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Is there a Threat of Self-Reinforcing Deflation in the Euro Area? A View through the Lens of the Phillips Curve

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Is there a Threat of Self-Reinforcing Deflation in the Euro Area? A View through the Lens of the Phillips Curve

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Abstract

The recent decline in euro area inflation has triggered new calls for additional monetary stimulus by the ECB in order to counter the threat of a self-reinforcing deflation and recession spiral. This note reviews the available evidence on inflation expectations, output gaps and other factors driving current inflation through the lens of the Phillips curve. It also draws a comparison to the Japanese experience with deflation in the late 1990s and the evidence from Japan concerning the output-inflation nexus at low trend inflation. The note concludes from this evidence that the risk of a self-reinforcing deflation remains very small. Thus, the ECB best await the impact of the long-term refinancing operations decided in June that have the potential to induce substantial monetary accommodation once implemented for the first time in September.

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1. The Recent Decline in Euro Area Inflation

Euro area inflation, as measured by the overall index of consumer prices, last peaked at 3 % towards the end of 2011. By early 2013 it had dropped below the ECB's objective of close to but below 2 %. From October 2013 onwards CPI inflation has come in at values between 0.3 % and 0.8 %. There has been only one period with lower inflation rates since the introduction of the Euro – the months following the trough of the Great Recession from May to October 2009. In addition, euro area output is far below standard estimates of potential output. The implied output gap is predicted to remain negative over the medium term.

The recent decline of inflation joint with substantial economic slack has led many commentators in the press and policy debates to warn of deflation and the threat of a self-reinforcing spiral of deflation and recession. They call for massive additional monetary stimulus to counter this threat, preferably outright purchases of government debt, even though the ECB has already announced a new program for substantial monetary expansion in June offering four-year liquidity at an unprecedented, very attractive, fixed rate starting in September. By contrast, this note argues that a period of sustained deflation or a deflationary spiral remains very unlikely. This conclusion is reached based on a review of the available evidence on inflation expectations, output gaps, price determination at low inflation rates and other factors driving inflation through the lens of the Phillips curve and a comparison with the experience of Japan in the late 1990s.

Most modern macroeconomic models contain a version of the Phillips curve similar to the following equation:

$$\pi_t = E_t\pi_{t+1} + \alpha y_t + \varepsilon_t. \quad (1)$$

π_t denotes the inflation rate, $E_t\pi_{t+1}$ refers to inflation expectations, y_t is a measure of the output gap and ε_t is a shock term, which may reflect changes in the market power of firms, changes in energy prices or the exchange rate. Additionally, Phillips curves often include lagged inflation terms that capture intrinsic, predictable, inflation persistence. The parameter α represents the slope of the Phillips curve and indicates the elasticity of inflation with respect to the output gap. According to the Phillips curve a negative output gap causes a reduction of the inflation rate. The magnitude of this reduction depends on the parameter α. If the output gap remains negative, inflation expectations, $E_t\pi_{t+1}$, might also shift downwards and put further downward pressure on inflation. With nominal interest rates constrained at zero, an expectation of deflation would increase the ex-ante real interest rate, $r_t = i_t - E_t\pi_{t+1}$, drive output further below potential, and reinforce deflation. A separate, but similarly detrimental effect arises, because deflation raises the debtors' burden. To the extent that debtors' propensity to spend is greater than their creditors', aggregate demand would be further depressed. Absent a quantitative monetary policy response by means of outright asset purchases or long-term refinancing operations, these reinforcing effects could send the economy into a deep recession and deflation, due to lower consumption, investment and greater incidence of defaults (Fisher, 1933).

