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Low Inflation and Deflation in EU Countries Outside the Euro Area Should Policymakers be Concerned?

Abstract

Analysis of post-2011 disinflation finds that falling world prices of food and energy have been the main explanatory factor across EU countries outside the euro area, including Sweden. Disinflationary spillovers from the euro area have also been an important factor in the rest of the EU. Exchange rate movements have played an important role in inflation targeters. Second-round effects via forward-looking inflation expectations have also been non-negligible. However, the prolonged weakness of inflation expectations can be explained, in part, by their historic link with world commodity prices. When faced with prolonged disinflationary pressures, central banks should aim at bringing inflation closer to its target, paying particular attention to signs of overshooting of inflation expectations. But, with policy rates at historical lows and in some cases negative, further easing by inflation-targeting central banks would need to take into account the impact on financial stability and be complemented by macroprudential measures as needed.

1 Introduction

Inflation has fallen sharply across Europe since 2012. This synchronized disinflation raises the question of whether EU countries outside the euro area are affected by the undershooting of the inflation target in their main trading partner (the euro area), by other global factors, or by synchronized domestic, real sector developments. The need and extent of policy responses to low inflation/deflation critically depend on the nature of its underlying drivers.

In this paper, we analyze the driving forces of the disinflationary tide that has swept through EU countries outside the euro area starting in 2012, with the view of

informing policymaking in the region.¹ Section 2 reviews inflationary outcomes across EU countries outside the euro area. Section 3 explains why policymakers are concerned about fluctuations in inflation. Section 4 presents the theoretical underpinnings of our analysis of disinflationary drivers and appropriate policy responses. Section 5 reviews the behavior of key demand and supply-side disinflationary drivers, with the view of informing the regression analysis of their relative importance carried out in Section 6. Section 7 focuses on the experience of Sweden. Section 8 takes stock of the risks posed by low inflation at the current juncture. Section 9 sketches the appropriate policy responses. Section 10 concludes.

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¹ EU countries outside the euro area include a number of economies in Central and Eastern Europe (CEE), as well as Sweden, Denmark, and the United Kingdom.

2 Recent low inflation and deflation in Europe

Inflation has fallen sharply across Europe since 2012 (Figure 1).² In the first half of 2015, the 12-month inflation rates were below one percent (and often negative) in both the euro area (EA) and in EU countries outside the euro area. Despite the recent pick-up in inflation, it remains at historic lows, taking into account the resilient albeit tepid economic recovery. Inflation is also significantly below the targets of inflation-targeting central banks.3 Inflation expectations have also drifted down across the region, more so in countries that peg their currencies to the euro (Figure 2).⁴

3 Why it matters?

Most economists agree that the goal of monetary policy should be to keep inflation stable at close to 2 percent in advanced countries and somewhat higher in converging economies:

- · Inflation in this range is consistent with qualityadjusted price stability, as improvements in the quality of consumer goods can result in an upward drift in the price level unrelated to liquidity conditions in the economy. It also allows for adjustments in relative prices, mitigating effects of downward wage rigidities,⁵ which is key for the normal functioning of markets.
- Higher inflation is known to cause output losses, as it is typically associated with higher price variability and hence uncertainty that complicates consumption and investment decisions (Dowd, 1994). It also creates deadweight welfare losses, as it increases the cost of holding money, broadly referred to as 'shoe-leather costs', but also other costs such as menu costs, see Mussa (1977).
- At the same time, inflation that is too low or negative also has costs. In the presence of wage rigidities and the zero lower bound of nominal interest rates, low



Notes: Data for non-euro area countries are weighted averages of harmonized consumer price indices, using country HICP weights for 2013.

Notes: In a given quarter, the plotted observation is the average of professional forecasters views on inflation two years ahead, as surveyed by Consensus Economics Inc (e.g., in Dec'14 the forecast for 2016 is plotted, and in Feb'15 that for 2017).

CEE euro peggers are Bulgaria, Croatia and Lithuania. Lithuania joined the euro area on January 1, 2015.

We measure inflation by the year-over-year growth rate of the Harmonized Consumer Price Index published by Eurostat statistical agency.

