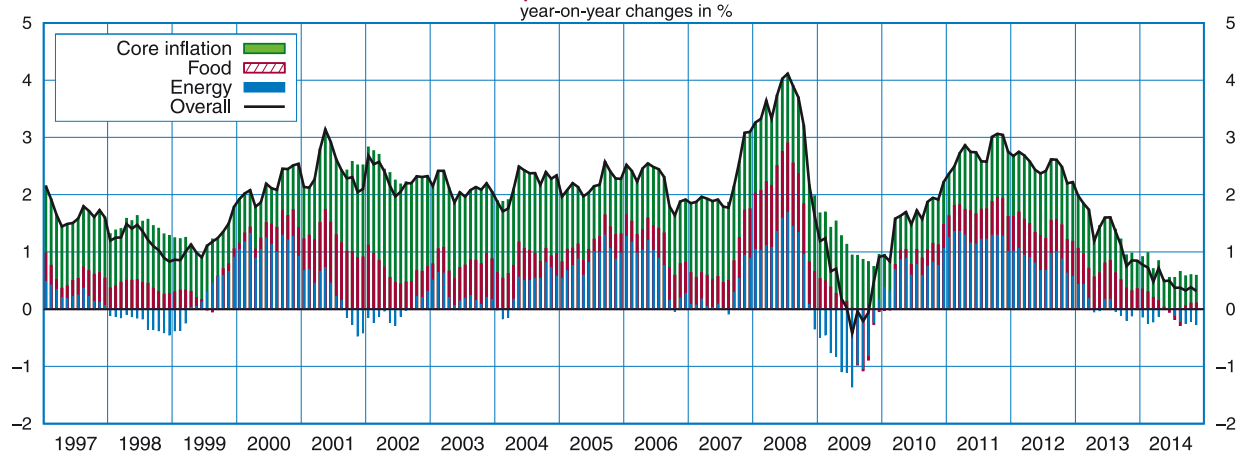
Inflation has fallen below 0.5% in the Eurozone

Since mid-2012, Eurozone inflation (measured by year-on-year change in the consumer price index) has been decreasing almost continuously. In November 2014, it stood at +0.3%, against +1.6% in summer 2013 and +2.6% in August 2012, representing a fall of 2.3 percentage points in 2 years. This value is far removed from the European Central Bank's declared target of inflation "close to but below +2%". It is also a very long way from agents' habitual expectations (which guide wage negotiations or the setting of interest rates, among other things), which are also usually around +2%.

Historically, this situation is not a first: highly volatile changes in energy and food prices have sometimes led inflation to move far from the ECB target. In 2008, the very sharp rise in the oil price, in particular, pushed inflation up to +4.1%, while its sharp fall in 2009 brought it down temporarily to -0.4%.

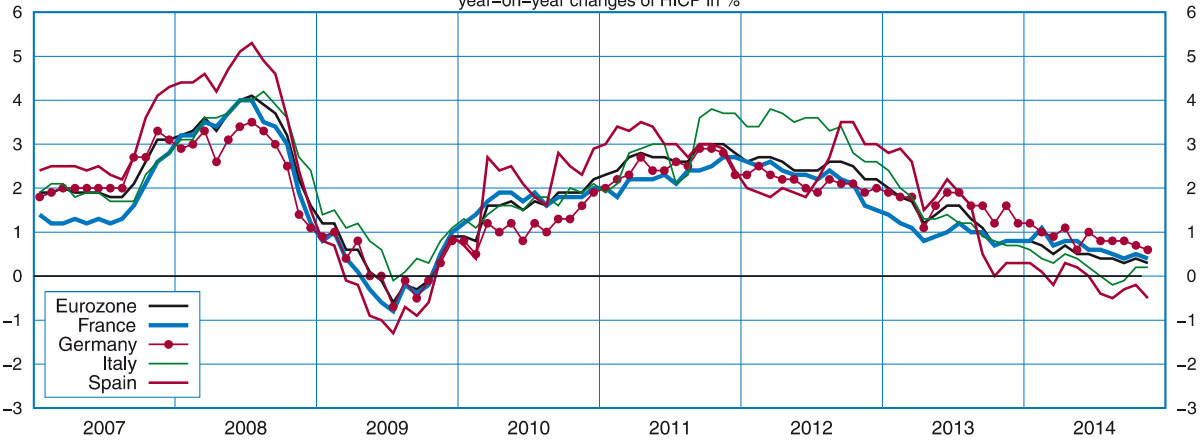
Over the recent period, the main volatile components of the price index (oil and food) have not been the only factors in this change, however. Core inflation stood at +0.7% in November, its lowest since the beginning of the series (which is to say since 1996; *Graph 1*). Disinflation is particularly strong in the "peripheral" countries, notably in Spain where consumer prices have been down year on year since June 2014, while it is more measured in Germany and France (*Graph 2*).

1 - Breakdown of Eurozone inflation
Last point: November 2014
year-on-year changes in %



Source: Eurostat, provisional estimate: November 2014

2 - Inflation in the major Eurozone countries
Last point: November 2014
year–on–year changes of HICP in %



Sources: Eurostat, provisional estimate: November 2014

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Prices of many products are falling...

The prices of many products are even falling. In October 2014, the prices of 25% of the 72 main items in the core index were down year on year. This share is slightly lower than in spring 2014 (in May, 27% of the items were down year on year), but remains above the highest level reached over the period 1997-2007 (20%). For over half of these 72 items, the change in prices year on year is below +1% (*Graph 3*).

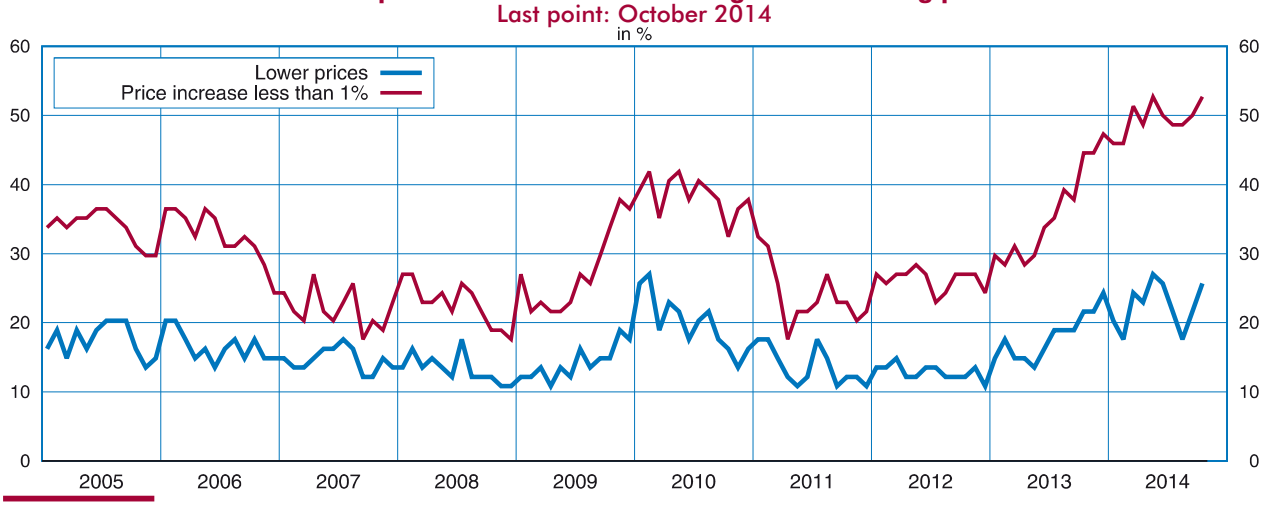
Disinflation is particularly strong in manufactured goods

... notably in manufactured products

Although somewhat general, the fall in inflation observed since mid-2012 in the Eurozone has been driven more particularly by price of manufactured goods, for which the fall has become more pronounced. They contributed -0.6 percentage points to the 1.0 point fall in core inflation between July 2012 and November 2014.