2. The Slope of the Phillips Curve Declines with Trend Inflation

Forecasts using estimated Phillips curves such as equation (1) may well have been used to provide empirical support for the above-mentioned warnings of the threat of deflation. Using a historical estimate of the slope of the Phillips curve, α, together with current output gap estimates would imply a forecast of a further decline in inflation. However, such a linear projection ignores that the slope parameter α may have changed. In particular, the slope may well decline with the prevailing trend inflation rate. While the original Phillips curve was nonlinear, many analysts nowadays work with linear versions. Yet, some economic theory suggests that the frequency of price adjustments depends on the level of inflation. Firms are more likely to adjust product prices if inflation is high. When the aggregate price level does not change much, firms do not deviate much from their optimal price even if they do not reset prices for their products for a prolonged period of time. Examples of such state-dependent price adjustment mechanisms can be found in Ball, Mankiw and Romer (1988) and Dotsey, King, and Wolman (1999). Hence, the parameter α is predicted to decrease if trend inflation declines: the Phillips curve flattens. In this case, large negative output gaps put less downward pressure on inflation than would be anticipated based on historical periods with higher trend inflation.[1] In turn, inflation expectations do not drop as much and the risks of deflation and a deflationary spiral are lower than a linear Phillips curve would imply.

De Veirman (2009) provides empirical support for such state-dependent price adjustment mechanisms based on the experience of Japan in the late 1990s. He shows that a flattening of the Phillips curve consistent with state dependent pricing models can explain the absence of large and accelerating deflation rates despite a prolonged period of negative output gaps. First, he estimates a Phillips curve with a time varying slope parameter following a random walk. The estimation indicates that the slope of the Japanese Phillips curve has changed over time: it decreased from $\alpha_t \approx 0.35$ in the 1970s throughout the 1980s and the first half of the 1990s to $\alpha_t \approx 0.10$ and remained there.[2] Then, de Veirman estimates a version of the Phillips curve with the slope parameter depending on the rate of trend inflation.[3] He discovers a positive relation between trend inflation and the slope parameter: for a 1 % decrease in

[1] According to these theories the Phillips Curve becomes S-shaped. Firms adjust prices frequently if the aggregate price level changes often and by a large amount. This is the case for high inflation rates as well as for large deflation rates. In these cases the slope of the Phillips curve is large. For low rates of inflation or mild deflation, firms do not adjust prices as often in response to macroeconomic shocks and the slope of the Phillips curve is small.

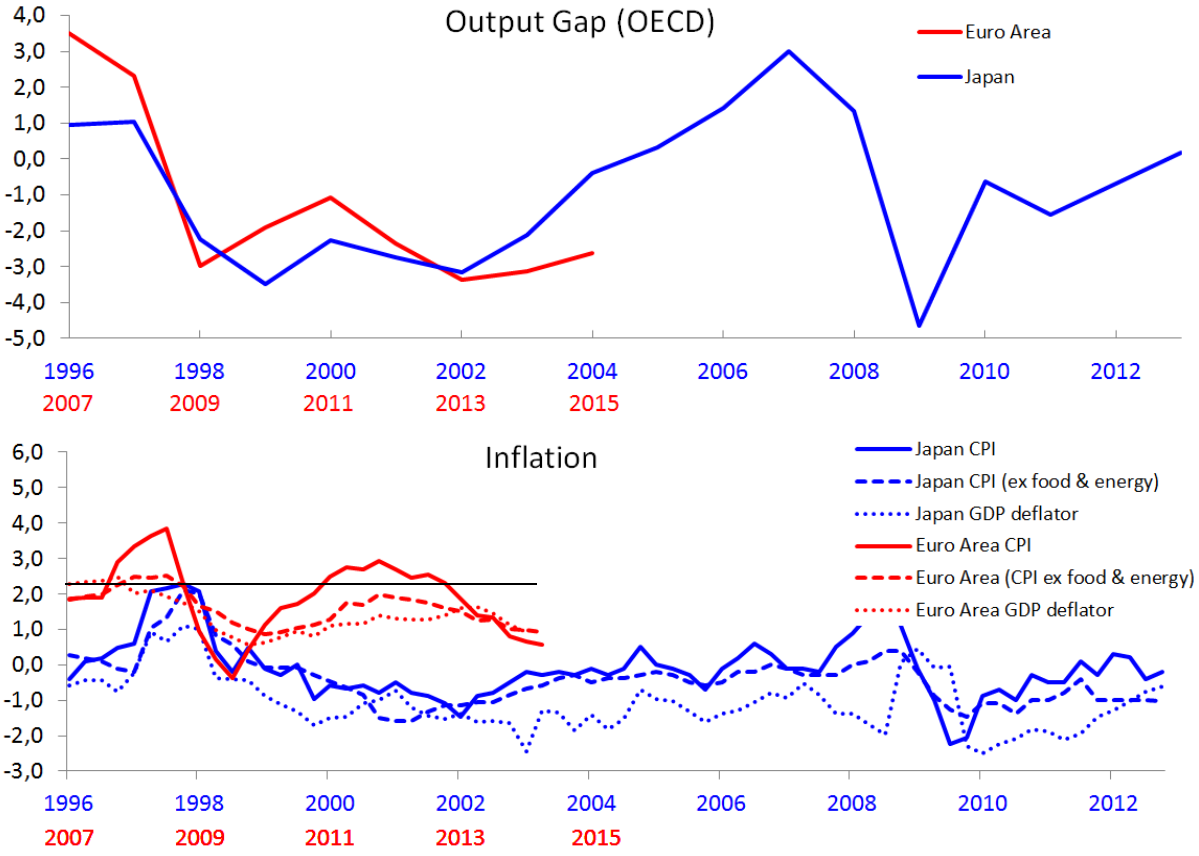
[2] The Phillips curve was already relatively flat during the late 1980s which is the reason why inflation remained surprisingly moderate during Japan's bubble economy from 1986–1991.