The Sveriges Riksbank's objective is to keep inflation around 2 per cent per year (measured using national CPI). Inflation targeting CEE countries are the Czech Republic, Hungary, Poland, and Romania, which inflation targets range from 2 to 3 percent.

Nobody likes to see their nominal wages or profits decrease, while temporary lagging behind of growth of wages and profits in particular segments of the economy is a common phenomenon.

inflation/deflation can increase the real cost of labor and capital, forcing companies to cut back production to restore the parity between the marginal products of labor and capital and their real costs. Low inflation/ deflation also aggravates financial distress (Cargill et al., 1997 and Jonung, 1994)-as it increases real debt burdens-further weakening the employment and investment outlook. Moreover, despite the fact that disinflation reduces cost-of-living and, hence, supports domestic demand and savings in the short run, it raises the possibility of further disinflationary effects in the medium-term. The prospect of falling prices could suppress domestic demand, if it prompts households and firms to postpone consumption and investment in anticipation of further price easing. For example, Bordo and Redish (2003) show that periods of deflation are characterized by weaker and more volatile output growth.

Most central banks, therefore, target inflation around the 2-percent price stability benchmark. Given the long and variable lags in economy's response to monetary policy, central banks typically target forecasted inflation in the policy-relevant time horizon (most often two-years ahead). The credibility of central bank forecasts is evaluated based on surveys of inflation expectations of firms and households. The more pronounced the departure of inflation expectations from the central bank's target at two-year horizon, the more likely it is that inflation will stay away from the inflation target for longer and would require central bank actions.

Deviations of inflation and inflation expectations from the target can be caused by both external and domestic factors. While domestic demand-driven disinflation appears to be more harmful than that driven by external supply shocks (Kumar et al., 2003), serially correlated external shocks can cause protracted periods of disinflation that could affect inflation expectations and spread from supply- to demand-driven disinflation.

Appropriate policy responses would depend on the type and effects of disinflationary drivers. As long as external shocks are considered temporary and inflation expectations are well anchored, there may not be a need to adjust policies. However, policy interventions might be needed, if external shocks are persistent and spillover to inflation expectations, and/or if disinflation is driven by weakness of domestic demand. Therefore, the identification of disinflationary drivers is important for the design of optimal policy responses.

4 Analytical framework

In this section, we sketch the theoretical framework underlying the subsequent empirical analysis of disinflationary drivers and appropriate policy responses. We first present the open-economy, New Keynesian, Phillips curve in equation 1, which captures the negative relationship between inflation and unemployment, as well as the importance for inflationary outcomes of expectations of future inflation and supply-side shocks, including imported inflation. We then make the expectations of future inflation endogenous (i.e., dependent on other economic variables) in equation 2. Taken together, the two equations allow us to decompose the pass-through of demand and supply-side shocks to headline inflation into first- and second-round effects, the latter operating via inflation expectations. Next, we present a simple model of monetary policy decisionmaking in equation 3, which has empirically been found to approximate well the behavior of inflation targeting banks. The system of equations 1-3 sheds light on the likely culprits for the synchronized disinflation across EU countries outside the euro area.

Open-Economy, New Keynesian Phillips Curve

The gold standard for analyzing inflationary developments is arguably the open-economy New Keynesian Phillips curve, put forth by Galí and Gertler (1999). In this model, inflation exhibits a degree of persistence – captured by its dependence on own lagged values – and depends on expected future inflation, as well as the aggregate marginal

BOX 1 OPEN-ECONOMY, NEW KEYNESIAN PHILLIPS CURVE

The open-economy, New Keynesian, Phillips curve is given by:

$$\pi_t = a_1 \pi_{t-1} + a_2 \pi_t^* + a_3 \tilde{u}_t + z_t \theta + w_t \vartheta + \varepsilon_t, \text{ where }$$

- π_{t-1} lagged headline inflation;
- π_t^* expectation of future inflation; Both lagged inflation and the expectations of future inflation are included, because inflation expectations are assumed to be both forward-looking and exhibiting some degree of inertia.
- \tilde{u}_t unemployment gap as a measure of demand-side shocks (we expect $a_3 < 0$).
- $Z_t 1xK$ vector of country-specific supply-side shocks;
- $W_t = -1xP$ vector of common external supply-side shocks, including imported inflation.
- ε_t residual.

cost of production that in turn is affected by demand and supply-side shocks (Hornstein, 2008 and Box 1).

