In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

Nicolas Jégou
Anna Testas

Département de la conjoncture

Since 2009 the economic situation has diverged sharply between the main Eurozone countries. For example, GDP in Germany has risen 1.4 point above its pre-crisis level while it is 6.3 points lower in Spain and 7.7 lower in Italy, with France in an intermediate position showing a 1.1 points deficit. The unemployment rate stands at 5% in Germany, compared with 26% in Spain. It could therefore be expected that inflation should be much lower in Spain and Italy than in Germany. But in fact inflation has been higher each year in Spain and Italy than in Germany. What is the reason for this apparent paradox?

Several potential factors can be ruled out: difference in methods to measure inflation; difference in composition of consumption baskets; higher food inflation. Similarly, it cannot be said that wages have failed to adjust to the labour market situation. On average over the last two years real wages have progressed by 1.2% in Germany, and fallen by 2.7% in Spain and 1.6% in Italy.

The relative dynamism of inflation in Spain and Italy over the last two years can in fact be ascribed to the following factors:

- indirect taxation has played a significant role over the recent period in Spain and Italy, with a contribution to annual inflation of respectively 0.7 and 0.5 point. Inflation at constant taxation is thus slightly lower in Spain than in Germany and in France, but has remained higher in Italy;

- since 2010 energy inflation has been higher in Spain than in the other three countries, with the differential contributing an annual average of 0.4 inflation point;

- productivity has continued to decline in Italy, while it has improved in Germany and France since 2010, albeit moderately. Consequently, despite the divergence in wages, unit wage costs have followed a parallel path in the three countries. However, productivity has been extremely dynamic in Spain since 2008, to the extent that the growth differential in unit wage costs (UWC) with the other three countries reached 5 points in 2011 and 2012.

- the margin rate of Spanish companies has increased sharply since 2009 (+10 points in four years). Meanwhile, it has fallen in the other three countries since the start of the crisis, thereby attenuating the impact of the increase in unit wage costs on inflation.

Most of these factors are probably temporary, so the inflation differentials in the Eurozone should soon conform more closely to the macroeconomic situation.■

In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

Since 2009 the economic situations in the four main Eurozone economies have diverged sharply

The economic trend in the main Eurozone countries has diverged sharply since the end of the crisis *(see Table 1)*. The growth rate in Germany is significantly higher than in France, while activity has been very weak in Italy and Spain. These divergences continued in 2012: GDP growth should stand at +0.9% in Germany, against a 2.2% decline in Italy and a fall of 1.4% in Spain. In France, GDP should remain stable in 2012.

A very marked cyclical trough in Spain and Italy

The level of activity is not, however, sufficient as an indicator of the short-term economic situation because the sustainable growth rate and production capacities are not the same from one economy to the next. The gap between actual output and potential output[1], or the output gap, theoretically allows for a measurement of the tensions between supply and demand on the goods and labour markets[2] *(see Box 1)*. IMF output gap estimates *(see Table 1)* confirm the divergences between the European economies: an output gap that is virtually nil in Germany, in the order of -3 points in France and in the order of -4.5 points in Spain and Italy.

Unemployment rates differ widely

The differences in labour market situations also bear testimony to the divergence between the European economies *(see Graph 2)*. In Spain, the unemployment rate has climbed very sharply since 2008 and reached 26.1% in Q4 2012. At the same date, it stood at 11.2% in Italy, a level close to that observed in France (10.6%). Conversely, in Germany, it has fallen since 2005 and settled at 5.3% in Q4 2012.

(1)Potential output: the highest level of output that can be sustained in an economy over the long term.
(2)The calculation of the level of potential output, and hence of the output gap, is fragile. In particular, it is difficult to estimate the potential GDP level after a period of severe recession and to know the extent of the destruction of productive capacities. The output gap can be estimated either statistically by smoothing or adjusting a trend, or *via* an implicit structural relationship. This latter method requires the estimation of an equilibrium unemployment rate.

Table 1

GDP Growth rate[1], unemployment rate[2] and *output gap*[3]

	2009	2010	2011	2012
Germany				
GDP Growth rate	-5.1	4.0	3.1	0.9
Unemployment rate	7.8	7.1	6.0	5.5
Output gap	-3.7	-1.2	0.6	0.2
France				
GDP Growth rate	-3.1	1.6	1.7	0.0
Unemployment rate	9.5	9.7	9.6	10.3
Output gap	-4.6	-3.8	-2.7	-3.0
Spain				
GDP Growth rate	-3.7	-0.3	0.4	-1.4
Unemployment rate	18.0	20.1	21.7	25.1
Output gap	-2.8	-3.4	-3.2	-4.8
Italy				
GDP Growth rate	-5.5	1.8	0.6	-2.4
Unemployment rate	7.8	8.4	8.4	10.6
Output gap	-4.5	-2.9	-2.3	-4.2

(1) GDP - Seasonal and working-day adjustment
(2) Unemployment ratein the sense of the ILO (International Labor Bureau) - Annual mean
(3) Output gap in percent of potential GDP
Sources: INSEE, National statistical institutes, Eurostat, IMF

In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

However, inflation levels remained similar in 2012

In light of these macroeconomic trends, inflation in Spain and Italy, and even in France, should be much lower than in Germany *(see Box 1)*. Yet in 2012, it was similar in Spain, France and Germany, and even much higher in Italy *(see Graph 2)*.

In Spain, inflation is lower than it was prior to the crisis while in Italy it is higher

These inflation levels in 2012 partly mask certain trends which, since 2008, have conformed more closely to economic intuition. In Spain, average inflation in 2011-2012 was far lower than in the period 2000-2007, even though it remained higher than in Germany and France. The case of Italy is more surprising on the face of things, as the differential between inflation in Italy and that in Germany and France has grown slightly since 2007. Lastly, in Germany and France average inflation increased over the period 2011- 2012 against that in the period 2000-2007 *(see Table 2)*.

Table 2

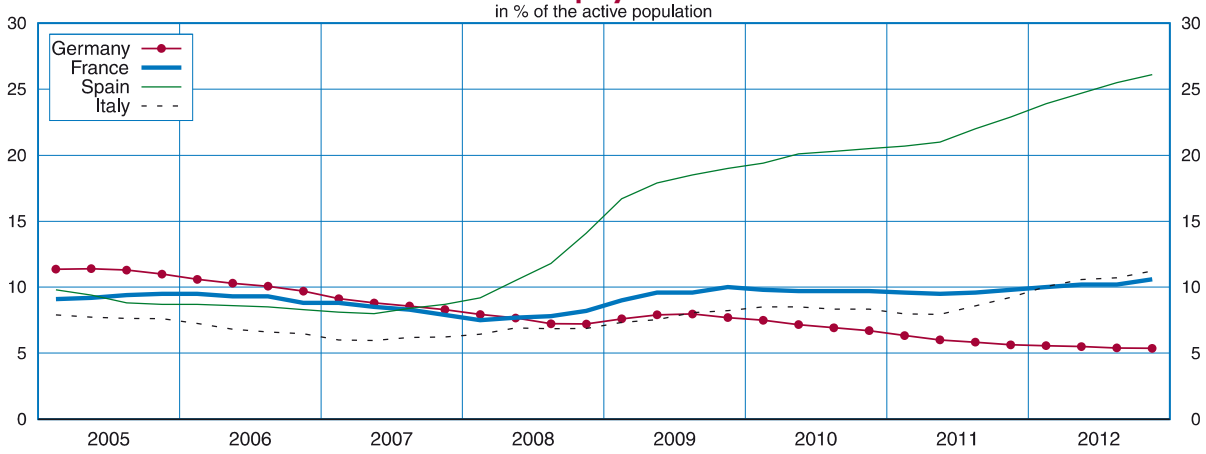
Overall inflation

Year-on-year annual variations	2000-2007	2008-2010	2011-2012
Germany	1.7	1.4	2.3
France	1.9	1.7	2.3
Spain	3.2	2.0	2.7
Italy	2.4	2.0	3.1