[3] Trend inflation is measured by a geometric average of past inflation which can be approximated with exponential smoothing.

trend inflation α decreases by 0.06.[4] Once the Phillips curve slope parameter is modelled as depending on trend inflation, de Veirman finds no more evidence for additional time variation.

The upper panel of Figure 1 shows output gaps estimated by the OECD for Japan (blue line) and the euro area (red line). Data for Japan starts in 1996 and data for the euro area starts in 2007. The lower panel displays yearly CPI, core CPI inflation and GDP deflator inflation rates. Japan experienced a negative output gap from 1998 to 2004. In line with this development, inflation started to decrease in 1998 and turned negative in 1999. Deflation was most pronounced in the first quarter of 2002 with a CPI inflation rate of –1.4 %. Yet, despite the large negative output gap the economy did not slide into a deflationary spiral. Instead, deflation remained quite moderate. The average rate of headline consumer price reduction from 2002 to 2004 came to –0.38 %.

Figure 1:
A Comparison of Output Gaps and Inflation Rates in Japan and the Euro Area



Source: OECD Economic Outlook Volume 2014 Issue 1; Eurostat, Datastream; own calculations.

[4] De Veirman (2009) estimates a Phillips curve of the following form: $\pi_t = \sum_{j=1}^{4} \beta_j \pi_{t-j} + [a + b\bar{\pi}_t]\,[y_{t-1} + \rho y_{t-2}] + \delta x_t + \epsilon_t$, where x_t denotes additional controls like import and oil prices. The specification contains two lags of the output gap so that the overall change in the slope caused by trend inflation is given by $(1+\rho)b$ which de Veirman estimates to be $(1 - 0.82)0.34 = 0.0612$.

While the OECD's output gap estimates for the euro area between 2007 and 2015[5] take on values that are quite similar to Japan in the late 1990s, inflation remains quite a bit higher in the euro area in this historical comparison.[6] In this regard, the situation appears much less dramatic than in Japan in the late 1990s. Note also that inflation as measured by the GDP deflator remains above CPI inflation in the euro area in recent quarters.