Abstracting from expectations and supply-side shocks, the Phillips curve captures the negative relationship between inflation and unemployment. When domestic demand is buoyant, firms compete for scarce labor, reducing unemployment and pushing up wages. The rising production costs eventually translate into higher inflation. The positive impact of growing nominal wages on employment critically hinges on real wages temporarily remaining above the level at which the economy is operating at its potential output. The most plausible motivation for such an occurrence is price stickiness.

Model of expectations of future inflation

The standard open-economy New Keynesian Phillips curve can be paired with a model of *expectations of future inflation*. If inflation-targeting central banks are perfectly credible, the forecast of future inflation should equal the inflation target. However, in practice expectations of future inflation are likely to be anchored by the central bank target only to an extent, while continuing to exhibit some degree of inertia and being affected by the output gap and external and country-specific supply shocks (Box 2). The shorter the time horizon of inflation expectation, the bigger the expected impact of conjunctural developments and inertia.

First- and second-round effects of shocks on inflation

In the system of equations (1) - (2), the pass-through of demand and supply-side shocks to headline inflation can be broken down into *first- and second-round effects*.

BOX 2 MODEL OF EXPECTATIONS OF FUTURE INFLATION

The model of expectations of future inflation can be described as:

$$\pi_t^* = b_1 \pi_t^T + b_2 \pi_{t-1}^* + b_3 \tilde{u}_t + z_t \mu + w_t \tau + \omega_t,$$

 π_t^T – central bank inflation target;

 π_t^* – expectation of future inflation;

- \tilde{u}_t unemployment gap;
- $Z_t 1 \times K$ vector of country-specific supply-side shocks;

 $W_t - 1 \times P$ vector of common external supply-side shocks; $\omega_t - residual.$

First-round effects capture:

- Direct impact on inflation of changes in prices of energy and unprocessed food included in consumer baskets; and
- Indirect impact on inflation via input costs of other goods and services.

Second-round effects reflect the impact channeled through inflation expectations via:

- Softening of contemporaneous demand, as economic agents attempt to take advantage of expected future price cuts; and
- Wage and price-setting behavior, which can embed the expectation of disinflation in the evolution of future wages and prices. In extreme cases, changes in wage and price-setting behavior can trigger a deflationary spiral—a self-feeding, vicious feedback loop between inflationary expectations and prices.

It is generally believed that food and energy price changes account for the bulk of observed second-round effects. This is because food and energy prices are the most visible part of the price matrix for consumers and, hence, have larger impact on expectations formation than suggested by their shares in consumer baskets (Coibion and Gorodnichenko, 2015).

Monetary policy reaction function

In a widely cited paper, Taylor (1993) puts forth a policy rule that approximates reasonably well the US Federal Reserve policy over the period 1987-1992. The Taylor rule postulates the existence of a stable linear relationship between the contemporaneous deviation of the real Federal Funds Rate from its equilibrium value (assumed to be 2 percent), and the contemporaneous deviations of the rate of inflation from its target (also assumed to be 2 percent) and of the real GDP from its trend (in percent). Empirical studies of the Fed's reaction function often use alternative measures of the output gap, the most common of which is the unemployment gap, and allow for a gradual adjustment of policy rates to their rule-based values, via the inclusion of a lagged dependent variable (Clarida et al., 2000 and Box 3).⁶ Today, variations of the Taylor rule are widely used to approximate the policy reaction functions of inflation targeting banks.

Inflation targeting central banks typically react to demand developments and second-round effects of demand and supply shocks. Second-round effects are undesirable because

⁶ In Taylor's original formulation, the coefficients of the Federal Reserve's reaction function are not estimated econometrically, but are both set equal to 0.5 (Taylor, 1993).