Source: Eurostat

1 - Unemployment rate

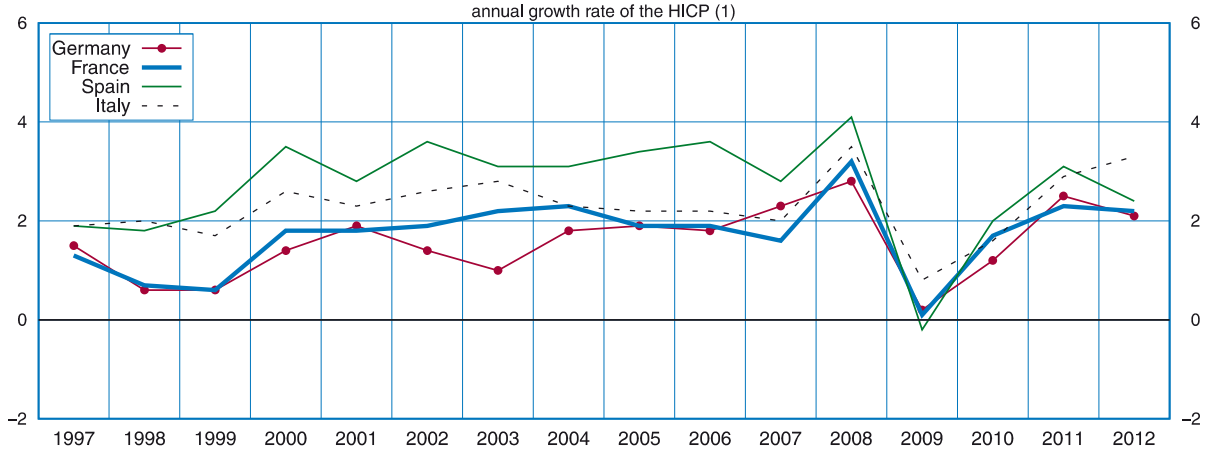
in % of the active population



Source: Eurostat

2 - Overall inflation

annual growth rate of the HICP (1)



(1) Harmonised Consumer Price Index: this concept is used in all this report

Source: Eurostat

In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

Box 1: There are numerous causes of inflation differentials

Different macroeconomic situations bring about inflation differentials

A link between unemployment, wages and prices

There is a close link between the formation of prices and that of wages (*see Box 5* in the previous report in this same issue of *Conjoncture* in France). Theoretically there is an inverse relationship between the unemployment rate (or its variations) and the growth rate of wages. Indeed the bargaining power of employees diminishes as the labour market deteriorates. Furthermore, a rise in unemployment results in a fall in household income and hence in demand. To cope with this and bearing in mind the fall in production costs, companies lower their prices. This is why inflation decreases when unemployment increases.

How to model price formation

The goods consumed in a country are either imported or produced locally. For a given sector (manufactured goods, energy, services, foodstuffs), the prices of consumer goods are thus a weighted average of the prices of products produced locally and the prices of imported goods.

The prices of imported goods are themselves generally a function of prices on foreign markets, converted into the national currency via the exchange rate, and of the prices of goods produced locally. Indeed, foreign exporters usually adapt their margins to the conditions of competition that they encounter on the national market. In practice the impact of foreign price variations on domestic prices is negligible, especially compared with the impact of exchange-rate fluctuations, which are more volatile.

In the long term the prices of locally produced goods are the result of a margin (mark-up) on the unit production costs. These costs include the unit wage cost (ratio of wages to productivity), the price of intermediate consumptions, and the cost of capital.

Corporate margins depend on the company's market power. The higher the demand to supply ratio, the greater this market power. An indicator of the pressure on supply is the production capacity utilisation rate. However, this is an imperfect indicator as its scope only covers the manufacturing industry. An alternative way to model the price-elasticity of demand is to directly use the growth rate of demand.

Other factors may be at the origin of inflation differentials with a given macroeconomic situation

Different baskets of consumption

Firstly, the various price indices are based on national baskets of goods. But consumer expenditure structures differ from one country to the next. The same price change in a sector may thus have different repercussions on the overall index of each country. For example in Germany, rents weigh heavier in the overall index because Germans rent more than in France, Spain and Italy. The same rise in rent prices will therefore contribute more to an increase in inflation in Germany than in the other countries.

Measurement differences

Estimating inflation is highly complex and requires methodological choices that may differ from country to country (*see Box 2*). The HICP concept, standardised by Eurostat, homogenises the calculation methods as far as possible in order to facilitate international comparisons. However, the methodology used to calculate the prices of certain products, in particular to take account of quality effects, may differ slightly from one country to the next.

Differences in tax changes

Inflation is also affected by indirect tax shocks, especially in a period of wide-ranging fiscal consolidation measures. A taxation change can cause a temporary inflation differential between countries as the rise is transmitted by companies to consumers. These rises are either targeted to certain products (energy, tobacco, public transport services, telecommunications, etc.) or are more general VAT rises. Italy and Spain in particular have recently implemented major VAT increases.

Economic structure differentials

Lastly, inflation differentials between countries may reflect differences in economic structure. For the same good, price changes may produce a different trend because of the degree of competition in the sector, the nature of wage negotiations, the degree of wage indexation to prices, etc. Inflation may also undergo various shocks and the reaction to the same shock may differ in both scale and speed.■

This report presents a first analysis of the factors explaining these inflation differentials other than the macroeconomic situation of the countries and methodological differences *(see Box 2)*. Then price formation mechanisms will be examined by sector, through the prices of energy and food, as well as the core prices.

Differences in consumption structure barely contribute to the inflation differentials between the four biggest Eurozone countries

Baskets of goods differ from one country to the next

There is no basket of goods which is common to all countries for harmonised consumer price indices across European countries, and so products are not weighted in the same way from one country to the next *(see Table 3)*. Indeed this weighting reflects the monetary expenditure of final household consumption in the country in question *(Eurostat, 2008)*. These differences in weighting influence the inflation differentials between countries. For example, foodstuffs, clothing items and café and restaurant expenditure weigh more in Spain and Italy than in France and Germany. In Germany the "housing" and "leisure and culture" items weigh less heavily in headline inflation than they do in the other countries. Lastly, the weight of transports is greater in the French HICP.

These differences contribute little to inflation differentials

To identify the impact of differences in weighting on inflation differentials, it is instructive to create inflation series by country using the Eurozone average weighting. These series serve to estimate how consumer prices would evolve if all the counties had an identical consumption structure to that of the Eurozone average.[3]

For each country, the differential between the year-on-year prices calculated using the Eurozone weighting and these same year-on-year values calculated with the weighting of the country is represented *(see Graph 3)*. On average over the period 1998-2012, this differential is nil for the four main countries. This means that the differences in consumption composition do not explain a

(3)For each country 46 sectoral price series were aggregated in order to rebuild a price index with an identical consumption structure.