It is possible to use de Veirman's parameter estimates obtained from Japanese data to calibrate at least roughly the potential impact of a decline in euro area trend inflation on the slope of the Phillips curve in the euro area. Musso, Stracca, and van Dijk (2009) estimate Phillips curves for the euro area. Their sample covers 1970 to 2005. They allow for time variation in the slope parameter. For the period after 1979 they report a slope parameter of $\alpha = 0.134$. Thus, an output gap of –1 % would imply a reduction in inflation by 0.134 percentage points holding everything else constant. De Veirman's estimates would imply that a reduction in trend inflation from 2 % to 1 % would reduce the slope of the Phillips curve by 0.06. Adjusting the euro area Phillips curve accordingly would imply that a 1 % drop in the output gap decreases inflation only by 0.074 percentage points. This is almost 50 % less compared to the case where trend inflation equals 2 %. Current euro area output gap estimates of the OECD are about –3 %. On the basis of de Veirman's estimates, an inflation forecast that does not account for the dependence of α on trend inflation would thus need to be adjusted upwards by 3*0.06=0.18 percentage points. This adjustment does not account for second-round effects via inflation expectations and can therefore be viewed as a lower bound. With a flattening Phillips curve, a self-reinforcing deflation is very unlikely despite large negative output gaps.[7]

3. Euro Area Inflation Expectations and their Effects via the Phillips Curve

The Phillips curve in equation (1) indicates that inflation expectations, $E_t\pi_{t+1}$, have essentially a one-for-one effect on current inflation.[8] This effect would be reduced to the extent there is intrinsic inflation persistence arising from lagged inflation terms in the Phillips curve. Estimates for the euro area as considered, for example, in the ECB's New Area-wide model assign a weight of roughly 1/3 to lagged inflation.

[5] The value for 2015 in the graph is a forecast by the OECD.

[6] The output gap in Japan was also negative from 1993 to 1995 with only a short recovery in 1996 which might explain the lower inflation rates in Japan at that time.

[7] In the euro area also downward nominal wage rigidities (see e.g. Akerlof, Dickens, and Perry, 1996) might play a role. While they would prevent a further decrease in inflation and lower the risk of deflation, they also prolong the adjustment period as real wages need to drop in peripheral countries to regain competitiveness.

[8] To be precise New-Keynesian Phillips curves derived under monopolistic competition and Calvo-style price contracts typically feature a parameter in front of the expectations term that is motivated as the discount factor from household time preferences. It would be very close to but slightly below unity.

In the following, we review a range of currently available measures of inflation expectations for the euro area. They include forecasts from the ECB, professional forecasters, financial market participants and a consumer survey. Table 1 reports ECB staff projections for inflation. The first column indicates the publication date of the forecast, while the subsequent columns report the projected annual inflation rates from 2011 to 2016. Inflation projections are denoted in ranges that reflect uncertainty consistent with earlier forecast errors.

Table 1:
ECB Staff Projections for HICP Inflation

	2011	2012	2013	2014	2015	2016
March 2011	2.0–2.6	1.0–2.4				
June 2011	2.5–2.7	1.1–2.3				
September 2011	2.5–2.7	1.2–2.2				
December 2011	2.6–2.8	1.5–2.5	0.8–2.2			
March 2012		2.1–2.7	0.9–2.3			
June 2012		2.3–2.5	1.0–2.2			
September 2012		2.4–2.6	1.3–2.5			
December 2012		2.5–2.5	1.1–2.1	0.6–2.2		
March 2013			1.2–2.0	0.6–2.0		
June 2013			1.3–1.5	0.7–1.9		
September 2013			1.4–1.6	0.7–1.9		
December 2013			1.4–1.4	0.6–1.6	0.5–2.1	
March 2014				0.7–1.3	0.6–2.0	0.7–2.3
June 2014				0.6–0.8	0.5–1.7	0.6–2.2
Outcome	2.7	2.5	1.4	0.6*		

*Jan-August 2014.

Source: European Central Bank.

As of June 2014, the ECB projected 0.6–0.8 % inflation for 2014, 0.5–1.7 % for 2015 and 0.6–2.2 % for 2016. These projections are much lower than in previous years, but do not include negative rates. Furthermore, the ECB anticipates a gradual return of inflation to its objective of just below 2 %. The projections are driven by a gradually strengthening recovery in the euro area, partly due to improving domestic demand and partly due to greater external demand. The upward path of inflation arises despite assumed declines in oil prices. The next update will become available on September 4.