BOX 3 MONETARY POLICY REACTION FUNCTION

t,

The Taylor rule is given by:

$$\begin{aligned} R_t^P &- \pi_t = r^P + c_1 \tilde{u}_t + c_2 (\pi_t - \pi_t^T) + \delta \\ R_t^P &- \text{nominal policy rate;} \\ \pi_t &- \text{headline inflation;} \\ r^P &- \text{equilibrium real policy rate;} \\ \tilde{u}_t &- \text{unemployment gap } (c_1 > 0).; \\ \pi_t^T &- \text{central bank inflation target } (c_2 > 0); \\ \delta_t &- \text{residual.} \end{aligned}$$

they can lead to protracted deviation of inflation from the target. First-round effects are allowed to (gradually) pass through to the general price level, as the resultant changes in relative prices are necessary for the efficient reallocation of resources in the economy. At the same time, a prolonged undershooting of the inflation target, even if triggered by successive and correlated first-round shocks, can damage central banks' credibility. This in turn would make it much harder to bring inflation back to target over the medium-term. The threat of this – as captured by persistent deviations of short-term inflation expectations from their normal reaction to shocks (as captured by equation 2 in Box 2) – may warrant intervention by the central bank.

In the analytical framework outlined above, synchronized disinflation across a large number of countries can be explained by:

- First-round effects of common external factors, such as developments in shared trade partners or international commodity prices;
- First-round effects of coincidentally occurring countryspecific shocks;
- Failure of inflation targeting central banks to stem out second-round effects from external and/or coincidentally occurring country-specific shocks.

5 Potential disinflationary drivers

In this section, we take the analytical framework outlined above to the data, by reviewing the observed behavior of the demand and supply-side disinflationary drivers included in equations 1 and 2.

Demand- and supply-side shocks

At first glance, domestic demand factors do not appear to drive the recent disinflationary episode. Figure 3 plots the inflation and unemployment gaps for different country groups over 2004-11 and 2012-15. The negative relationship between these two variables –predicted by the theory behind the New Keynesian Phillips curve – holds reasonably well



Source: Haver and Fund staffestimates.

Notes: CEE euro peggers - Bulgaria, Croatia and Lithuania; CEE inflation targeters - Czech Republic, Hungary, Poland, and Romania; Plotted data are weighted averages of country observations, using country shares in the 2013 GDP for the region, expressed in euros at actual exchange rates. Inflation gap is the difference between the 12-month HICP inflation and the inflation target (ECB price stability criterion in the case of euro peggers). Unemployment gap is the difference between the rate of unemployment and its long-run trend and is given by the cyclical component of the unemployment rate extracted with the Baxter-King bandpass filter.

until 2012 (Figure 3). But, this has not been the case in the recent disinflationary period. Over that period, the Phillips curve appears flat or even pointing upward in both CEE and advanced countries. Across all country groups, the same value of the inflation gap has occurred alongside widely varying unemployment gaps. This suggests that the Phillips curve has repeatedly shifted over 2012-15, driven by serially-correlated supply-side shocks affecting the cost of production inputs other than labor.

One such cost-push driver is the nominal effective exchange rate, which is a weighted average of bilateral exchange rates with main trading partners. However, many nominal effective exchange rates have been on a roller-coaster over the period 2012-15 (Figure 4), making it unlikely to be the primary factor behind the one-directional disinflationary trend.

On the one hand, periods of appreciation of domestic currencies – such as the one following ECB President Draghi's "whatever it takes" speech in July 2012, which shored-up investor confidence in the euro – do amplify external disinflationary pressures. This is the case because the domestic price of imported goods is given by the



Source: Eurostat.

Notes: (+) appreciation/(-) depreciation of the national currency. Plotted data are weighted averages of country observations, using country shares in the 2013 GDP for the region, expressed in euros at actual exchange rates.



Sources: Eurostat, European Central Bank, and Fund staff estimates.

domestic-currency equivalent of their prices abroad plus a mark-up that covers costs and profits in the distribution network. When the domestic currency appreciates, one needs less of it to buy one euro, and therefore the domesticcurrency equivalent of the price at which imported goods were purchased abroad decreases. Competition among importers then ensures some degree of passthrough of these savings to the final users.

On the other hand, the easing of domestic monetary policies – against the background of preparation for monetary tightening in the United States – has led to depreciation of flexible exchange rates in several countries in the region, partially offsetting the deflationary external pressures.