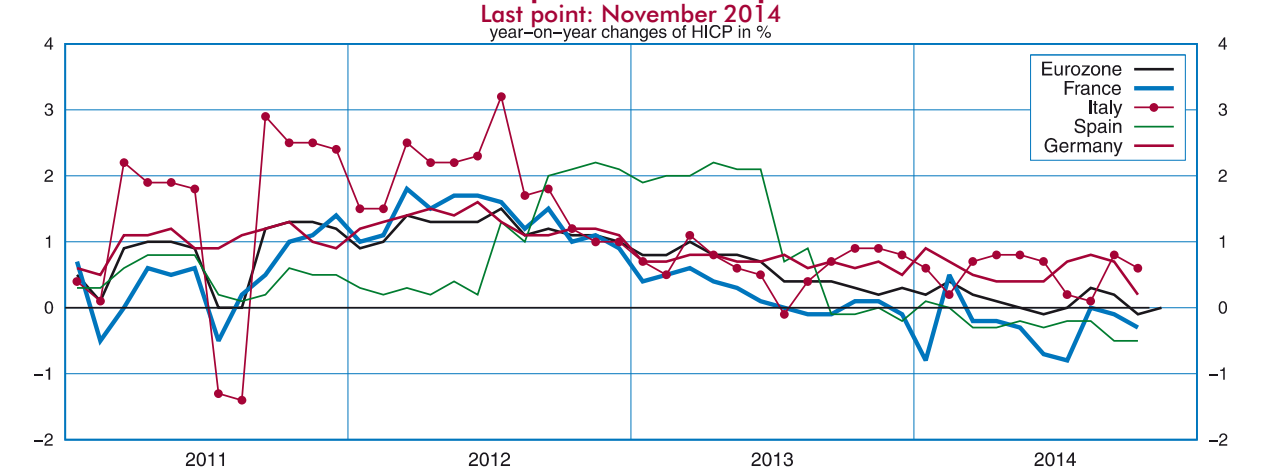
The slowdown in manufactured product prices concerns all the Eurozone economies. Between July 2012 and October 2014, year-on-year change in manufactured product prices thus fell in France by 1.9 percentage points to -0.3%, despite the effect of the rises in the VAT rate on 1st January 2014, and by 1.1 percentage points in Germany to +0.2% (*Graph 4*).

3 - Share of the index components in a situation of low growth or falling prices in the Eurozone
Last point: October 2014



How to read it: In October the prices of 26% of products were down on last year in the Eurozone; 53% of products saw a price rise of less than 1%.
Sources: Eurostat, INSEE calculations

4 - Price of manufactured products in the major Eurozone economies
Last point: November 2014



Sources: Eurostat, provisional estimate: November 2014

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In Spain, manufactured product prices were marked by the 3-point rise in the normal VAT rate in September 2012. Starting at +0.2% in June, inflation in manufactured products fell to -0.5% in October 2014, making a difference of -0.7 percentage points.

Likewise, prices in Italy were affected by VAT rate rises in September 2011 (from 20% to 21%) then in October 2013 (from 21% to 22%). Starting at a high point (excluding the VAT effect) of +1.2% in October 2012, two years later, manufactured product prices were only increasing by 0.6% year on year, representing a change of -0.6 percentage points.

The disinflation observed over the past two years can be put down to the moderation of import prices and under-utilisation of production capacities...

We will therefore seek to analyse the causes of recent disinflation

To gain a better insight into the likelihood of this disinflation continuing in coming months, the causes must be analysed, in particular to determine the purely short-term outlook factors, which are not likely to continue, and the more sustained trends.In principle, three main factors can explain this recent disinflation:

- first, the moderation of imported industrial and food commodity prices, and then of oil from summer 2014 onwards, has worked through into consumer prices, fairly directly in the case of oil prices, and via the production chain for commodities as a whole;

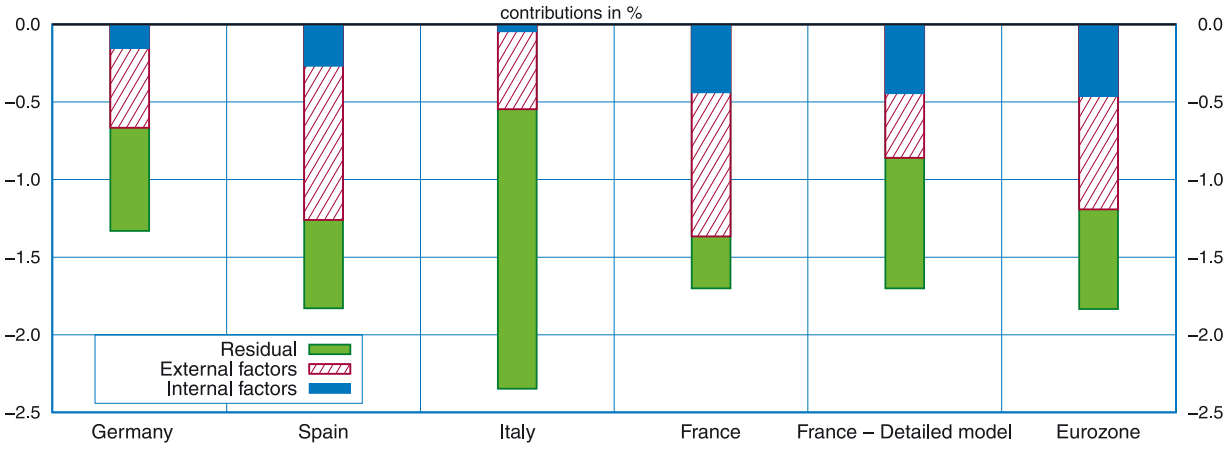
- next, the rise in the value of the Euro between summer 2012 and spring 2014 (the nominal effective exchange rate of the Euro rose by about 6% over this period) amplified the downward movement in commodities prices, as well as in those of finished products imported by Eurozone countries;

- finally the low level of utilisation of production capacities, capital and labour may have weighed down on companies' margins and the wage bargaining power of employees.

Recent disinflation can be explained...

The impact of these factors can be assessed using a simple econometric model linking inflation to these determinants (*Box 1*). In the case of France, this analysis can be fine-tuned using detailed modelling of the "price-wage spiral" (*Box 2*). This exercise produces the following conclusions (*Graph 5*):

5 - Econometric contributions of the main factors in the disinflation observed in the Eurozone



How to read it: the graph shows contributions to the drop in inflation (measured by year-on-year price variations) between Q1 2012 and Q2 2014. The negative contribution of import prices is mainly because oil prices rose sharply in 2011, sustaining inflation in Q1 2012, while energy inflation was far weaker in Q2 2014.Comment: the results correspond to the equations presented in *Box 1*, except the results of the "France – Detailed Model" which correspond to the equations presented in *Box 2* for core inflation, enriched by equations on the volatile components.
Source: INSEE calculations

Box 1 - Simple model of Eurozone total inflation

A model of inflation in the main Eurozone countries that is simple but takes account of its main determinants can be used. It links the deseasonalised quarterly variation in the HCPI to variations in import prices, the deviation of production capacity utilisation rates from their long-term average and the level of the unemployment rate (or the difference between the unemployment rate and its trend when the unemployment rate is not stationary). The effects of changes in productivity were also tested, but appeared non-significant in all the countries tested.

The results are presented in the table below.

No endogenous delay appeared significant in the estimate. This result is important because it means that, over the estimation period (1996 to 2011), a sustained rise in the unemployment rate above its equilibrium level or a sustained fall in the production capacity utilisation rate leads to a fall in inflation "in steps" without triggering a deflationary spiral. One way of explaining this result is to consider that it shows the anchoring of inflation expectations. As wages and prices are generally fixed in advance for a certain period of time, inflation expectations are an important determinant in wage negotiations or in price setting by companies; if the central bank is credible, agents therefore expect inflation to return more or less towards the central bank's target, whereas when it is not, they will tend to build their expectations on the basis of recent trends. The more credible the central bank, the less past inflation will tend to feed current inflation.

This result corresponds to the results of several studies pinpointing the fact that the inflation target proposed by the ECB has contributed to anchoring expectations strongly in the Zone as a whole. Expectations were assessed, in particular both before the Great Recession (*Beechey and Österholm (2007)*, *Levin et al. (2004)*) and very recently *(Autrup et al. (2014))*, as being more firmly anchored in the Eurozone than in the United States, notably as they react less strongly to economic surprises.■

Variable	Germany	France	Italy	Spain	Eurozone
Constant	0.4% (11.0)	1.3% (6.2)	5.2% (17.5)	5.5% (10.8)	0.4% (15.6)
Production capacity utilisation rate	1.9% (2.6)		1.6% (2.6)		
DL(PM)	11.6% (4.0)	18.0% (9.4)	6.7% (4.6)	12.7% (5.1)	14.3% (7.9)
Unemployment rate		-0.1% (-4.5)		-0.04% (-2.7)	-0.09% (-3.6)
Adjusted R^2	42.1%	62.4%	33.2%	36.5%	56.3%
DW	2.1	1.8	1.6	1.7	1.6
Period	1996Q1-2011Q1				

Sources: Eurostat, INSEE calculations

Box 2 - Detailed model of inflation in France

The model of "core" inflation that is generally used to make short-term forecasts can assess the scale of the disinflation at work in the light of the usual determinants in France.

The model of core inflation is based on a price-wage loop comprising four equations in particular: for mean wages per head, for producer prices on the domestic market, for intermediate consumer prices and for core inflation (*Figure*). The framework is similar to that described in *Bourquard et al. (2005)*.

The mean wage per head is modelled by a Phillips-type equation without a long-term relation. Its determinants are inflation, the unemployment rate and rises in the minimum wage. Various consumer price indices are included in the equation: on the one hand, the core index, as an approximation of the inflation expected by the various economic agents; on the other, the consumer price indices for fuels and food which represent the non-core components of inflation (persistent price shocks in such sectors cause compensatory index-linking of wages, with a delay of a few quarters.)