While the ECB staff forecast is clearly an important and widely observed guidepost market participants, and among them price and wage setters in particular, need not agree with it. Thus, it need not be the best estimate of the expectations term in the Phillips curve. Also, its determination might not be completely free of strategic considerations regarding its impact on market participants' expectations formation. Table 2 reports forecasts from the Survey of Professional Forecasters (SPF). Their projections for inflation in 2014 and 2015 have decreased over time. However, they are not approaching negative rates. As of August 2014, the mean forecast for 2014 is 0.7 %, with an increase to 1.2 % next year and to 1.5 % in

2016. Five year inflation expectations dropped from 2 % to 1.8 % in May and increased to 1.9 % in August. They remain anchored at the ECB's objective of close to but below 2 %. The SPF also anticipates a slow recovery with GDP growth of 1.0 % in 2014, 1.5 % in 2015 and 1.7 % in 2016.

Table 2:
Mean Inflation Forecasts from the Survey of Professional Forecasters (SPF)

	2011	2012	2013	2014	2015	2016	Longer term (five years ahead)
2011 Q1	1.9	1.8					2.0
2011 Q2	2.5	1.9					2.0
2011 Q3	2.6	2.0	1.9				2.0
2011 Q4	2.6	1.8	1.8				2.0
2012 Q1		1.9	1.7				2.0
2012 Q2		2.3	1.8				2.0
2012 Q3		2.3	1.7	1.9			2.0
2012 Q4		2.5	1.9	1.9			2.0
2013 Q1			1.8	1.8	1.9		2.0
2013 Q2			1.7	1.6	1.8		2.0
2013 Q3			1.5	1.5	1.8		2.0
2013 Q4			1.4	1.5	1.6		1.9
2014 Q1				1.4	1.5	1.6	1.9
2014 Q2				1.1	1.4	1.7	1.8
2014 Q3				0.7	1.2	1.5	1.9
Outcome	2.7	2.5	1.4	0.6*			

*Jan-August 2014.

Source: European Central Bank.

The SPF survey also questions participants regarding their assessment of the probability of different inflation rates. Table 3 shows the estimated probability of deflation, that is, an inflation rate coming in below 0 %. Recently, this probability increased a bit from 1.4 % in the survey published in February 2014 (1st quarter survey) to 4.4 % in the survey published in May 2014 (2nd quarter survey). Most recently, it declined again a bit towards 3.2 %. This probability mostly concerns the range of very mild price declines of –0.5 % to –0.1 %. In any case, these are very low probabilities. For 2015, the probability estimate declines further towards 2.2 % and then to 1.8 % for 2016. Hence, the deflation probabilities from the SPF do not support the warnings of a threat of an expectations-driven deflationary spiral.

Table 3:
Probabilities on Inflation Rates below 0 % based on the SPF (in %)

	2011	2012	2013	2014	2015	2016	Longer term
2011 Q1	0.3	0.8					0.8
2011 Q2	0.1	0.7					1.2
2011 Q3	0.1	0.6	0.6				1.2
2011 Q4	0.0	0.7	0.8				1.1
2012 Q1		0.4	1.2				1.2
2012 Q2		0.3	1.4				1.9
2012 Q3		0.0	0.8	0.9			1.2
2012 Q4		0.0	0.3	0.7			1.2
2013 Q1			0.5	0.9	0.8		1.1
2013 Q2			0.4	1.2	1.0		0.9
2013 Q3			0.3	1.2	0.8		0.9
2013 Q4			0.2	0.8	1.0		1.1
2014 Q1				1.4	1.2	0.9	1.2
2014 Q2				4.4	2.2	1.8	1.2
2014 Q3				3.2	2.5	1.1	1.0

Source: European Central Bank.