Falling world food and energy prices and, where relevant, cuts in administered prices of energy have been another important cost-push driver of disinflation across EU countries outside the euro area. The fall in oil prices started in early 2012 and accelerated sharply since June 2014. The Russian state gas producer Gazprom, which delivers close to 40 percent of Europe's consumption of natural gas, has



Source: Haver, Eurostat and Fund staff calculations. Notes: Data for CEE EU countries are weighted averages, using country HICP weights for 2013. Data for the world excluding EU countries are weighted averages, using country GDP weights. also cut gas prices at several steps, starting in early 2012. Decomposing headline inflation into the contributions of prices of foodstuffs and energy and the remainder (core) of the consumer basket suggests that declining food and energy prices accounted for a very large share of the observed disinflation since 2012 (Figure 5).

Core inflation – which strips the impact of the more volatile food and energy prices from the general price index – has also drifted down, tracing price trends in the euro area, and increasingly diverging from developments in the rest of the world (Figure 6). This suggests possible disinflationary spillovers from the euro area to other EU countries, in light of their close trade links.

Inflationary expectations

Expectations of future inflation can be gauged by surveys of the general public or professional forecasters. It is generally believed that firms rely on professional forecasters (e.g., using surveys carried out by Consensus Forecasts), when planning their pricing strategies. Households, on the other hand, are much more likely to be backward-looking in the formation of their inflation expectations and follow the general sentiment reflected in survey results (e.g., in surveys compiled by European Commission). Figure 7 presents the relative performance of the general public and professional forecasters in predicting inflation over the next 12 months and over the course of the next calendar year, respectively.⁷ We can see that whereas both groups of respondents are generally able to predict the direction of price changes, the general public is better able to capture the amplitude of the move.

Abstracting from level shifts in professional forecasts,⁸ inflation expectations generally remain on a downward path in CEE. In Sweden, the opinion of the general public, however, appears to have pivoted in the direction of expecting higher prices in 2015-16. However, both types of forecasts have a long way to go to return to where they were prior to the onset of disinflation. Furthermore, it should be kept in mind that survey-based indicators can be wrong. For example, Moghadam, Teja, and Berkmen (2014) point out that long-term inflation expectations had also been positive on the eve of the three deflationary episodes in Japan.

⁷ In contrast to professional forecasters, who predict directly the rate of inflation, survey data collected from the general public are used to construct an index, which can then be used to predict inflation based on the empirical link between the two, in a similar fashion to the use of the Purchasing Managers Index (PMI) for forecasting real GDP.

⁸ For example, in December 2012, next calendar year's forecast refers to 2013, whereas in January 2013 – to 2014.



FIGURE 7 INFLATION AND INFLATION EXPECTATIONS, 2012 -15

Sources: Eurostat harmonized consumer price indices dataset, European Commission, and Consensus Economics Forecasts. Note: Data for non-euro area countries are weighted averages, using country HICP weights for 2013. Consensus forecasts are for the average inflation in the years shown on the horizontal axes, made 12 months prior to the month, for which actual inflation is shown. Consumer inflationary expectations reflectsurvey responses to the question on price trends over next 12 months. It is calculated as + 1* ("Pecentage thinking it will rise a lot") + $1/2^*$ ("Pecentage thinking it will rise moderately"- $1/2^*$ ("Pecentage thinking it will stay about the same") - 1* ("Pecentage thinking it will fall").

6 Model-based decomposition of disinflationary drivers

In this section, we carry out regression analysis of the relative importance of different disinflationary drivers, by estimating equations 1 and 2 using panel data for all noneuro area EU countries.

Open-economy, New Keynesian Phillips curve

We start by augmenting our analysis of disinflation in Iossifov and Podpiera (2014). We extend the timedimension of the sample through end-2014 and separate the effect of inflation expectations from that of the autonomous dynamics of actual inflation. We estimate a version of equation (1) (see Box 1), identifying supply-side shocks with changes in the nominal effective exchange rate and taxes, as well as common external drivers, such as world food and oil prices (and the changes in administered prices of energy and food they trigger), and core inflation in the euro area, which is a major trade partner for countries in the region.