The unemployment rate appears as an indicator of employees' wage bargaining power. As increases in the minimum wage tend to work through to a greater extent than their simple accounting effect on the remuneration of the workers in question, the corresponding variable also proves to be important in the model.

The only determinant of producer prices for the French market is the unit wage cost and the unit cost of intermediate consumption. In the short term, index-linking of producer prices on costs is partial, but it is total over the long term and producer prices adjust completely to the unit production cost: any deviation of the margin rate of enterprises from its long-term average is corrected progressively.

Prices of intermediate consumption are formed by import prices of industrial goods and producer prices for the French market. The long-term model is estimated with a homogeneity

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requirement in order to avoid over-reaction effects: the sum of the parameter associated with producer prices and of the parameter associated with import prices is set to 1. The deviation from the long-term average proves essential in the short-term relation, which also comprises variations in producer and import prices.

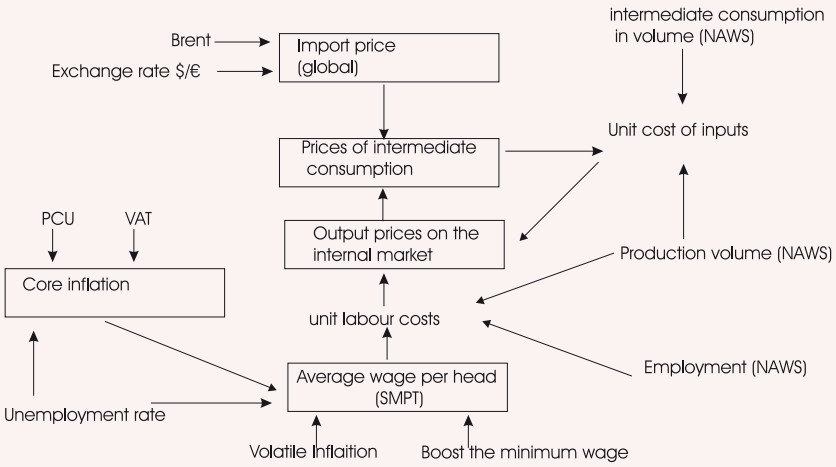
The model of the core consumer price index comprises a long-term relation with indexing on producer prices. Its short-term changes take into account the production capacity utilisation rate and the unemployment rate as indicators of the imbalance between supply and demand. Also, since core inflation is corrected for fiscal measures, apparent VAT rates in the manufacturing and accommodation-restaurant sectors also capture the additional accounting effects of these corrections when they are not immediately passed on to prices. The equation is thus written as follows:
Estimation period: Q1 1991 - Q4 2013 with:

- TVA_IZ: apparent VAT rate in the «accommodation-restaurant» sector

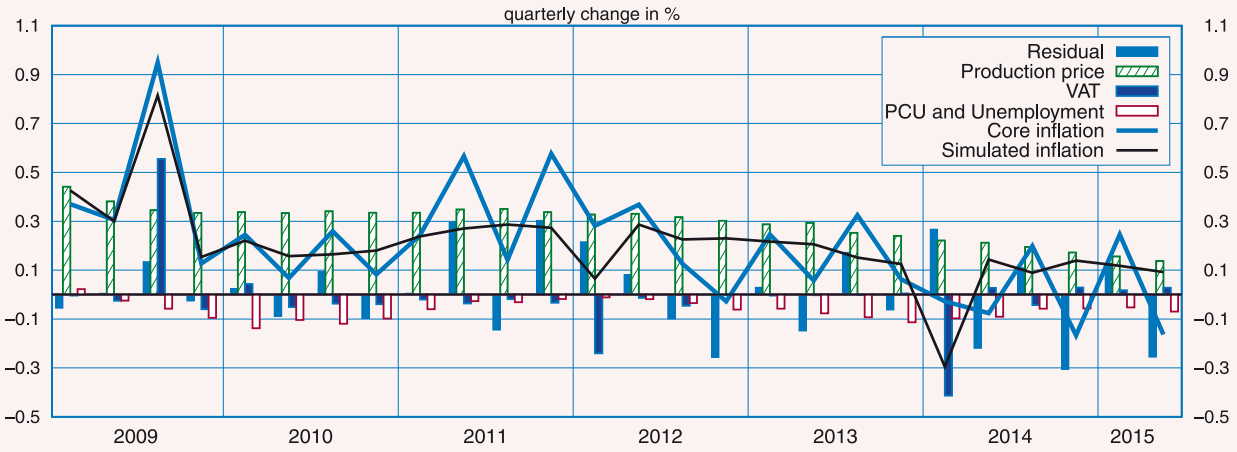
- VA_DIM: apparent VAT rate in the manufacturing sector

- TUC: production capacity utilisation rate. ■

Price modelling



Econometric contributions to core inflation



Source: INSEE

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... half by import prices...

- The fall in import price inflation since mid-2012 corresponds on average to about half of the fall observed in inflation. A simple econometric estimate[1] shows that two-thirds of the impact is linked to the variation in oil prices over the period (the latter made a large contribution to inflation in 2012, as prices increased sharply in 2011, but that is no longer the case in 2014), and one-third is linked to the change in the effective exchange rate. This shock is therefore only partly shared with other countries in the world.

... for a small part by low production capacity utilisation

- In all countries, the low level of utilisation of production capacities, labour and capital has also contributed to reducing inflation, but in lesser proportions; in France as in the whole of the Eurozone, this contribution to the fall in inflation is assessed to be about 0.5 points.

- Not only is this estimated impact small, it is also unlikely to continue, as long as the degree of under-utilisation of production capacities (labour and capital) does not increase any further, as has been the case since the beginning of 2014; on the basis of the behaviour demonstrated by econometrics over the past 20 years, a sustained fall in utilisation of capital or labour only causes inflation to fall to a lower level, whereas the behaviour shown by the estimates made for the 1970s and 80s would have triggered a sustained fall in inflation.

...but the scale of the phenomenon remains difficult to explain, however

But it is partly unexplained by the estimated impact of these determinants...

However, this rather reassuring result should be nuanced by the fact that a significant part of the disinflation observed (20% in France, 30% in Spain, 50% in Germany, 75% in Italy)[2] remains largely unexplained by these usual factors. Factors specific to some of the countries may have come into play; in France, notably, the atypical trend in telecommunications prices, further to the arrival of a fourth operator on the market, may explain a part of the residual observed. But on the whole for the Eurozone and the various countries studied, the disinflation phenomenon since 2012 remains difficult to explain.

Depending on the way in which we interpret this unexplained portion and therefore carry it forward, inflation prospects may look very different.

... perhaps because it is underestimated during a slump...

A first possible hypothesis is that these residuals are the result of a simple underestimation of the impact of unemployment and the production capacity utilisation rate, for example if under-utilisation of production capacities has a non-linear impact, weighing down all the more as it deepens. Unemployment rate inertia may only give a partial picture of the deterioration in the labour market and the decline in employee bargaining power since 2009. In this hypothesis, if this under-utilisation does not increase, the residual portion should stop increasing in the coming quarters and disinflation should come to an end.

... or in times of continuing low demand...

A second hypothesis is that this unexplained portion may be the result of the reaction of agents, in particular companies, to continuing weak demand. In this interpretation, companies may initially have sought to protect their margins in the face of a drop in demand they considered temporary, but then found themselves forced to lower their margins to try to attract clients and make use of their production capacities. In this hypothesis, the slight upturn starting in the Eurozone should enable companies to avoid stepping up their efforts on margins, although the possibility cannot be excluded that the upturn may be insufficient to prevent the downward movement in margins continuing.

(1) Modelling the quarterly change in Eurozone import prices by the (contemporary and delayed) variation in oil prices and that in the effective nominal interest rate.
(2) In Italy, the fall in inflation was calculated using the constant-taxation series to neutralise the effect of the rises in VAT.

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... or, finally, on account of a shift in expectations

A third hypothesis is that these residues are the result of a disanchoring of agent expectations. As agents expect inflation to remain low over the longer term, they base price formation on a lower inflation forecast than if they were expecting a gradual return to the European Central Bank target of 2%.

The unexplained portion of the fall in inflation is not carried forward...

In the forecast, the unexplained portion has been maintained at its most recent level...

To construct the scenario for this *Conjoncture in France*, a forecast hypothesis must be made on this unexplained portion. The choice was made to consider that the unexplained part of the downward trend in inflation observed recently does not continue. Although there is great uncertainty around this hypothesis, it does appear to be fairly central for at least three reasons.