It is useful to cross-check the SPF numbers with those published by Consensus Economics, which is another survey among professional forecasters. The Consensus survey includes more than 250 financial and economic forecasters. Table 4 reports the mean inflation forecasts. The forecasts for 2014, 2015 and 2016 are slightly lower than the SPF forecasts. Yet, they remain distant from deflation. In the April 2014 survey participants were also asked about their long-term forecasts until 2024. The long-term mean is 2.0 % and confirms anchoring at the ECB's inflation objective. GDP growth is predicted, on average, around 1.5 % each year from 2016 to 2024.

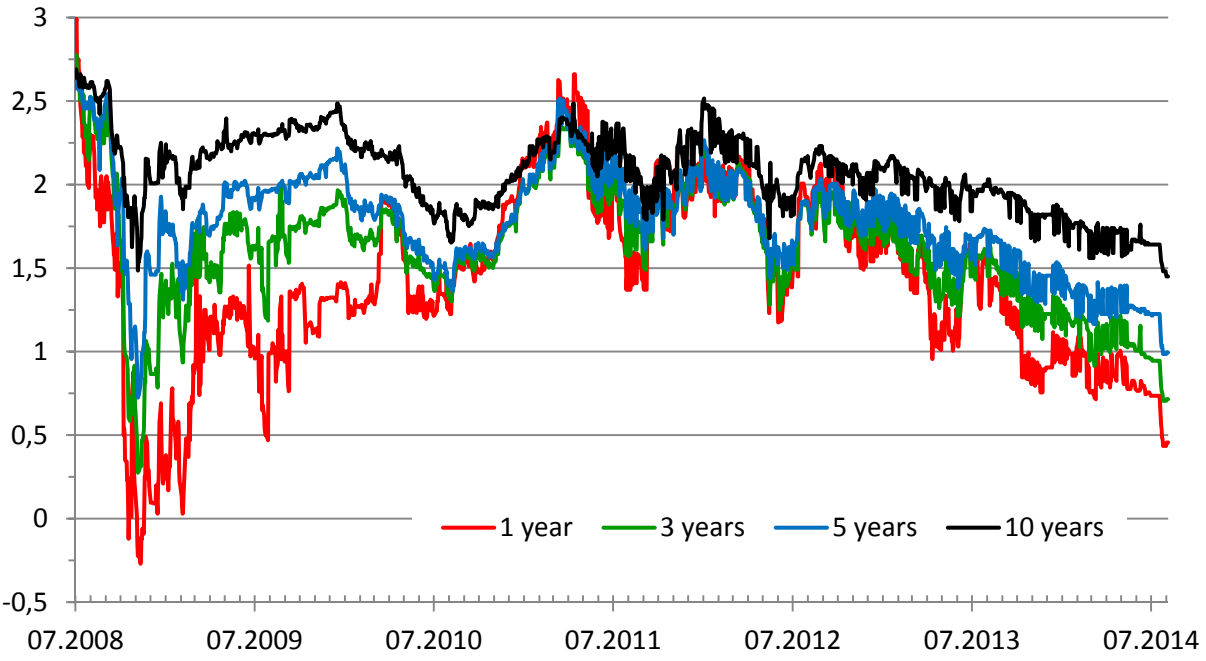
Table 4:
Mean Inflation Forecasts based on Consensus Economics

	2011	2012	2013	2014	2015	2016	Longer term
2013 Q3			1.5	1.5			
2013 Q4			1.4	1.1			
2014 Q1				1.1	1.4		
2014 Q2				0.9	1.3	1.5	2.0
2014 Q3				0.6	1.1		

Source: Consensus Economics.

Another approach for measuring inflation expectations is based on inflation-indexed derivatives. Their prices aggregate financial market participants' expectations. Figure 2 displays inflation expectations for 1, 3, 5 and 10 years into the future that are derived from inflation swap rates. Expectations for all four horizons are currently below 2 %. It is also noteworthy that they have dropped by 20 to 30 basis points in August 2014. Inflation expectations are currently 0.46 % (1 year), 0.72 % (3 years), 1.00 % (5 years) and 1.45 % (10 years). Thus, they are below available forecasts from the ECB, the SPF and Consensus Economics and might even signal impending downward revisions in upcoming updates of those forecasts. Even so, they are still some distance away from negative territory.