Table 3

Weighting of the major sectors in the harmonised consumer price index in 2012

	Germany	France	Spain	Italy	Euro zone
All harmonised consumer price index	1 000	1 000	1 000	1 000	1 000
Overall index excluding . energy. food. alcohol and tobacco	718	698	670	701	699
Food	117	163	184	169	152
Alcoholic beverages. tobacco	39	40	29	33	38
Clothing	54	53	84	97	68
Housing. water. electricity. gas	239	158	124	111	163
Household equipmentr	57	63	67	84	66
Health	52	41	32	37	44
Transport	144	174	145	161	154
Communications	30	31	38	26	31
Hobbies and culture	120	93	77	63	93
Education	9	4	14	12	10
Hotels, coffee and restaurants	55	80	138	115	92
Other goods and services	84	101	68	91	87

Source: Eurostat

In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

Box 2: Methodological differences only explain small inflation differentials

The HICP were designed specifically for the purposes of international comparison. They are devised using a harmonised method with a view to calculating comparable ICP as required by the convergence criterion of the *Maastricht Treaty*.

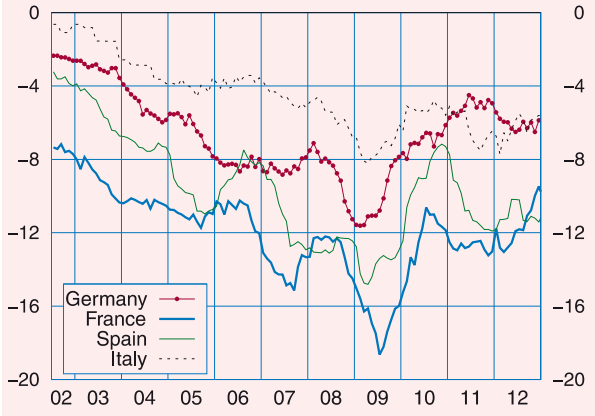
However, the process for harmonising price indices is still in progress. The methods recommended by the legislation can be applied with a certain flexibility. For some calculations, several methods can be used. However, they must not be at the origin of a differential of more than 0.1 point in the overall HICP. Additionally, the measure of quality effects can differ from one country to the next in certain sectors. These are sectors in which the "quality effect" is important, i.e. in which products are often replaced by other products of different quality and price. In its *Guide to the Harmonised Indices of Consumer Prices*, the European Commission indicated in 2004 that a range of specific goods and services such as automobiles, books and CDs, clothing items, computers and telecommunications services, required a better adjustment of quality and sampling.

As an example, the year-on-year prices of sound and image reception, recording and reproduction equipment on the one hand, and telephony and fax equipment on the other, is represented *(see Graphs 1 and 2)*. Overall the prices of these apparatuses have fallen sharply in all countries over the last ten years, reflecting among other things the inclusion of quality effects in each country.

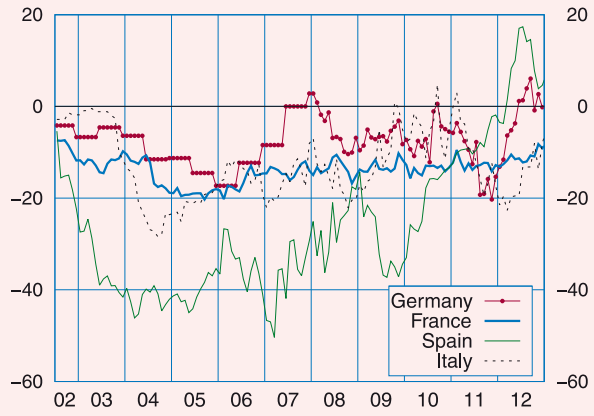
However, the differences between countries are sometimes substantial. For reception equipment, inflation is far lower in France than in Italy. From 2003 to 2012, this gap contributed 0.1 point to the headline inflation differential between the two countries. For telephony equipment inflation from 2003 to 2011 was much lower in Spain than in the other countries, before picking up sharply in 2012. In Spanish headline inflation in 2011 and 2012, bearing in mind the low weighting (0.06%), these fluctuations had a negligible impact.

As regards relatively standard and easily exchangeable goods, it is nonetheless still difficult to know whether these gaps reflect differences of inclusion of quality changes in the price index or of distribution structures that differ from one country to the next (competition between distributors, level of equipment of households, etc.).■

1 - Sound and image reception, recording and reproduction equipment



2 - Telephony and facsimile equipment



Source: Eurostat

structural inflation differential. However, these gaps may have short-term repercussions although they are usually limited to +/- 0.2 inflation point. The largest differential is observed at the start of 2009. Spanish inflation would have been 0.5 point higher if it had been calculated with the Eurozone average weighting, since fuels, the prices of which were falling sharply, weigh less in the Eurozone weighting than in that of Spain. At the end of 2012, if inflation were to be calculated with the Eurozone weighting it would be 0.2 point higher in Germany, Italy and Spain

When corrected for taxation, inflation seems low in Spain but not in Italy

A measure of the effects of tax changes on prices

To describe the effects of taxation on observed inflation, Eurostat publishes inflation series "at constant tax rates". These series give the theoretical impact of changes to indirect taxes (VAT and excise duty) on headline inflation, and across the four main sectors. This impact is theoretical because it assumes that the change in indirect taxes is transferred to consumer prices immediately. In practice this transfer is slower and only partial, because in the short or even long term, companies absorb part of these changes into their margins[4] *(see Box 3)*.

The difference between the quarterly consumer price variations actually observed and those that would have been observed at constant tax rates gives a measure of the maximum amplitude of inflation differentials between countries; such differentials may be due to fiscal consolidation measures and in particular recent VAT rises *(see Graphs 4a to d)*.

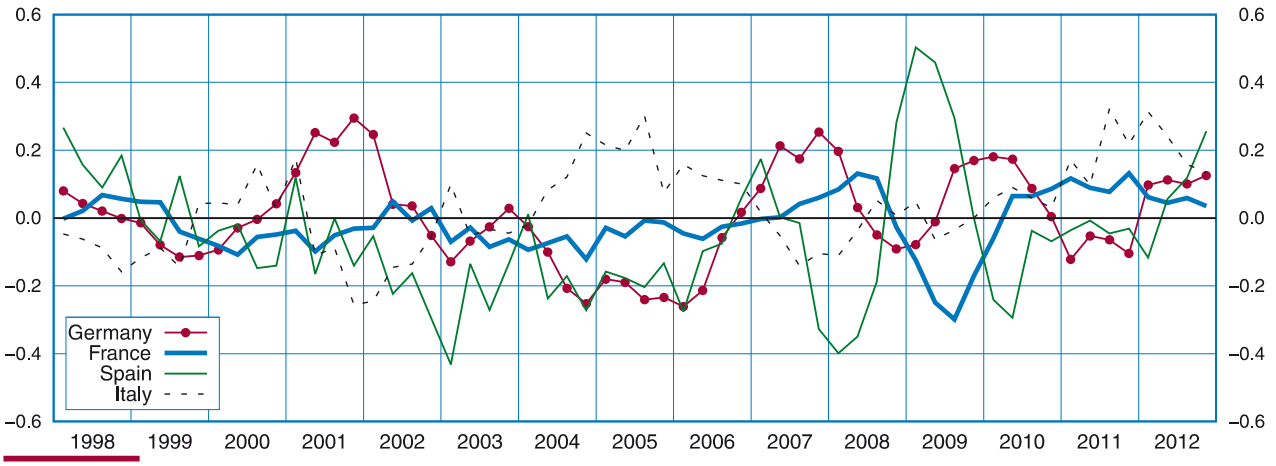
Numerous shocks in the recent period in Italy and Spain

In Italy and Spain there have been numerous changes to indirect taxes since 2010.In Italy, the full rate of VAT rose from 20 to 21% on 17 September 2011. The rise in taxes on energy in 2011 was also large, with a budgetary performance in 2012 that was higher than the VAT rise. In 2012, taxes on tobacco also increased.