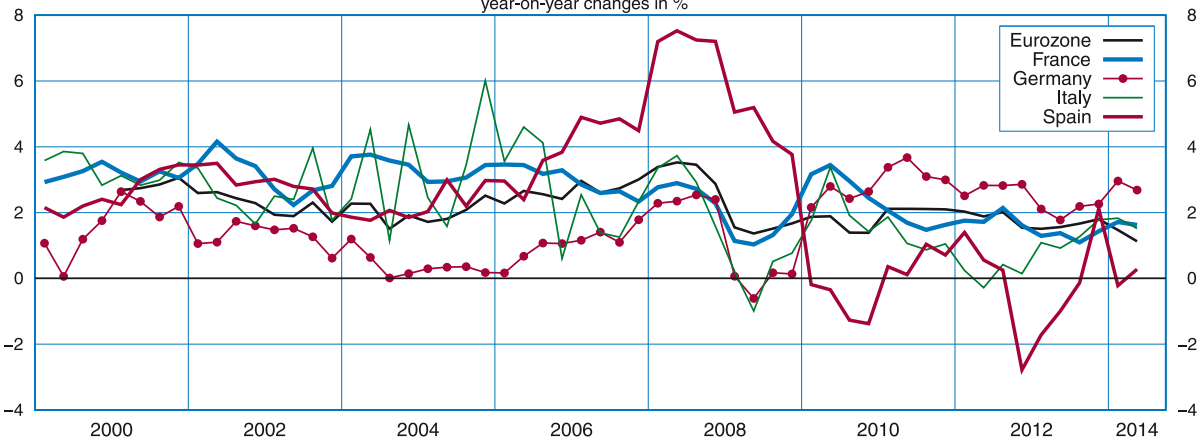
... the hypothesis that the slight upturn currently underway will allow deflationary pressure to be stabilised

First of all, as explained above, if the unexplained portion is the result of an under-estimation of the impact of demand factors (non-linearity effect), it should not increase in the coming quarters and may even be reduced, driven by the modest upturn underway in the Eurozone.

... especially as nominal wage inertia limits the transmission of disinflation to wages...

Next, the inertia of wages is likely to slow down disinflation. Inflation is currently close to zero, and sustained negative inflation should therefore end up causing a fall in nominal wages. However, unlike in Japan, wages in the Eurozone, especially in France and Germany, show considerable resilience which could prevent such a fall in wages in the event of a fall in prices (see, for example, *Audenaert & al. (2014)* for an analysis of this resilience of France). Regulations may restrict the possibilities for reducing wages, at least as far as the basic wage is concerned (although bonuses may be adjusted). For example, the existence of a minimum wage creates nominal rigidities which are all the greater in those sectors with low-wage employees. In France, the rise in the minimum wage scheduled for 1st January 2015 should therefore ease disinflation in service sectors such as hotels and restaurants. In Germany, the introduction of a minimum wage at the beginning of 2015 should boost low wages. In the longer term, if prices fall lastingly, it cannot be excluded that episodes of falling nominal wages, as recently seen in Spain, could also concern other countries of the Eurozone (*Graph 6*).

6 - Mean wage per capital in the Eurozone
Last point: 2014Q2
year-on-year changes in %



Sources: Eurostat, INSEE calculations

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...notably because agents' expectations do not seem to have "stalled"

... and inflation expectations do not seem to have stalled

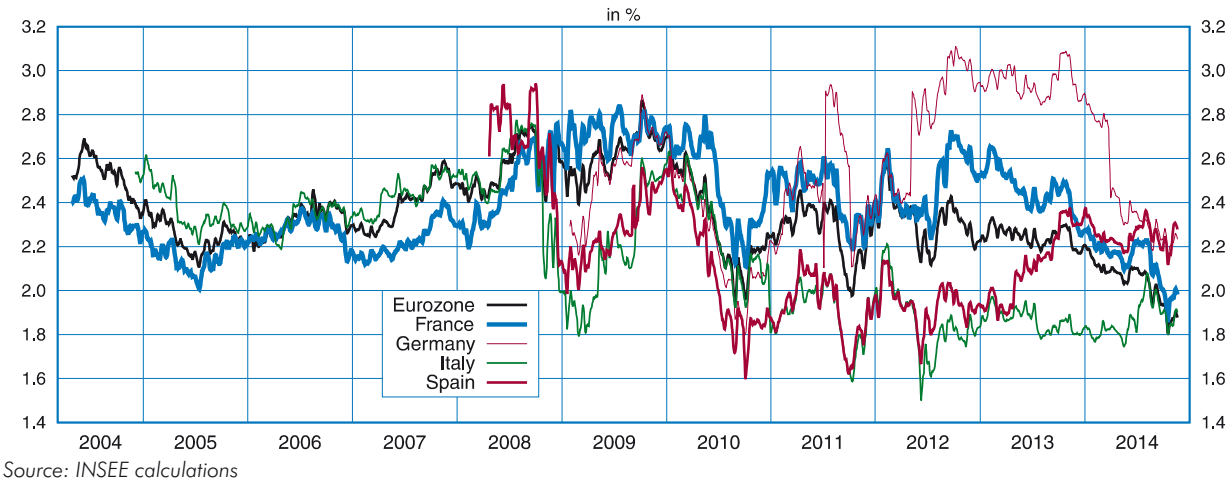
Finally, the measurements at our disposal on inflation expectations do not suggest a downward trend. Inflation expectations may be deduced either from the trend in the price of financial assets ("break-even inflation rates") or from household outlook surveys. The central banks track these measurements closely, especially the financial ones: measurement of the "5 year / 5 year forward" breakeven inflation rate[3] is a figure the ECB tracks particularly closely, as Mr Draghi said last August.

Regarding financial markets (*Graph 7*), inflation expectations fell recently by almost one percentage point in Germany (from +3.1% at end 2013 to +2.2% in November 2014) and by 0.7 points in France (from +2.7% to +2.0%), while they levelled out in Italy (around +1.9% in November 2014) and increased in Spain (+2.3% in November 2014 against +1.9% on average in 2012). The importance of a variation such as that observed in Germany and in France, however, must be weighted, as such a variation is not unprecedented (the monthly standard deviation of the series is 20 basis points). Also, in all these countries, expectations remain within a range of 1.8% to 2.3%, with an average of 1.9% for the Eurozone, which is very close to the ECB target.

Inflation expectations traced in household surveys have also fallen since mid-2012 (*Graph 8*), particularly in Spain and Italy, but the levels they have reached are not unusual, indicating that household expectations have not particularly "stalled". However, these surveys are closely correlated with the current level of inflation and are very limited as a forecast.

(3) Average annual inflation over 5 years, from 5 years in the future, calculated on the basis of expected inflation at 5 years and expected inflation at 10 years. In other words, it is the average annual inflation between years N+6 and N+10 if the inflation expected at 5 years and 10 years are correct. This indicator reflects the expectations of actors over the medium term, without regard for the situation in the coming 5 years. This indicator can be calculated on the basis of Sovereign bond prices (the term "breakeven" being taken in its literal sense in this case), or, as here, on inflation swaps (the term "breakeven" being a linguistic shortcut in this case).

7 - 5 year /5 year forward breakeven inflation



Source: INSEE calculations

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This hypothesis suggests a relative stabilisation of core inflation, with the risk of it being negative over the forecasting period estimated to be about 30%

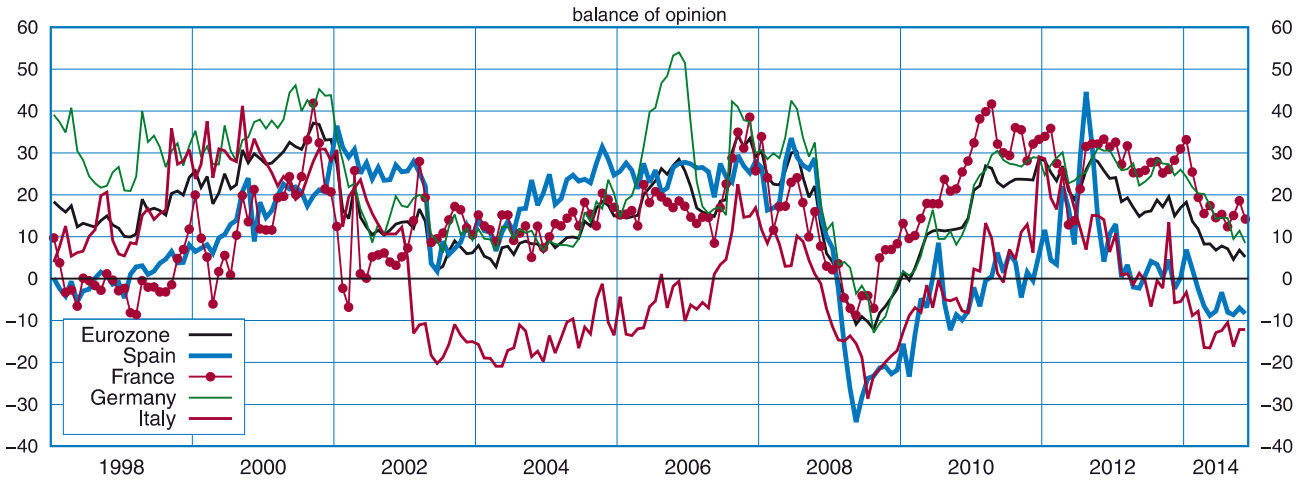
The central forecast is of slightly positive core inflation in June 2015

To appreciate the risk of prices falling in France, we focus here on core inflation: by definition, it eliminates the most volatile components which may mask the trends at work. Given the hypothesis made as to the unexplained portion, in France, core inflation should remain negative in December 2014 (-0.1% after -0.2% in November), and should be low but positive through H1, standing at +0.1% in June 2015 (*see the "Consumer Prices" note*). However, this is only the central scenario and is surrounded by some uncertainty.