Figure 2:
Inflation Linked Interest Swaps



Source: Datastream.

While the SPF and the Consensus Economics survey and inflation swaps reflect the views of professional forecasters and financial market participants, Coibion and Gorodnichenko (2013) argue that consumers' expectations are more relevant in assessing the impact of inflation expectation on current inflation via the Phillips curve defined by equation (1). Thus, we conclude this review by considering inflation expectations from the European Commission's consumer survey. This survey only elicits inflation expectations over the next 12 months. It is conducted on the national level and the results for the euro area are computed by aggregating country-level data. The survey question is: "By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12

months? They will…". Possible answers include: 1. rise a lot (PP), 2. rise moderately (P), 3. rise slightly (E), 4. stay about the same (M), 5. fall (MM), 6. don't know (N). Percentage shares are provided for each answer. They are also aggregated in the following balance: $Balance = PP + 0.5P - 0.5M - MM$. It can take on values between –100 and +100. Table 5 reports the percentage shares for each category and the aggregate balance.[9]

The aggregate balance has fallen substantially over the last year. The July value is, however, slightly higher than the June value. The fall in the aggregate balance is mainly caused by the fall in the share of consumers who expect that prices rises a lot and an increase in the share of consumers who expect prices to stay the same. The share of participants anticipating falling prices has increased slightly but remains very small. While in January 2013 1.5 % of survey participants expected decreasing prices over the next 12 months the share has increased to 2.9 % in July 2014. This is somewhat higher than the average since the introduction of the Euro in 1999 of 1.9 %, but still very small.

Table 5:
European Commission Consumer Survey: Inflation Expectations next 12 Months (Percentage Shares)

	Compared to the past 12 months, consumer prices in the next 12 months will:						
	rise a lot (PP)	rise moderately (P)	rise slightly (E)	stay about the same (M)	fall (MM)	don't know (E)	Balance =PP+0.5P–0.5M–MM
2013 M1	17.43	39.94	11.13	23.55	1.49	6.49	24.13
2013 M2	12.96	40.81	10.85	26.48	1.72	7.15	18.40
2013 M3	14.11	39.74	11.30	25.92	1.73	7.17	19.29
2013 M4	12.92	38.87	11.82	26.58	2.09	7.73	16.97
2013 M5	12.55	36.77	12.20	28.10	1.96	8.41	14.93
2013 M6	13.70	37.58	12.03	27.49	2.87	6.33	15.88
2013 M7	13.59	38.04	12.39	27.50	2.69	5.80	16.17
2013 M8	13.83	40.35	11.93	25.88	2.33	5.68	18.74
2013 M9	12.57	39.78	12.97	26.21	2.25	6.21	17.11
2013 M10	14.19	39.93	13.14	24.67	2.30	5.77	19.52
2013 M11	12.09	38.55	12.38	27.77	2.54	6.67	14.94
2013 M12	14.15	38.03	11.60	27.39	2.57	6.30	16.90
2014 M1	14.45	38.74	12.20	26.36	2.31	5.98	18.33
2014 M2	11.75	37.75	12.70	29.43	2.17	6.19	13.73
2014 M3	10.91	37.11	12.13	30.71	2.24	6.90	11.87
2014 M4	9.79	35.48	12.03	32.90	2.81	6.96	8.27
2014 M5	9.80	35.56	11.55	33.19	2.62	7.30	8.36
2014 M6	9.99	33.33	12.37	33.96	2.80	7.59	6.88
2014 M7	9.39	35.75	12.30	33.05	2.89	6.63	7.85

Source: European Commission.

[9] The numbers are not seasonally adjusted.