In Spain, on 1st July 2010 the full rate of VAT rose from 16 to 18% and the reduced rate from 7 to 8%. Then on 1st September 2012 the full rate was increased once

(4) In concrete terms, this convention results in an increase in the impact of tax changes on inflation. This strengthens the argument that the role of tax changes is not decisive in inflation differentials within the Eurozone.

3-Differentials between inflation series calculated with the Eurozone weighting and the published HICP series



How to read it: in early 2009, Spanish inflation would have been 0.5 point higher if it was calculated with the Eurozone average weighting.

Sources: Eurostat, INSEE calculations

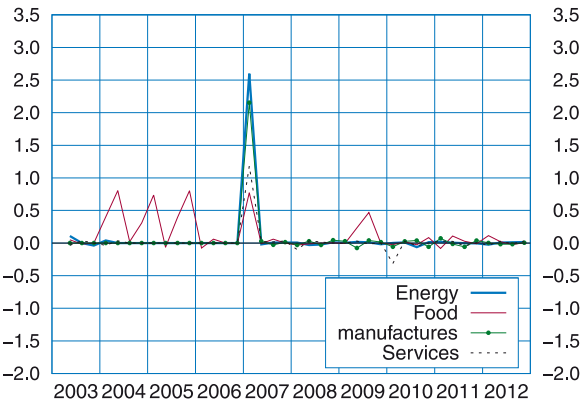
In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

Box 3: Indirect tax rises are transmitted only partially: the example of the VAT rise in Spain

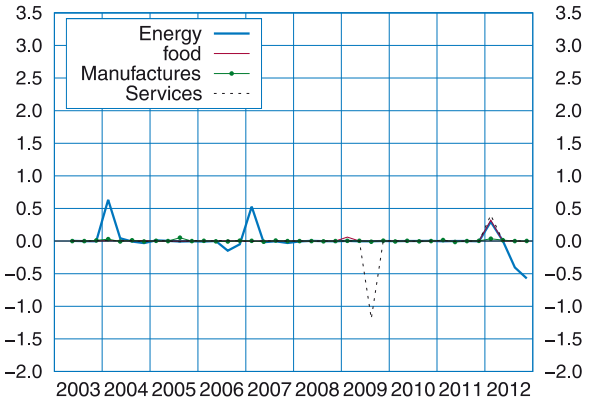
Indirect taxation has had a major impact on inflation in Spain and Italy over the last three years. However, VAT rises are usually only partially transmitted to consumer prices. In this case inflation at constant tax rates, whereby the entire theoretical effect of tax changes on prices is subtracted, underestimates inflation "excluding taxation" in the event of tax rises.

In Spain in July 2010, the theoretical impact of the increase in the full and reduced VAT rates is estimated at 1.1%. The Focus in the Conjoncture in France issue of December 2010, "Effects of the VAT rise on consumption in Spain", proposed a measure of the actual transmission by comparing the observed changes in prices to those "without a VAT rise" which were simulated on the basis of past behaviour. This modelling suggested that this tax rise contributed to a 0.6-point increase in year-on-year consumer prices in October 2010, i.e. a transmission in the order of 54% of the VAT rise to consumer prices four months later. Businesses thus absorbed part of it into their margins in order to limit the rise in their own prices. In September 2012, the theoretical impact of the increase in the full and reduced VAT rates is estimated at 1.9%. In December 2012, the tax rise appears to have contributed to a 0.9% year-on-year rise in consumer prices: 50% of the VAT rise was transmitted to the consumer price. Once again, businesses absorbed part of it into their margins.■

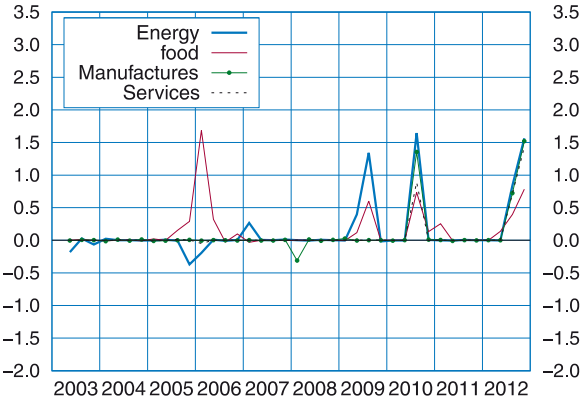
4a - Impact of taxes in Germany



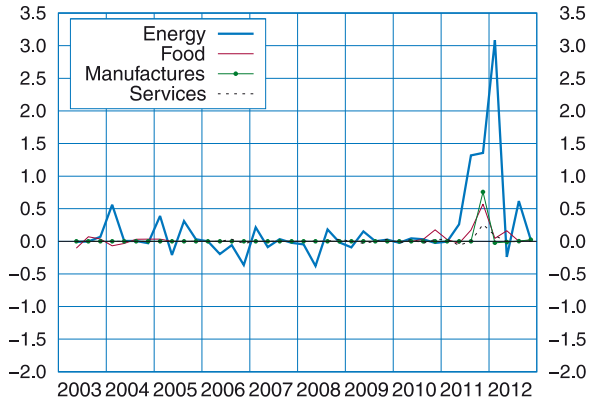
4b -Impact of taxes in france



4c - Impact of taxes in Spain



4d -Impact of taxes in Italy



How to read it: In Spain, indirect taxes in 2009 contributed 2009 to 1.5 point of energy inflation and 0.6 point of food inflation.

Sources: Eurostat, INSEE calculations

again, from 18 to 21%, and the reduced rate from 8 to 10%. The theoretical impact[5] of these rises on the general price level is estimated by Eurostat at respectively 1.1% and 2.0%[6] *(see Box 3)*. Since mid-2009 tobacco prices have risen sharply in Spain. From 1997 to May 2009, the year-on-year rise in tobacco prices averaged 6.0%, but since June 2009 this figure has climbed to 13.0%. The impact of tobacco taxes represented a contribution of 0.23 point to headline inflation overage between June 2009 and December 2012.

Tax changes have been less frequent in Germany and France

In Germany, taxation has changed little over the last five years. The VAT rate was increased from 16 to 19% on 1st January 2007, and tobacco prices rose in March and December 2004, September 2005 and June 2009.

In France the VAT rate in the catering sector was lowered on 1st July 2009. The reduced rate then rose from 5.5 to 7% on 1st January 2012. Additionally, the TIPP (domestic tax on petroleum products) was raised in 2004 and 2007. However, the TIPP, now called the TICPE[7] was cut by 3 eurocents in September 2012, contributing to a 0.5 point fall in energy inflation *(see Graph 4b)*.