But the risk of it being negative over the forecasting period is around 30%

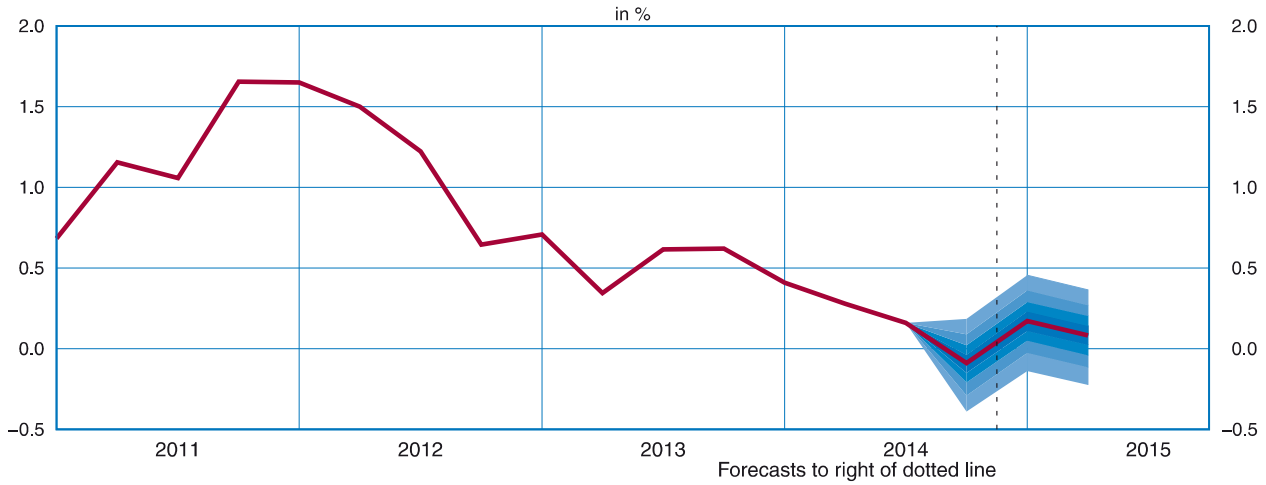
By conducting a statistical analysis of the historic distribution of deviations between the forecasts in Conjoncture in France and actual inflation figures, the probability of core inflation being negative in Q1 2015 is about 30% (*Graph 9* and *Box 3*). Therefore, based on the hypothesis that the unexplained portion remains stable, the risk of entering a zone where core inflation becomes negative on a sustained basis is significant, although it is not the most likely scenario.

8 - Household inflation expectations in surveys



Sources: Consumer surveys, European commission

9 - Core inflation forecast for France and risks surrounding the forecast



How to read it: the fan chart plots 80% of the likely scenarios around the baseline forecast (red line). The first and darkest band covers the likeliest scenarios around the baseline, which have a combined probability of 20%. The second band, which is a shade lighter, comprises two sub-bands just above and just below the central band. It contains the next most likely scenarios, raising the total probability of the first two bands to 40%. We can repeat the process, moving from the centre outwards and from the darkest band to the lightest, up to a 80% probability.
Source: INSEE

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Box 3 - Construction of a graph of risks surrounding the inflation forecast

The forecasting capacity of economists can be assessed by a historical comparison between actual and forecast inflation. For France, the INSEE quarterly forecast (quarterly and annual inflation) over two quarters (*Conjoncture in France* for June and September) was thus compared with the consumer price index and the core index (graph). It can be observed that:

1. the core inflation forecast is centred on the whole (very slightly negative median error of -0.05). An over-estimation bias does exist, however, with the average error being significantly negative (-0.13).

2.the headline inflation forecast underestimates inflation structurally (median and average significantly positive, at +0.30 and +0.17 respectively). This can mainly be explained by the hypothesis of oil price stability taken for the forecasting exercise, whereas on average, the price per barrel of oil increased by 2.9% per quarter over the period 2000-2013, making an average impact of 0.25 percentage points on headline inflation.

Associated statistics:

Average forecasting error:

Headline inflation = 0.17
Core inflation =-0.13

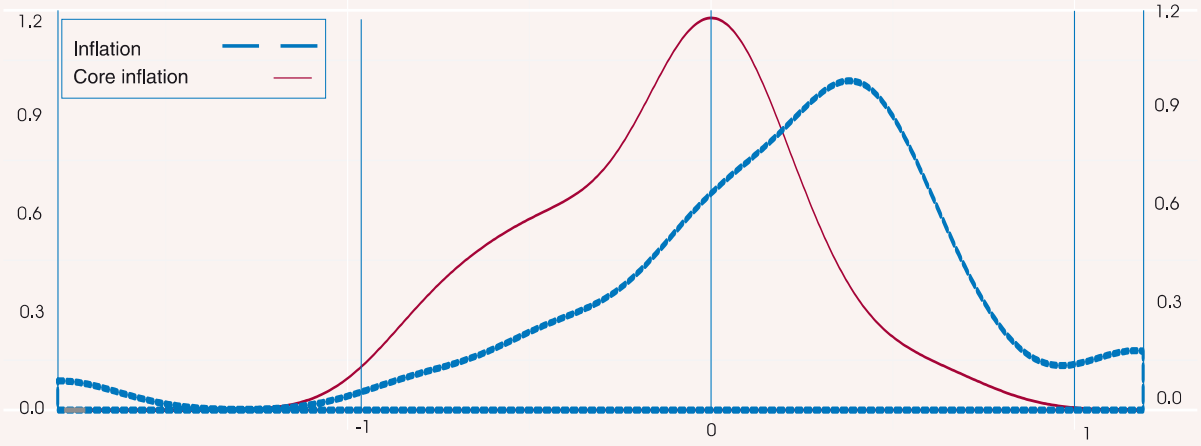
Median forecasting error:

Headline inflation = 0.30
Core inflation =-0.05

Standard deviation of forecasting error:

Headline inflation = 0.35

Forecast error density - inflation in France



How to read it: a positive error means that the observed was higher than expected, i.e. the forecast underestimated inflation.

In the short term, disinflation can be a positive shock for competitiveness...

Current disinflation brings competitiveness gains for the Eurozone...

A disinflation shock can be beneficial for the economy. On the one hand, a fall in inflation can buoy up the financial situation of domestic agents, especially when disinflation is imported. This is the case for households whose purchasing power is increased, especially in the short term, as disinflation does not work through into a slower progression wages immediately. It is also the case for companies, because it brings production costs down and thus increases their margins. But these favourable effects disappear when disinflation comes from internal factors, for example when it is driven by wage moderation (limiting gains in purchasing power) or a reduction in corporate margins limiting their investment expenditure.

Disinflation also has positive effects on activity when it is specific to this zone, especially when there is a large deficit in demand. This seems to be very much the case currently in the Eurozone, if compared with the United States where inflation has levelled out since mid-2012, or in the United Kingdom, where inflation has fallen less over the same period (a fall of 1.2 points in the United Kingdom between August 2012 and October 2014, against 2.2 percentage points in the Eurozone). The inflation differential in relation to the economic partners does allow a gain in competitiveness on foreign markets and

stimulation of internal demand, because locally-produced products become more competitive again compared to imported products. According to the estimates proposed in the report in Conjoncture in France in June 2013 (*Borey and Quille (2013)*), this positive impact in the Eurozone should be particularly favourable in Spain and France, while Germany is likely to be little affected.

... but presents risk for agents with debts...

... but low inflation is costly ...

On the other hand, this low inflation has an adverse effect of bringing into question the sustainability of economic agents' debt (States, households and companies), and this is an effect that grows the longer it remains low.

...for public finances...

Low inflation mechanically reduces a part of public revenues, either because they are directly linked to prices (VAT in particular), or because they are linked to elements that are themselves linked to prices (corporation tax, for example, which depends on the nominal profit of companies and therefore on sale prices). The corresponding adjustments to public expenditure may be more limited in the event of nominal downward rigidities (retirement pensions, for example), which may deteriorate the budget position of the State at least in the short term.

... and does not allow the central bank to adjust its interest rates

More diffusely over time, depending on the agents in question, this increases real interest rates, if nominal interest rates do not adjust to the fall in inflation, and therefore limits the incentive to borrow. The effect may be limited for real-estate loans as long as medium-term expectations do not change. It may also be limited for companies if disinflation is imported, as it is the gap between interest rates and the price of their added value that is of importance; but generally, a rise in real interest rates may encourage companies to adopt a wait-and-see attitude. It can become particularly important when nominal interest rates are at a very low level, as is the case today in the Eurozone: the central bank practically cannot lower its rates in the face of falling inflation and the real interest rate therefore rises. The central bank is thus more restricted in its ability to react to an inflation or activity shock, although unconventional measures may address this difficulty to some extent.