The estimated panel regression coefficients allow us to decompose the inflation variance in 2012-14 into contributions by the explanatory variables, including quantifying first- and second-round effects of shocks (Figure 8)⁹:

⁹ The model-explained variance is decomposed into each of the explanatory factors using partial-covariance approach (Groemping, 2007). In this way, it reflects the relative importance of factors in explaining the dynamics of inflation. Since the explained period has been characterized by disinflation, factors' contributions explain sources of disinflation.



Source: IMF staff calculations.

Note: *Inflation variances are normaliazed to the variance of CEE euro peggers. Based on full-sample regression coefficients.

FIGURE 9 GAP BETWEEN ACTUAL AND FITTED VALUES OF INFLATION EXPECTATIONS



Sources: European Commission, Consensus Economics Forecasts, and Fund staff estimates.

Note: Fitted values from a fixed -effects regression over the period prior to the latest episode of falling world oil prices (2004-2011) of the two proxies of inflation expectations on their first-lags (interacted by a dummy variable for exchange rate regime) and the log of the world price of oil in USD, multiplied by the fraction of consumer basket spent on energy. Consensus forecasts are for the average inflation in the years shown on the horizontal axes, made 12 months prior to the month, for which actual inflation is shown. Consumer inflationary expectations index reflect survey responses to the question on price trends over next 12 months. It is calculated as $+ 1^*$ ("Pecentage thinking it will rise a lot") $+ 1/2^*$ ("Pecentage thinking it will rise moderately"- $1/2^*$ ("Pecentage thinking it will stay about the same") $- 1^*$ ("Pecentage thinking it will fall").

- *First-round effects of lower commodity prices*, as captured by the combined impact of world food and energy prices and administered food and energy prices, account for the largest share of the inflation decline in non-euro area EU countries.
- Disinflation spillovers from the euro area have been an important factor for euro peggers, and to a smaller extent for inflation targeters. Falling euro area core inflation transmits through lower prices of imports to countries with currencies pegged to the euro and to inflation targeters with higher import-content in domestic demand.
- Nominal effective exchange rates have played an important role in inflation targeters, including in Sweden and the UK.
- Changes in indirect taxes have contributed sizably to the easing of domestic price pressures across CEE. This reflects base effects from the significant fiscal consolidation efforts in 2011-12, particularly in countries that have since exited the EU's Excessive Deficit Procedure.
- The domestic economic cycle measured by the unemployment gap has had a marginal impact in the recent disinflationary episode. This is consistent with the recent evidence of flattening Phillips curve (Blanchard et al., 2015).
- *Second-round effects*, as measured by the contribution of forward-looking inflation expectations, can account for between 1.5 and 14 percent of the observed inflation variance across country groups.

Model of expectations of future inflation

In the second stage of our analysis, we use the regression specification in IMF (2015) to estimate equation (2) (see Box 2) for households' and firms' short-run inflation expectations. We use panel data EU countries outside the euro area until the onset of disinflation in 2012. This helps identify the normal (i.e., fitted) reaction of inflationary expectations to oil prices and other shocks and any overshooting (i.e., abnormally large negative residuals) that can signal unanchoring of inflation expectations. The former can be considered benign, because in the past, such deviations have been consistent with well anchored inflation expectations, and if history repeats itself, commodity prices will not continue to fall indefinitely. Therefore, this effect will automatically reverse into boosting inflation back to the target, once commodity prices turn a corner. On the other hand, potential overshooting can be malignant, as a priori it is not known whether it will be symmetric in the downward and the upswing phases of the commodity price changes. It may, therefore, signal unanchoring of inflation expectations. Analysis of the out-of-sample forecasting performance of region-wide regressions of households' and firms' inflation expectations (Figure 9 and notes to the charts) shows that the estimated models of inflation expectations cannot fully explain the decline in consumer inflation expectations across both CEE inflation targeters and euro peggers. In contrast, professional forecasters' inflation expectations have most recently better aligned with the model-based predictions, mitigating earlier concerns over potential overshooting. In Sweden, both consumer and professional forecasters' inflation expectations have most recently aligned with their historical relationship with oil prices. Further work is needed to pinpoint the exact size of these more persistent and potentially self-reinforcing second-round effects, though our analysis of inflation variance in 2012-14 suggests that, at present, they play a minor role in the observed disinflation.