4. Other Factors Impacting Euro Area Inflation

Taking the perspective of the Phillips curve in equation (1), it remains to discuss other factors influencing euro area inflation that are captured by the placeholder shock term ε_t. This term refers to changes in inflation that cannot be explained by changes in the output gap or inflation expectations. Examples include changes in firms' mark-ups over marginal cost because of changes in the degree of competition, exchange rate movements and energy prices. Figure 1 reports not only headline inflation, but also core inflation which excludes energy and food prices. It is evident that core inflation has declined much less than headline inflation. Indeed, around 80 % of the decline in euro area inflation since late 2011 has been caused by falling energy and food prices. By now, however, the outlook for energy prices may include more upside than downside risks due to the increase in geopolitical tensions emanating from conflicts in East-Ukraine and the Middle East.

As to the exchange rate, the most relevant measure is not a particular bilateral exchange rate such as the exchange rate between the US Dollar and the euro, but a trade-weighted measure of the effective exchange rate. The nominal effective exchange rate calculated by the European Central Bank (ECB) is based on weighted averages of bilateral euro exchange rates against 20 trading partners of the euro area. As of September 1, 2014 the index stands at a value of 101, which is 1 % above the value at the time of introduction of the euro at the beginning of 1999. Between summer 2003 and summer 2011 the index was almost always above its current value, reaching values greater than 113 in 2008 and 2009. In the second half of 2011 and the first half of 2012 the euro depreciated rapidly. The index bottomed out at a value of 94 in July 2012 just about when ECB President Draghi announced that the ECB would do "whatever it takes" to save the euro. The euro then appreciated. The index reached its most recent peak at 105 in March 2014. This appreciation contributed to the observed decline in inflation since 2012. There is a link between the decline in energy prices and the movement in the exchange rate. The appreciation of the euro lowered import prices which include energy putting downward pressure on inflation via tradable goods. At the same time, the exchange rate appreciation reduced competitiveness and foreign demand by raising the foreign-currency price of euro area exports, thereby slowing the euro area recovery. Since March 2014 the effective exchange rate of the euro has declined by 4 %. As this depreciation feeds through to price setting it will raise euro area inflation and further reduce the risk of deflation.

As euro area crisis countries have been adjusting to regain competitiveness, prices of tradable goods from those countries have grown more slowly or declined. Reduced market power of individual firms in these countries exerts downward pressure on inflation. Indeed, core inflation has fallen in several of these countries below the euro area average. Such relative price adjustments are needed and benefit overall growth. The recent depreciation of the euro back towards the value it had at the start of monetary union further helps boosting foreign demand for euro area goods.

5. Conclusions

The preceding review of driving factors of euro area inflation through the lens of the Phillips curve leads us to the conclusion that the risk of entering a period of self-reinforcing deflation is currently very small and has not increased substantially in the recent period. While inflation, as measured by the overall CPI, is largely expected to remain below the ECB's objective of close to but below 2 % for some time, there is no particular threat of a deflation cum recession spiral. Inflation forecasts based on standard time-invariant Phillips curves are likely to overstate the effect of under-utilized capacity on price-setting. Evidence from Japan suggests that the impact of the output gap on inflation declines along with trend inflation. The appreciation of the euro in trade-weighted terms since summer 2012 partly reflected a normalization following a period during which many voices expressed doubts about the future of the euro. Since March 2014 it has depreciated by 4 %, a development that will put upward pressure on euro area inflation.

With regard to recent calls for substantial, additional monetary easing by the ECB as soon as at its next meeting on September 4 we note the following:

(1) To the extent that these calls refer to the impending threat of a period of self-reinforcing deflation, they are, in our view, not supported by the evidence reviewed in this note.

(2) The ECB has already lowered its main refinancing rate to a value of 15 basis points in June and introduced a negative deposit rate, furthermore it has announced long-term refinancing operations to be implemented starting in September 2014 that offer banks liquidity for four years at a very attractive fixed rate. Since the ECB anticipates that these measures will lead to a substantial monetary expansion, it should await their impact before putting additional measures on line. Furthermore, the euro area is awaiting the outcome of the ECB's comprehensive assessment of bank balance sheets. This review has the potential to create transparency, to trigger necessary restructuring, resolution or recapitalization of weak banks and thereby release credit-supply constraints that may be slowing euro area recovery.

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