Low inflation can lead to purchases being postponed

If disinflation leads to a fall in prices, theoretically this could encourage agents to adopt a wait-and-see attitude, with households in particular postponing their purchases of consumer durables as they expect prices to continue falling. Several factors, however, suggest that if the fall in prices is moderate, this effect should be very limited. First, the fact that for many durable goods (automobiles, home equipment), prices are already falling (hence the overall fall in manufactured product prices) without any fall in demand for these products being observed, in fact quite the contrary. These falls would also have to be substantial to generate significant postponement behaviour, such as specific incentives to buy automobiles (scrappage incentives, bonus-malus). Finally, there is the fact that in Japan, during the period of deflation, the household savings ratio fell, suggesting that purchases were not being postponed.

... which could theoretically trigger the appearance of a deflationary spiral in the longer term

Sustained low inflation...

Lasting low inflation makes the economy vulnerable to a negative price shock and, by making economic agent debt less sustainable, risks triggering a deflationary spiral in time, like that observed in Japan since the mid-1990s (*Box 4*).

... can lead to debt-deflation

This mechanism described back in 1933 by Fisher (then completed notably by Minsky in 1982 and Bernanke in 1983) is as follows: economic agents with too much debt must sell their assets to balance their budget. A spiral is then triggered in which initial deflation is gradually amplified by the loop effect on the economy. Such a spiral may occur in three distinct phases (*Figure*):

Box 4 - Deflation in Japan

Three phases can be distinguished in the process through which Japan fell into deflation.

1. Weakening of the economy (1990-1996)
The Japanese economy was severely weakened by the burst of the stock market and property market bubbles at the beginning of the 1990s and by the recession that followed in 1993. Companies then reduced their investments sharply and tried to cut their debts.

2. Fall into deflation (1997-1998)
The fall into deflation in 1997-1998 (prices only started falling in 1998, but they were stimulated artificially in 1997 by the rise in VAT) was linked to several negative shocks: fiscal shocks that depressed consumption (increase in VAT, end of tax cuts), the Asian crisis that hit Japanese exports hard and the financial crisis that then broke out endogenously. For several years, the problem of bad debt, amplified by the very close link between companies and banks, had been covered over and was only revealed when Japan was on the verge of systemic crisis. The banks' difficulties then led them to ration credit. The fall in prices that then occurred in 1998 was amplified by the wage-setting model: employees are ready to accept wage cuts at times when the economy is slowing down to avoid losing their jobs.

3. Deflationary spiral (1998-2003)
The deflationary spiral sustained itself because of the poor state of the financial system (no possibility for a stimulus by lending), structural downward pressures on wages and a poorly-adapted policy mix which could not prevent the appearance of a liquidity trap: ex post, many economists (for example Bernanke (1999)) consider that the Japanese Central bank intervened too late, at a time when the credit channel was blocked and inflation negative; the zero-rate policy adopted in 1999 therefore proved ineffective.■

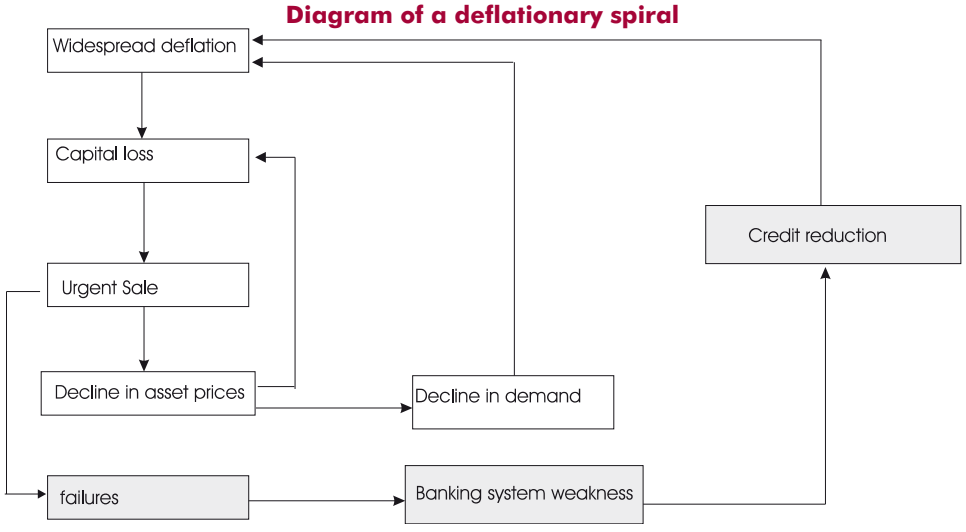
(i) A general fall in prices could cause capital losses for agents (for example, by triggering a fall in stock markets) which could lead them to sell off some of their assets in expectation of a continuing fall or to balance their balance sheet. This could then lead to a sustained fall in asset prices.

(ii) This fall in asset prices could also have a negative impact on demand by a wealth effect.

(iii) Asset sales could also trigger a larger number of bankruptcies, thereby weakening the banking system - increasing the bad debt rate - leading to credit restrictions and amplifying the fall in demand.

All these mechanisms are signs of a simple downward adjustment in inflation expectations and are not specific to periods when prices are falling. However, they are reinforced by two factors when inflation is low initially: on the one hand, sustained low inflation generally leads to a fall in risk premiums which is conducive to a sharp rise in asset prices and therefore to an excessive increase in debt; on the other, on account of the nominal rigidity of interest rates, low or even negative inflation limits the ability of the monetary authorities to counter the fall in demand and inflation that ends up resulting from it.

Diagram of a deflationary spiral



The risk of negative inflation is real but does not necessarily signal deflation

The recent fall in inflation may therefore be good news in countries that are sensitive to the positive competitiveness shock it represents. However, it may represent a large risk for agents with debts, which could theoretically lead to the emergence of a deflationary spiral.

Given the low level reached today by inflation in France and the Eurozone as a whole, it is therefore important to assess the risk of deflation.

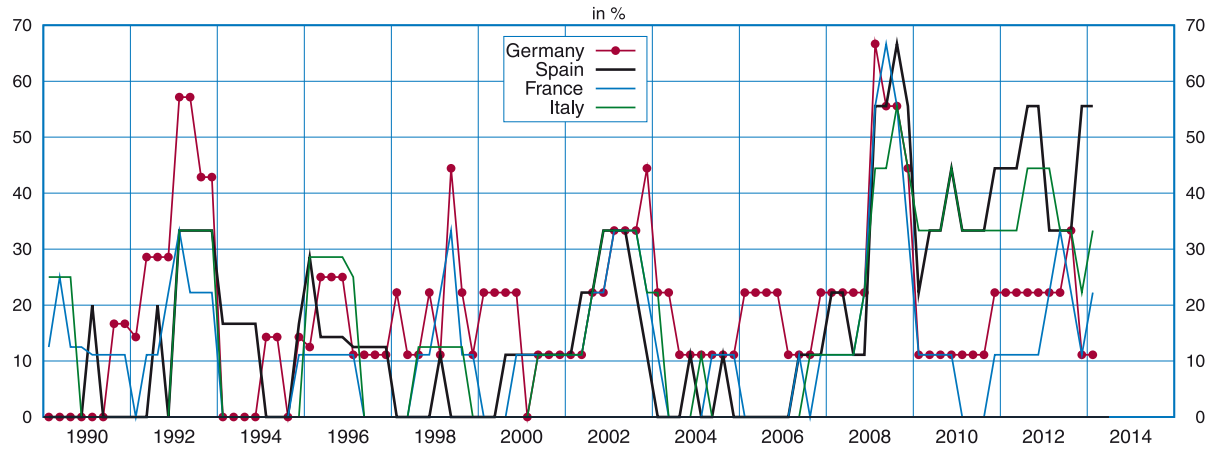
The indicator proposed by the IMF indicates a non-negligible risk of deflation in the Eurozone...

The IMF has developed an indicator to measure the risk of deflation...

The vulnerability indicator constructed by the IMF (see notably *Decressin J. and Laxton D., 2009* and *Box 5*) is an initial response to this question. The index aims to measure the risk of falling into deflation, which is defined as "a self-sustaining fall in the aggregate price index". A temporary fall driven by a particular factor (for example a fall in oil prices) therefore does not correspond to this definition. The greater the risk of deflation, the greater the risk of inflation remaining lastingly below its long-term target.

Currently, this indicator points to a particularly high risk of deflation in Spain (*Graph 10*). The risk would also seem to be present to a lesser extent in Italy and even in France, but would appear very low in Germany.

10 - Risk of Eurozone deflation (IMF indicator)



Source: IMF

Box 5 - The IMF deflation risk indicator

The deflation indicator constructed by *Kumar et alii (2003)* and used by the IMF is based on a wide range of economic variables (growth in GDP, real exchange rate, etc.). Each variable is associated with a risk indicator that may take two values (0 or 1), depending on whether the variable has crossed a certain threshold or not. The final indicator taken by the IMF is constructed as the percentage of the variables that have crossed what is considered as being the risk threshold.