7 Spotlight on Sweden

The Swedish disinflation episode started in early-2011, about a year earlier than in the euro area and other noneuro area EU countries. Since then, inflation continued decelerating, moving away from the 2 percent inflation target of the Sveriges Riksbank. What were the drivers of Swedish disinflation?

The early onset of disinflation in Sweden was likely caused by the strong appreciation of the Swedish krona between end-2009 and mid-2011, due to its safe haven status. As a result, the prices of non-energy industrial goods with highimport content fell into deflation that reached -1 percent in 2011, pulling down headline inflation.

The speed of disinflation has further accelerated on the back of the subsequent declines in world commodity prices. About a third of inflation variance between 2012 and 2014 can be attributed to falling world food and energy prices, including administered prices (Figure 10) – similar factors have been also identified in SR (2014), Figure A2.

Besides their first-round direct effect, there has been a pronounced first-round indirect effect as well, especially in the service sector (Arnold, 2014). Falling commodity prices affected Swedish trading partners as well, notably the euro area, where core inflation subsequently also weakened.

The renewed appreciation of the Swedish krona and disinflationary spillovers from the euro area have also been significant. The Swedish krona appreciated again between mid-2012 and mid-2013 on the back of renewed global uncertainty and flight to safety. Nominal exchange rate



Source: IMF Staff calculations.

dynamics can account for around a quarter of inflation variance in 2012-14. Declining core inflation in the euro area (main trading partner) has weakened inflation of imported goods and put competitive price pressures on prices of Swedish tradable products. Disinflationary spillovers from the euro area add-up to 13 percent of inflation decline.

The disinflation has also affected inflation expectations that led to some second-round effects, triggering further easing of monetary policy. Nevertheless, the size of the secondround effects in Sweden - at about 6 percent of the inflation variance - is smaller than the average of 11 percent for the EU inflation targeters outside the euro area. In response to falling inflation expectations and its own inflation forecasts, Sveriges Riksbank has gradually eased monetary policy, then in early 2015 escalated to unconventional measures, by cutting the key policy rate to negative 35 basis points and embarking on quantitative easing through purchases of government bonds. This move appears to have contributed to turnaround of inflation expectations (Figures 7 and 9) and should help bring inflation back to target over the medium-term. At the same time, macroprudential measures are called for to reduce the risk to financial stability from rapid increases in asset prices, especially in the housing market.

Last year's IMF (2014) report on Sweden argues that the following macroprudential measures could be particularly helpful in the short-run to curb mortgage demand and hereby the possibility of housing market excesses:

• A gradual introduction of a debt service-to-income (DSTI) limit, combined with a lower binding loan-to-value (LTV) cap. The LTV cap of 85 percent

is relatively generous compared with many other advanced economies. In addition, given rising housing values, even a more binding LTV cap might not keep debt-to-income ratios from rising. This suggests that adding a DSTI limit to the Swedish macroprudential toolbox could help keep debt at sustainable levels.

- Mandatory amortization requirements. Such regulation has been enforced, for example, in Singapore in 2012, where new mortgages have to be amortized within 35 years.
- Reducing mortgage interest tax deductibility. Tax deductibility incentivizes Swedish households to hold more debt and makes them more vulnerable to economic or financial shocks than they would otherwise be. A gradual reduction in mortgage interest deductibility – as is, for example, being done in Finland – would reduce this distortion.

8 Risks at current junction

The fall of international oil price and other commodities, particularly gas, accelerated sharply since June 2014 and stabilized and partially recovered only in early-2015. Their full disinflationary effect has been slowly filtering through to the prices paid by consumers, as administered prices of energy, which are changed infrequently, adjust. According to the April 2015 WEO forecasts and our estimates, headline inflation is expected to stay low through 2016 in euro peggers and remain below targets in Hungary, Poland, and Sweden.

What does this mean for the economy? The prospect of lower cost-of-living and production costs is undoubtedly a positive development in the short-run:

- Lower energy prices boost the purchasing power of households and businesses. Given the still negative output gaps throughout the region, a pick-up in demand would be a boon for domestic producers.
- The lower consumer and firm outlays on goods and services would also ease the liquidity strains of debt service for heavily indebted firms and households, reducing the risk of default and the related negative effect on consumption and investment.