At constant tax rates, inflation in Spain and Italy is lower, although still high in Italy

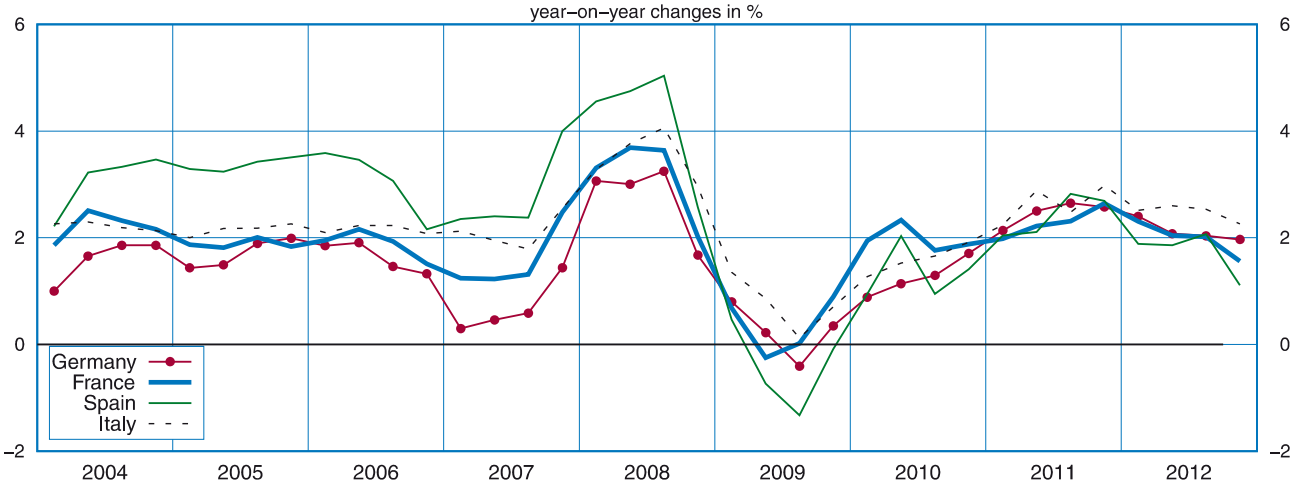
At constant tax rates the inflation differentials between the four economies are more in line with the respective position of the economies in the business cycle *(see Graph 5)*. Inflation has been lower in Spain than in the other countries since the start of 2012, except in August 2012 due to the effects of anticipation of the VAT rise. Spanish inflation at constant tax rates was only 0.9% in December 2012. In Italy however, the level of inflation is still high compared with the other countries.

Manufactured goods inflation was low in Spain at end 2012

An analysis of the data on inflation at constant tax rates for various products shows that manufactured goods inflation excluding taxation has been far lower in Spain since 2009 than in the other Eurozone countries. It was even nil in Q4 2012[8] *(see Graph 6a)*. It thus appears to be more in line with the position of the Spanish economy in the cycle, all the more so in that prior to 2008, manufactured

(5) In practice, the transmission is partial.
(6) The estimate is the same in the Focus, "Effects of the VAT rise on consumption in Spain", in *Conjoncture* in France, December 2010.
(7) TICPE: Domestic consumption tax on energy products, formerly the TIPP (domestic tax on petroleum products).
(8) Remember that the method for calculating inflation at constant tax rates, which assumes immediate and total transmission, means that inflation is underestimated just after tax rises.

5 - Headline inflation at constant tax rates



Source: Eurostat

In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

goods inflation was much higher in Spain than in France or Germany. Conversely, in Italy where manufactured goods inflation was also higher before, it only dropped very slightly in 2012.

Services inflation remains high in Italy but has fallen sharply in Spain

In 2012 in Italy, services inflation at constant tax rates was high *(see Graph 6b)*. Its contribution to headline inflation was 0.9 point in 2012, against 0.6 point in the other countries. Transport prices in particular were dynamic due to the transmission of the rises in oil prices. In Spain, services inflation at constant tax rates has fallen significantly since 2009 and is lower than elsewhere: 0.7% as an annual average in 2012.

In Spain the sharp drop in services inflation between October 2008 and April 2010 was fairly generalised. On the one hand the prices of leisure services including repairs and personal care decreased sharply, as did the prices of miscellaneous services, with these two items contributing 2.3 points in total to the drop in services inflation. On the other hand, the end of the property bubble led to a drop in housing services inflation, contributing to 0.5 point of the fall in services inflation over this period.

The inflation trajectories in the different Eurozone countries thus involve trends that differ from product to product. In the next part of this report we examine firstly the price formation of food and energy products, for which external commodity price shocks are very significant, and then the formation of core prices.

In Spain, less food inflation but more energy inflation

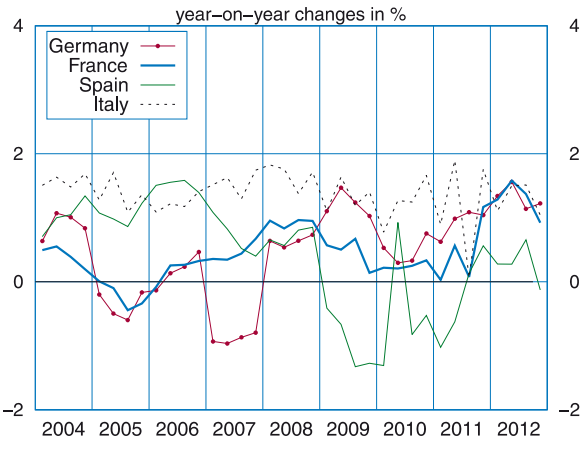
In 2011-2012, food inflation at constant tax rates was higher in Germany and France

Changes in food prices at constant tax rates have been fairly similar across the different countries since 2006. Food consumer prices in the four countries react, among other things, to variations in the prices of food commodities, the principal cause of their variability. Over the period 2011-2012, food inflation in France and Germany was higher on average than in Spain and Italy and so cannot explain the relative dynamism of Spanish and Italian inflation *(see Graph 6c)*.

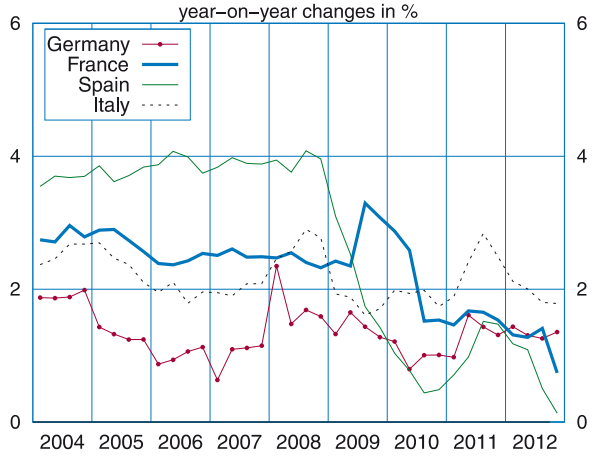
No break in food consumer price trends since 2011

By estimating the variation in food prices and performing a predictive failure test to compare the period 2011-2012 with the period 1996-2009, we observe that

6a - Manufacturing - constant tax



6b - Services - constant tax



Source: Eurostat

there is no break between these two periods in any of the countries *(see Box 4)*. Food inflation in 2011-2012 thus behaved in the same way as previously: the low level of food inflation in Spain and Italy does not result from an adjustment of food prices in reaction to weak demand *via* a fall in margins.

In all countries energy inflation adjusts to oil prices over the long term

Over the long term, energy inflation appears to have been similar in all four countries since it is highly correlated with the changes in Brent prices in euros *(Richard et al., 2008)*. Indeed there is a cointegration relationship between the energy HICP and the price in euros of Brent over the period 1999-2007 in France, Spain and Italy,[9] meaning that these two variables follow the same long-term trend.

Over the short term however, trends can differ. Up to 2011 in Germany and Italy, energy inflation did not fall as much as in France and Spain during periods when oil prices were falling, and increased less when they were rising. The share of flat-rate tax in indirect taxation in Germany and Italy, causing adjustment rigidities, may have contributed to this. However, in 2012, with the drop in the price of Brent, energy inflation fell sharply in Germany whilst remaining high in Italy *(see Graph 6d)*.