More precisely, the variables and the thresholds associated with them (on an ad hoc basis) are the following:

- Is headline inflation total below +0.5%?
- Is inflation within the meaning of the GDP deflator below +0.5%?
- Is core inflation below +0.5%?
- Has the output gap (between effective GDP and potential GDP) widened by more than 2 percentage points over the past 4 quarters?
- Is the output gap currently below 2%?
- Has growth been below the average growth rate for the past 2 years?
- Have stock market prices fallen over the past 3 years? By more than 30%?
- Has the real exchange rate increased by more than 3% over the past year? By more than 4.0%?Has cumulative growth in credit over the past 3 years been below 10%?

The main advantage of such an indicator is that it condenses several vulnerability variables of an economy. It thus offers a compound measure of the risk of "ow activity in a context of low inflation", and therefore implicitly of deflation.■

The risk of negative inflation is real but does not necessarily signal deflation

... but this type of indicator is at best coincident and makes little distinction between a fall in prices and a deflationary spiral

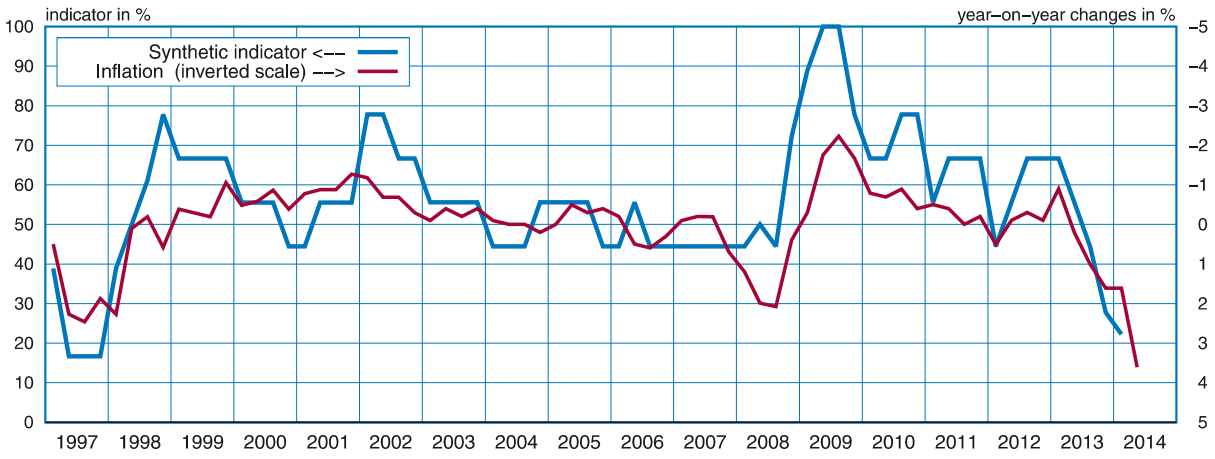
... but it is not a leading indicator...

However, this indicator gives at best a coincident vision of the risk of falling prices, but does not forecast deflation. The example of Japan illustrates this limit (*Graph 11*): the indicator here is closely correlated with inflation and, in 1998, it only increased at the same time as the fall in prices.

... and makes little distinction between a fall in prices and deflation

Today, this indicator shows a particularly significant risk of deflation in Spain. Headline inflation has been negative there since June 2014 and is likely to remain very low through to mid-2015. However, Spain does not seem to have entered a deflationary spiral, in particular due to the marked upturn in activity and the slight rise in real wages (*Box 6*).

11 - Risk of deflation in Japan and observed inflation



Sources: IMF, Statistics Bureau of Japan

Box 6: the fall in prices in Spain

While the Spanish have had to accept nominal wage cuts in recent years (*Graph 6*), prices have been falling in the country since June 2014. In the light of these criteria, Spain is under threat from deflation. However, it would not appear to have fallen into a spiral like that in Japan; several positive signals would appear to argue in favour of a rapid turnaround in this situation:

- the clear upturn in activity over the last six quarters with year-on-year growth in GDP of +1.8% in Q3 2014, which is forecast even to accelerate slightly (+2.1% mid-2015);
- lesser under-utilisation of production capacity, with the clear upturn in capacity utilisation rates (to 77% in Q3 2014, against 69% at the end of 2012 and 80% on average from 2000 to 2008) and the fall in the unemployment rate (to 23% in mid-2015, down by 4 percentage points since the beginning of 2013);
- the upward trend in financial asset prices and, above all, the recent levelling out of real-estate asset prices (up slightly year on year in mid-2014, after several years of large falls, *Graph 14*);
- the slight upturn in real wages since the beginning of 2014, which should continue through to mid-2015 (to +0.9% year on year) and a trend likely to come back into line with productivity gains (+0.9% year on year in mid-2015) after a pronounced phase of adjustment;
- the relative good health of the Spanish banking sector which passed the recent stress tests carried out by the European Banking Authority without any need for recapitalisation (see *focus in the "Financial Markets"note*). ■

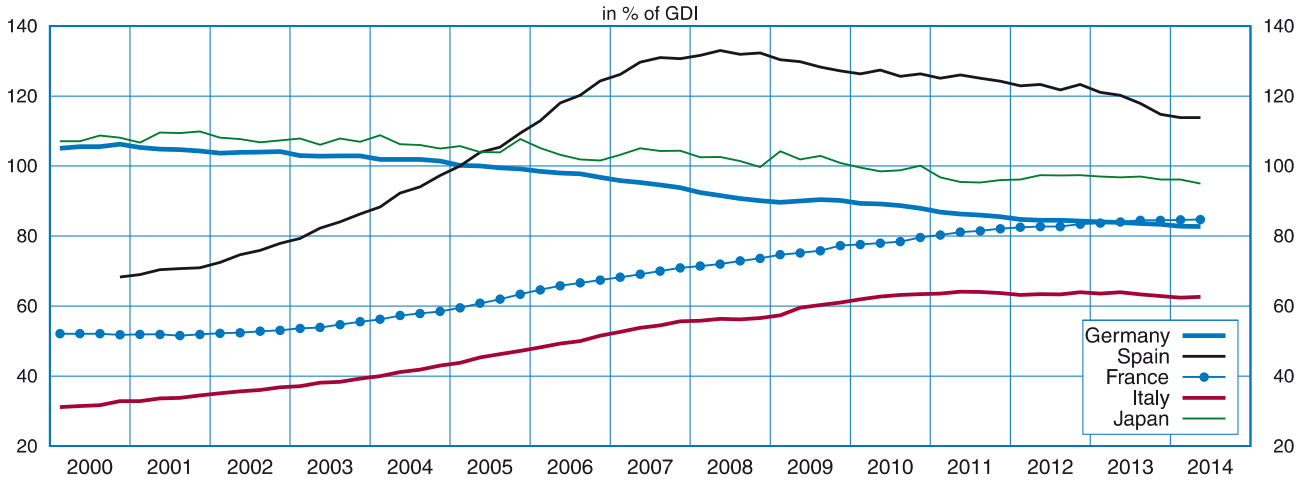
The risk of negative inflation is real but does not necessarily signal deflation

The theoretical deflationary spiral mechanism stresses the importance of tracking expectations, debt, asset prices and defaults... but it is difficult to set "alert" thresholds

The theoretical deflationary spiral mechanism stresses the importance of tracking agent debt

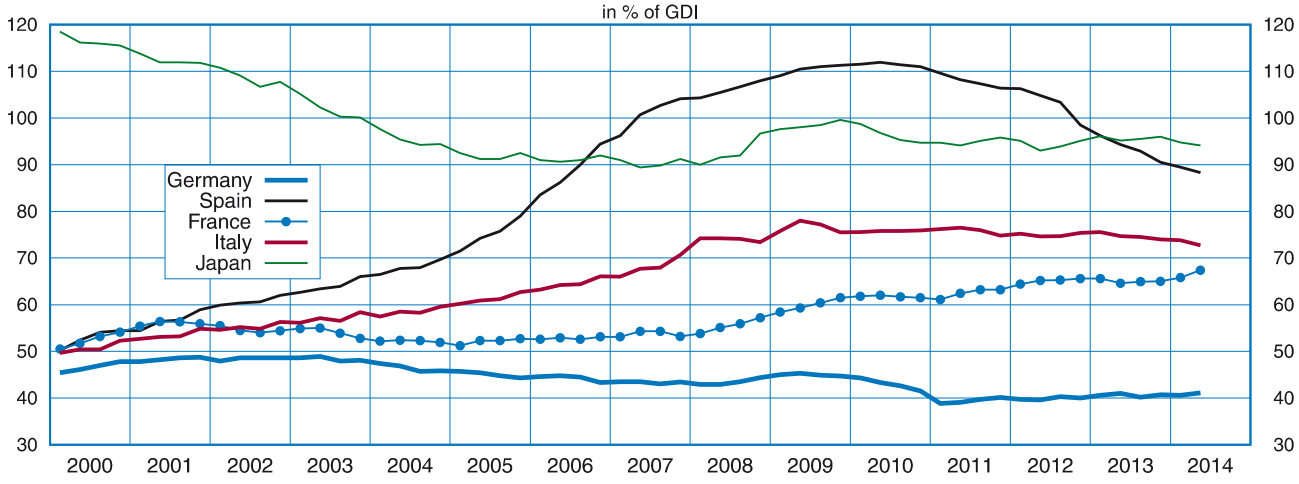
Aside from the financial indicators and agent inflation expectations (see above), the theoretical deflationary spiral mechanism and the Japanese experience stress the important role of agent debt. To appraise the extent to which agents can reduce their debt in the event of a fall in prices, we need to determine ex ante whether the level of agent debt is sustainable. A historic or geographic comparison can give a relative idea of the debt level: despite a debt-reduction phase since 2009, the share of debt today is at a much higher level for Spanish households (representing 114% of annual income) than at the beginning of the 2000's (*Graph 12*). In 15 years, the debt to income ratio has progressed in France and fallen in Germany, although they are at comparable levels in 2014. The ratio among Italian households has progressed, but remains below that of the other major European countries. For companies, outstanding credit has also increased more than GDP in the main Eurozone countries except Germany, and is now at a rather high level compared to the years since 2000 (*Graph 13*).