But, low inflation and particularly deflation increases debt sustainability risks and raises the possibility of second-round disinflationary effects in the medium-term:

• The prospect of falling prices could suppress domestic demand, as economic agents postpone consumption and investment to take advantage of the expected

future price cuts. The latter can also affect wage and price-setting behavior, embedding the expectation of disinflation in the evolution of future wages and prices.

• Persistent, broad-based disinflation can complicate the process of deleveraging by heavily indebted firms and households, as it increases the real debt burden. This can be further exacerbated by stagnating nominal incomes, to the extent that the loss of income is not offset by the pass-through of lower inflation via nominal interest rates to debt servicing costs.

9 Policy considerations

Overall, the fall in oil prices will likely boost growth in the short-run. But, it poses challenges to monetary policy making, which focuses on medium-term risks. A prolonged undershooting of the inflation objective could damage central banks' credibility, which would make it much harder to bring inflation back to the price stability objective.

What should policy makers do? Countries that peg to the euro do not have independent monetary policies and would have to rely on the ECB's quantitative easing (QE) policy response to persistently low inflation in the euro area. Although QE has already contributed to the depreciation of the euro that feeds into higher domestic prices of imported goods, euro area inflation is expected to return to its target only gradually by the end of 2016 (ECB, 2015a, b).Therefore, where fiscal space allows and output gap is negative, countries could also use discretionary, expansionary fiscal policies to boost demand and prices.

When faced with persistent disinflationary pressures, inflation-targeting central banks should aim at bringing inflation closer to its target over the medium-term. They should react to second-round effects of demand and supply shocks, and when the credibility of their policy framework is put under question by successive first-round effects of shocks.

However, policy responses to low inflation and deflation are limited by available policy space. With policy rates at historical lows, further easing by inflation-targeting central banks may need to be complemented with macroprudential policy,¹⁰ both on borrowers (caps on loan-to-value ratio and debt-to-income) and on lenders (reserve requirements, credit growth ceiling, or countercyclical capital buffers), if it threatens to weaken financial stability or risks causing large, sudden capital outflows. While capital outflows may help depreciate exchange rates¹¹ and hence raise inflation, there is always a risk that the process may go too far. This is of particular concern for countries with high share of debt in foreign currencies, which are more exposed to changing investors' risk appetite, geopolitical concerns, and global financing conditions.

On balance, the greater concern at present appears to be very low inflation than financial instability on account of capital outflows, but policymakers will need to keep a watchful eye on markets.

10 Conclusions

We examine the driving forces of the disinflationary tide that has swept through EU countries outside the euro area starting in 2012. We find that falling world prices of food and energy have been the main disinflationary driver both across the region and in Sweden. Disinflationary spillovers from the euro area have also been an important factor in other EU countries, particularly those with higher importcontent of domestic demand and more rigid exchangerate regimes. Exchange rate movements have played an important role in inflation targeters, including Sweden.

Second-round effects via forward-looking inflation expectations are also non-negligible in many countries in the region. In Sweden, they account for a smaller share of inflation variance than in other inflation targeters. However, the prolonged weakness of inflation expectations can be explained, in part, by their historic link with world commodity prices. Further work is needed to determine the extent of any overshooting of inflation expectations that can be a threat for their unanchoring.

When faced with prolonged disinflationary pressures, central banks should aim at bringing inflation closer to its target, paying particular attention to signs of overshooting of inflation expectations. But, with policy rates at historical lows and in some cases negative, further easing by inflationtargeting central banks would need to take into account the impact on financial stability and be complemented by macroprudential measures as needed.

¹⁰ As keeping policy rates at historical lows can fuel speculation in real estate and financial markets, raising risks to financial stability that may call for macroprudential measures to alleviate them.

¹¹ Lower domestic rates make local bonds less attractive for foreign investors. If foreign investors decide to pare down their holdings of local bonds and repatriate the funds abroad, the additional demand for foreign currency (to take out of the country) would tend, other things being equal, to depreciate the domestic currency.

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