Over the period 2010-2012, energy inflation was particularly high in Spain

Globally though, energy prices since 2008 have fluctuated in a similar pattern in France, in Germany and in Italy *(see Graph 7)*. However, the variations in energy prices in Spain since 2010 have been quite different to those observed in the other countries. Between January 2010 and December 2012, energy inflation was virtually always higher in Spain than in the other countries (10.4% on average in Spain against 6 to 8% in the other countries).

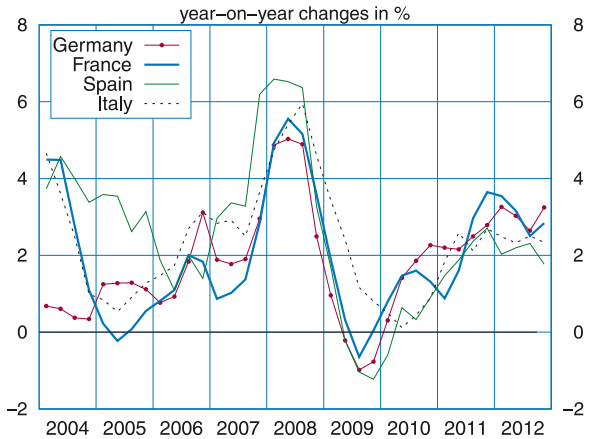
At constant tax rates over the period 2010-2012, energy inflation thus contributed 1.1 point on average to headline inflation in Spain, against respectively 0.8 point in France, 0.7 point in Germany and 0.6 point in Italy (the energy weighting is lower in the Italian HICP).

Inflation differentials are mainly due to changes in petrol prices

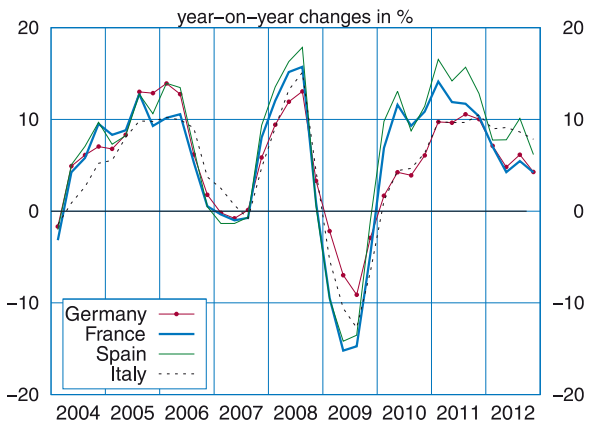
In the HICP, energy prices are composed of the prices of electricity, gas and other fuels, and the prices of petrol and lubricants. Gas and electricity prices are mainly

(9) In Germany the cointegration relationship is verified when a longer estimation period is used.

6c - Food- constant tax



6d - Energy - constant tax



Source: Eurostat

In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

Box 4: Modelling food inflation

For *Conjoncture* in France, the forecast of the changes to food consumer prices for France is built by modelling price formation sequences along the production chain: agricultural producer prices, agrifood producer prices, and consumer prices (*see Focus in Conjoncture in France* December 2010, "What are the effects of the rise in commodity prices on consumer prices?"). In the present report it is not possible to reproduce this estimation strategy because agricultural and agrifood producer prices are not available for all the countries.

Another possible strategy would have been to highlight - in the same way as for energy prices - a cointegration relationship between food consumer prices and food commodity prices. But the standard tests reject the existence of such a relationship.

However, it is possible to build a model describing the short-term variations in food consumer prices according to the variations in wheat and commodity prices, unit wage cost in agriculture and, where applicable, variations in the Brent price.

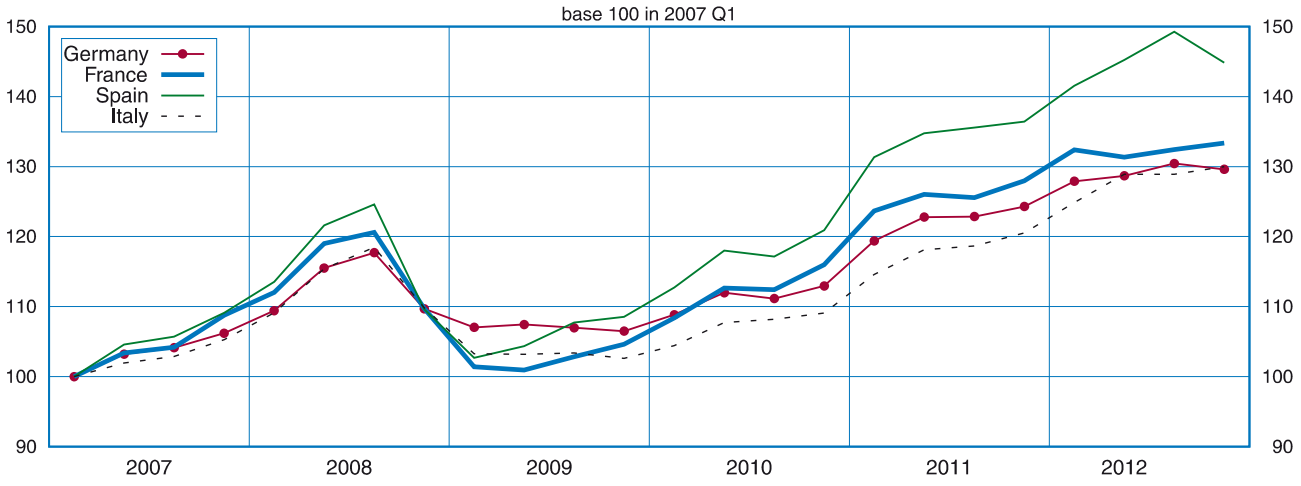
In order to test whether the food price formation was modified or not in recent years, these models are estimated over the period 1996-2009, after which statistical forecasts up to 2012 are performed and compared to the price changes actually observed, using Chow predictive failure tests. These suggest that food consumer price formation has not been modified in recent years.■

Predictive failure tests comparing the period 2011-2012 with the period 1996-2009

	Germany	France	Spain	Italy
F-statistic of Chow forecast test	1.14	1.66	1.62	1.56
P-value	Prob. F(7.45) = 0,35	Prob. F(7.45)=0,14	Prob(7.39)=0,16	Prob(7.44) = 0,17
Predictive failure tests of Chow	no	no	no	no

Source: INSEE

7 - Energy price level at constant tax rates



Sources: Eurostat, INSEE calculations

regulated. Once changes to taxation have been taken into account (VAT rises in Spain and Italy), fluctuations in the prices of electricity, gas and other fuels have not differed greatly across the four countries in recent years. Energy inflation differentials are thus due to the changes in petrol prices.

Rises in corporate margins in Spain and in unit wage costs in Italy contribute to the persistence of core inflation

An accounting breakdown of core consumer prices...