12 - Household debt



Source: Banque de France

13 - Non-financial corporations debt



Source: Banque de France

However, the progression in debt can be due to lengthening maturities, better credit risk diversification or other differences in the structure of financing of the economy. It is therefore difficult, given these differences over time and between countries, to isolate whether current debt levels contain deflationary potential, and therefore to set an "alert" threshold.

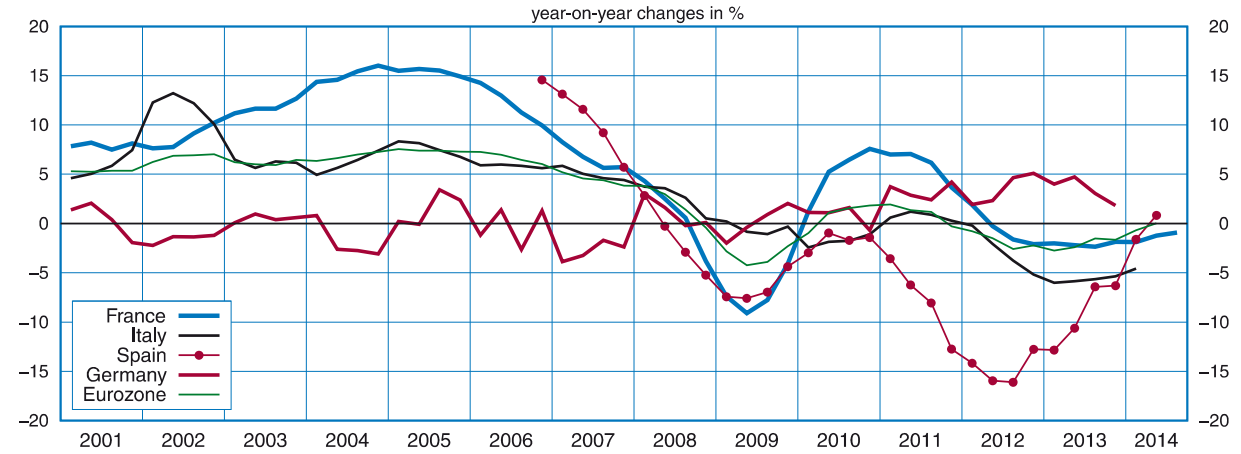
... trends in asset prices,...

Failing the possibility to determine the risk posed by debt levels, the trend in asset prices can be tracked as it provides an indication of the state of tension on these markets and of agent price expectations and can signal any large-scale debt-reduction behaviour. Today, new and existing property prices (*Graph 14*) are still falling on average in the Eurozone, notably in France and Italy, while they have levelled out in Spain and are progressing regularly in Germany. The national stock market indicators (CAC40, Dax30, Stoxx50, MIB, Ibex35), meanwhile, are on a positive trend, although this does not indicate what would happen if inflation were to become negative on a sustained basis.

... and corporate bankruptcies that can weaken the financial system...

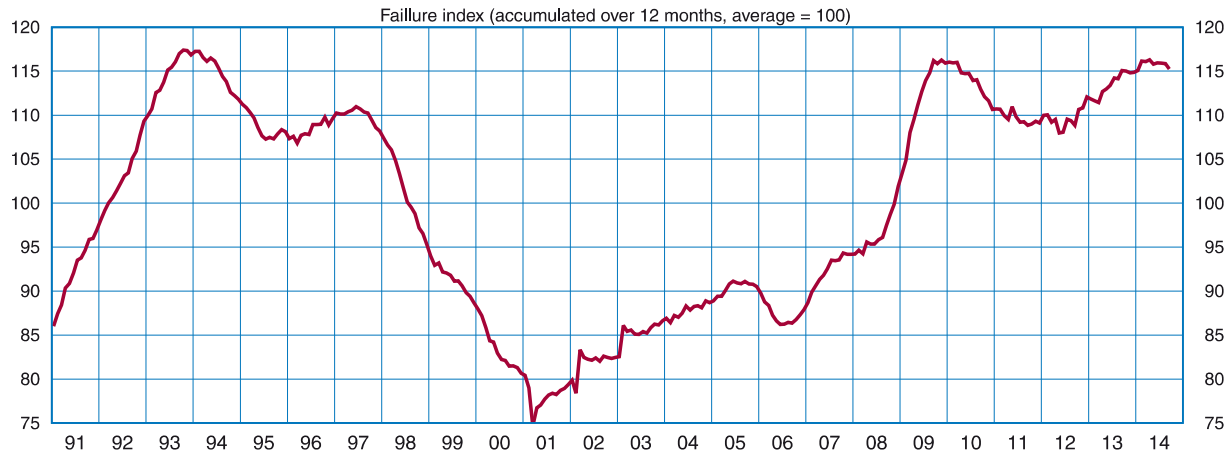
In the debt-deflation spiral process presented previously, the financial system may be weakened by bankruptcies of overindebted economic agents. In fact, continuing low demand in the Eurozone today is leading to a relatively high level of corporate bankruptcies, for example in France since the beginning of the 1990s (*Graph 15*), comparable to other slump phases in the economic cycle.

14 - Property prices



Sources: Destatis, Istat, INSEE, Eurostat

15 - Corporate bankruptcies in France



Source: Banque de France

The risk of negative inflation is real but does not necessarily signal deflation

However, the results provided by the ECB in its balance sheet review and stress tests (see *focus in the "Financial Markets" note*) give a more detailed assessment of the banking system of the main Eurozone countries. Among the Eurozone banks, Spanish and French banks would seem to have the equity levels that are closest to their optimal level, followed closely by the German banks. Conversely, the Italian banks need a more considerable adjustment in value (€12 billion) as a proportion of their assets (0.8% of their risk-weighted assets). Italian banks would also appear to be the most vulnerable to the stress scenario tested by the ECB.

... which can lead to restrictions of its supply of credit

Aside from agent debt-reduction behaviour that can weigh down on demand for credit, the deterioration in financial sector balance sheets can lead it to restrict its supply of credit, thereby slowing down activity and prices further. It is therefore important that we also track any restrictions there might be on lending. Today, according to the ECB Safe survey on access of European SMEs to financing over the period April to September 2014, 13% of European companies state that they are still encountering difficulties gaining access to external financing (against 11% six months earlier). In Italy, where credit supply restrictions have had a negative impact since the Great Recession (see *Del Giovane, Eramo and Nobili (2011)*), SMEs report a further increase in loan application refusals (to 20%) and show a recent tightening of access to bank loans and overdraft facilities. Conversely, according to the Safe survey, the situation is improving slightly in Spain and is much more favourable in Germany and France.

But determining "alert" thresholds is difficult

Analysis of the deflationary spiral mechanism described by the economic theory and observed in Japan suggests that several indicators should be tracked: agent debt, asset prices, corporate bankruptcies and credit supply. At this stage, several of these indicators point to some fragilities, at least partly linked to the low point in the economic cycle. It seems impossible, however, to determine in any sort of robust, rigorous way, whether the levels reached by these different indicators would favour the triggering of a deflationary spiral if inflation should become negative on a sustained basis.

All in all, while the risk of negative inflation is real, it does not necessarily signal deflation

Inflation should remain low in the Eurozone on a sustained basis. In Spain, France and even Italy, this could foster growth initially, by offering gains in purchasing power to households and in competitiveness to companies. But the situation of agents with debts - including the State - could then prove more complicated, which could limit the stimulus provided to the economy.

Also, given the uncertainties weighing on oil price trends, economic growth in the Eurozone and company margins, the risk of core inflation becoming negative in H1 2015 is real today.

The risk of such an episode of falling prices leading into a debt-deflation spiral, like in Japan at the end of the 1990s, is difficult to forecast in the absence of an indicator capable of predicting such a process. ■

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