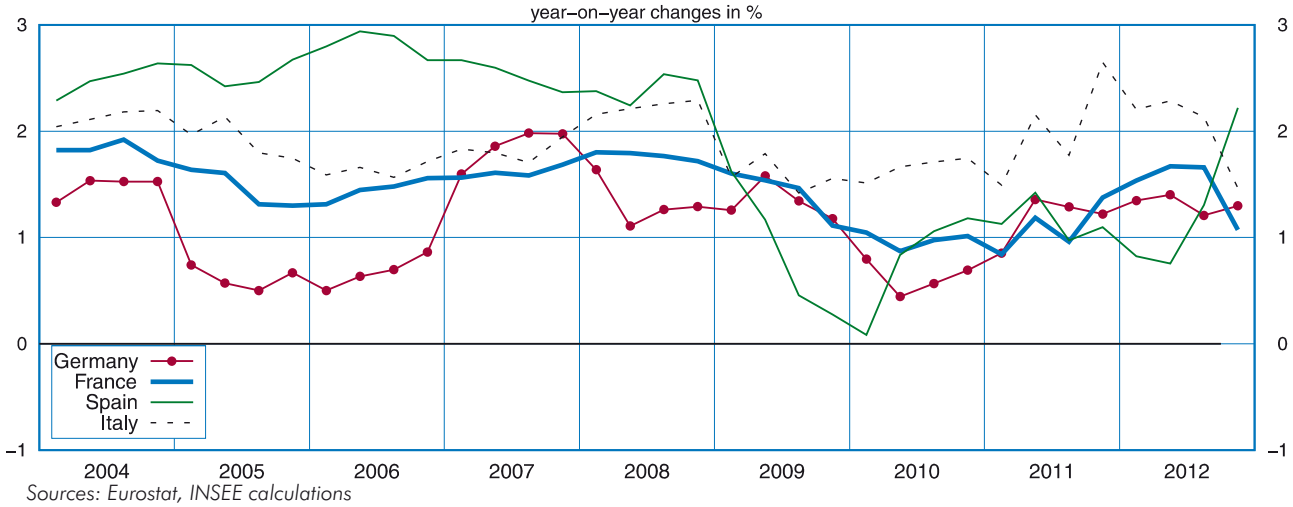
All in all, energy and food inflation is globally similar across the four main Eurozone countries. This is not in itself surprising as it is determined to a far greater extent by changes in commodity prices than by those in wage costs. However, wage costs do have a stronger influence on the other items in the basket of goods. Bearing in mind the divergence in the economic situation in the Eurozone, wages have evolved very differently in the four countries. In Germany nominal wages have increased by 3.1% on average over the last two years, against just +0.2% in Spain and +1.0% in Italy. So it is core inflation - excluding foodstuffs and energy - that is expected to be far lower in Spain and Italy. However, even when corrected for taxes, this is not the case in Italy, while observations in Spain are not fully in line with the growth differential in wages.

... according to the prices of domestic resources

To understand these evolutions which seem surprising on the face of things, the core prices *(see Graph 8)* are broken down according to their determinants *(see Table 4)*. The prices of goods consumed in a country depend on the prices of domestic resources, which are either produced by national producers or produced abroad and imported. The prices of value-added in the non-agricultural market branches are used as an approximation of the prices of national producers. The share of production destined for exports is subtracted from the calculation of prices of domestic resources. For the prices of imported goods, the deflator of imports excluding the share of fuel consumed by households[10] was used. All in all, the domestic resources used in this report are the sum of non-exported value-added and imports. Taxes and inventory change notwithstanding, they are equivalent to final domestic demand.

In order to understand the price formation mechanisms of national producers, the differential between the prices of domestic resources and the prices of value-added is then studied. This differential may have two sources. On the one hand, if import prices are very dynamic, most notably due to commodity prices, the prices of domestic resources increase more rapidly than the prices of domestic value-added. On the other hand, competition in exports may incite

8 - Core inflation



Sources: Eurostat, INSEE calculations

national producers to limit the rise in the prices of exported goods. This behaviour then results in the prices of value-added being less dynamic than those of domestic resources.

The changes in the prices of value-added can then be examined from an accounting viewpoint according to margins in relation to the growth in unit wage costs (*see Graphs 9a to 9d*). The unit wage cost measures the "cost of a unit produced". It is calculated as the ratio of the nominal wage cost per head to the actual productivity per worker. A drop in productivity or a rise in the nominal wage cost leads to a rise in the unit wage cost.

In Germany, the recent dynamism of the unit wage cost has been almost fully absorbed into margins

In 2011 and 2012, core inflation was slightly higher than in previous years in Germany (+1.3% against +1.0% on average over 1997-2007). Indeed in the 2000s the unit wage cost decreased in Germany because productivity rose sharply while nominal wages progressed only slightly. Conversely, in 2011 and 2012 the unit wage cost picked up sharply since productivity gains were smaller (even though the fact that they dropped in 2008 in 2009 would lead one to expect a catch-up effect), while nominal wages were more dynamic.

This rise in the unit wage cost is offset by a drop in the margin rate, which, after increasing significantly in the 2000s, has fallen since 2008. The prices of value-added have however grown less quickly than core inflation, although the differential has remained constant over time. This stability masks two trends, however. Over the period 1997-2007 core inflation was stronger than the prices of domestic resources. Indeed, the investment in construction deflator stagnated. Since 2008 core inflation has grown at the same pace as the prices of domestic resources. Additionally, the prices of domestic resources were substantially

(10) Variations in the import deflator are largely determined by changes in fuel prices, which are highly volatile. As part of this fuel is destined directly for household consumption and as we are modelling the growth of core prices, which thus exclude energy, the import deflator is calculated excluding fuel consumed by households.

Table 4

Core inflation and contributions of different determinants

Countries	Germany		France		Spain		Italy	
Period	1997-2007	2011-2012	1997-2007	2011-2012	1997-2007	2011-2012	1997 - 2007	2011-2012
Core inflation	1.0	1.3	1.3	1.3	2.7	1.2	2.2	2.0
Difference between inflation and prices of domestic resources	0.6	0.0	-0.2	-0.1	-0.6	-0.9	-0.3	0.8
Difference between prices of domestic resources and prices of VA	0.0	0.6	0.0	0.2	-0.3	0.9	0.2	0.4
Difference between prices of VA and unit wage cost	1.1	-1.6	0.2	-0.9	0.1	4.0	0.0	-1.1
Unit wage cost	-0.7	2.3	1.3	2.0	3.5	-2.6	2.3	1.9
including contribution :								
of labor costs per head	*1.0*	*2.9*	*2.5*	*2.6*	*2.7*	*0.3*	*1.8*	*0.8*
of productivity growth	*-1.7*	*-0.6*	*-1.2*	*-0.5*	*0.8*	*-3.0*	*0.4*	*1.1*

How to read it: On average over 2011-2012, core inflation in Germany was +1.3% with contributions of +2.3 point from unit wage costs, -1.6 point from the margin rate, and +0.6 point from the increased dynamism of prices of domestic resources against the price of value-added. All values concern the non-agricultural market branches (except for core inflation).

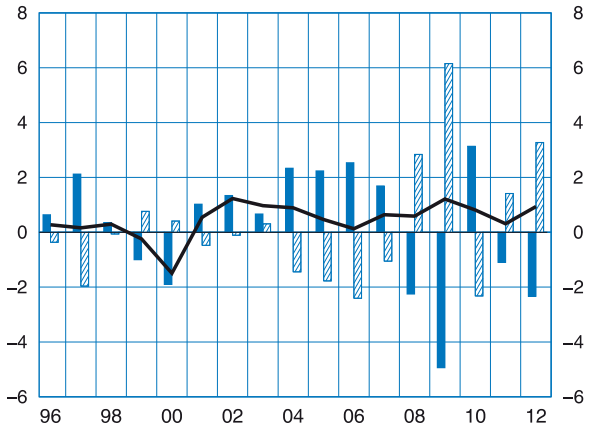
sustained by import prices in 2011-2012, explaining why they increased more sharply than the prices of value-added.

In France the slowdown in productivity has been offset by the fall in margins, and core inflation has remained unchanged from the pre-crisis period

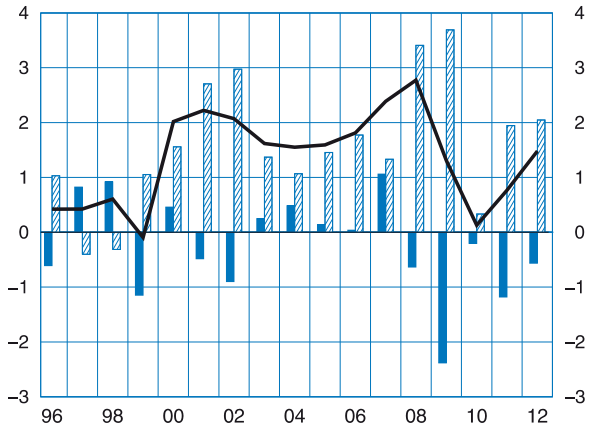
Core inflation stood at 1.3% on average for 2011-2012, i.e. the same as in 1997-2007. In France, core inflation grows at the same pace on average as the prices of domestic resources. Furthermore, these prices of domestic resources were only moderately affected by the rebound in import prices in 2011-2012 (contribution of 0.2 point to core inflation). All in all, core inflation has behaved like the prices of value-added.

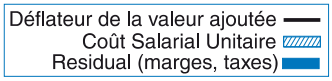
9 - Contributions to changes in the prices of value-added

9a - Germany

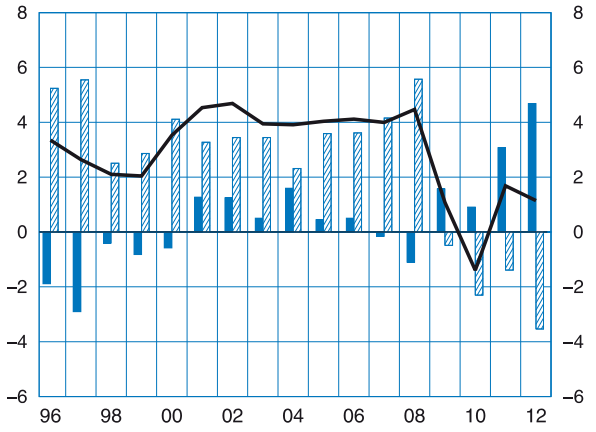


9b - France

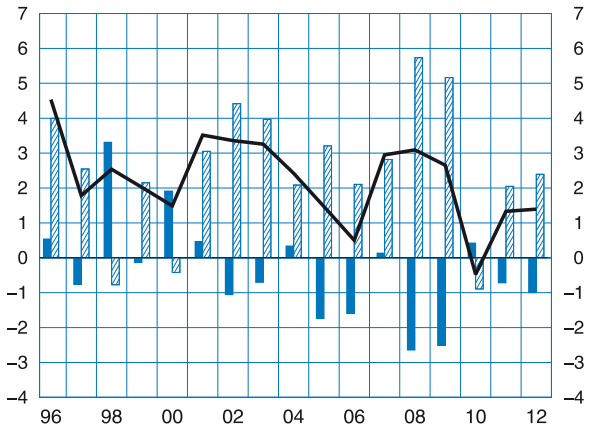




9c - Spain



9d - Italy



Sources: National Statistical Institutes, INSEE calculations

In the Eurozone, why is inflation not lower in the countries most affected by the crisis?

In France, productivity has slowed since the crisis but wages have continued to increase at the same pace as before. Therefore, unit wage costs have accelerated and contributed to core inflation more. But core inflation has managed to remain stable because the rise in the unit wage cost has been absorbed into corporate margins, which have fallen since the crisis.

In Spain, core inflation has decreased because the significant drop in the unit wage cost has only been partially offset by the sharp rise in margins

Core inflation slipped back in 2011-2012 (+1.2% on average against +2.7% in 1997-2007). During the 2000s the unit wage cost was dynamic in Spain because nominal wages grew strongly and productivity was stable. In 2011 and 2012, nominal wages stopped progressing and productivity gains grew strongly, so much so that the unit wage cost fell back sharply (-2.6% against +3.5% previously). This slide led to a drop in the prices of value-added, although this was limited by the significant rise in the margin rate.

The transmission of this drop in prices of value-added to core inflation was partly mitigated by the acceleration of import prices which stimulated the prices of domestic resources. All in all, core inflation grew by 1.2% on average in 2011-2012 against 2.7% between 1997 and 2007.

In Italy, wages have slowed and margins narrowed, but productivity has dropped further and taxes have increased

Core inflation fell back only slightly in Italy in 2011-2012 compared to 1997-2007, despite the sharp deterioration in activity.In 2011-2012, core inflation was sustained by the VAT rise in September 2011, explaining the gap between core inflation and prices of domestic resources. Also, as in the other countries, import prices were more dynamic in 2011-2012 and the differential between prices of domestic resources and prices of value-added rose by 0.2 point. However, prices of value-added slowed due to the fall in the margin rate, contributing to the slowdown in core prices. Unit wage costs barely slowed because the drop in productivity worsened, thereby virtually offsetting the sluggishness of wages.

Conclusion

Inflation in Spain and Italy seems high considering the macroeconomic situations of these countries, and this report has highlighted a number of factors that have contributed to sustaining inflation in these countries in recent months.

Some of these factors are the result of shocks that should be exogenous to the price formation processes in the different economies. In particular, these include the increases in indirect taxation which have largely sustained prices, with the VAT rises in September 2011 in Italy and July 2010 and September 2012 in Spain. Additionally, energy inflation in Spain, even corrected for indirect tax rises, was higher than in the other countries. These factors are temporary by nature.

But the persistence of inflation also reflects certain price formation mechanisms in these countries. In Spain unit wage costs fell sharply in 2011 and 2012 due to the stagnation of wages and very high productivity gains. But so far this drop has mainly resulted more in an increase in corporate margins than a slowdown in sale prices. Eventually however, the margin rate will stabilise even if productivity gains do not remain so dynamic, and the weak progress of labour costs will slow down prices in the Spanish economy. Corrected for the effect of the VAT rise in September 2012, core inflation appears to be low in Spain at the start of 2013.

In Italy, the cost of labour also significantly lost ground in 2011 and 2012, but in parallel the drop in productivity gathered pace, so unit wage costs barely slowed. In this country a slowdown in core prices without squeezing corporate margins can only happen if productivity starts to pick up again.■

Bibliography

Banque centrale Européenne, 2012 "Inflation differentials in the euro area during the last decade"

Commission Européenne, 2004 « Indices des Prix à la Consommation Harmonisés (IPCH), Petit guide de l'utilisateur », *Méthodes et nomenclatures*, mars 2004.

Eurostat, 2008, " European price statistics, an overview" *Eurostat Statistical Books*, pp 21-30.

Gallot P. et Heitz B., 2004, « L'inflation en France et en zone euro : une approche macro sectorielle », *Note de Conjoncture*, Insee, mars 2004, pp 25-40.

Insee, 2010, « Quels effets de la hausse des cours des matières premières alimentaires sur les prix à la consommation ? », *Note de Conjoncture,* décembre 2010, pp 68-69

Insee, 2010, « Effets de la hausse de TVA sur la consommation en Espagne », *Note de Conjoncture*, décembre 2010, pp 111-113.

Richard B. et Roos W., 2008, « Prévoir l'inflation en zone euro : une approche macro-sectorielle », *Documents de travail de la DGTPE,* mars 2008. ■