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Is US inflation picking up?

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DISCUSSION
NOTE

n.5 - March 2018

Main points

- The possibility of US inflation surprises has recently created market tensions
- So far, however, both actual and expected inflation are subdued...
- ...and growth in labor costs also contained
- In this note we estimate a Phillips curve to assess inflation pressures going forward
- Based on these estimates we see Personal Consumer Expenditure inflation go over the Fed target in 2018, ...
- ... partly due to oil price surges, dollar depreciation and temporary factors, ...
- ...and return below target in 2019

I. Introduction

Fears of US inflation exceeding expectations, and hence of a more aggressive monetary policy, have recently created tensions in financial markets. Moreover the weak dollar, the higher oil prices, the highly expansionary budget measures taken by the US administration and the recent announcement of tariffs all point to higher price dynamics. How much higher is difficult to tell. And the question is whether this will trigger a monetary policy reaction by the Federal Reserve (Fed) which is above what markets are currently expecting. An excessively rapid US monetary policy normalization would have significant implications for the US and for the global economy. It would reduce global liquidity, with effects on interest rates also in the euro area. Some emerging economies, especially those with high private and/or public debt, could face higher financing costs and possible exchange rate realignments.

In this discussion note, we will assess the current prospects regarding US inflation. Section I will review the recent data. Section II will present estimates of a Phillips curve that we will use to make preliminary projections on inflation for the next two years. Section III will discuss some temporary factors that have contained inflation in 2017, but that are likely to fade away in 2018. Section IV will draw some conclusions regarding the likely course of the Fed monetary policy and section V will wrap up.

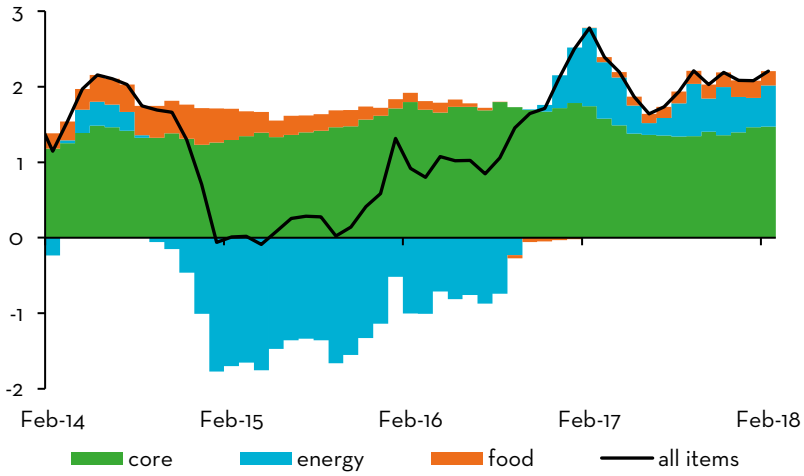
II. The signs that inflation is edging up are weak

Price indexes do not currently show price pressures... In 2017, the inflation rate measured by the Consumer Price Index all urban (CPI) was 2.1 per cent, and excluding the more volatile components, energy and food, it was 1.7 per cent. In January and February, reacting to the increased oil price, total consumer prices accelerated while core inflation remained substantially stable at around 1.8 per cent (Figures 1 and 2). To assess whether the inflation dynamic is widespread across sectors, we have computed a diffusion index that sums the weights of the CPI core items whose price has a positive increase (in annual terms; Figure 3). The index shows a decline starting in July of 2017 and a stability afterwards at about 70 per cent.[1] The diffusion index, and core inflation as well, currently have values below the historical average, suggesting that inflationary pressures are not widespread.

Figure 1

Food and energy pushing-up inflation

contribution to headline CPI all urban inflation, per cent

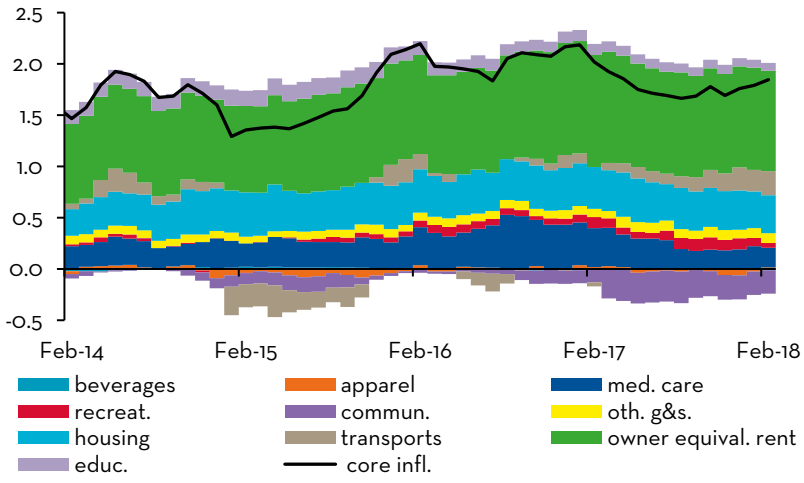


Source: Prometeia's calculations based on Bureau of Labor Statistics.

Figure 2

Communications pushing-down core inflation

contribution to core CPI all urban inflation, per cent



Source: Prometeia's calculations based on Bureau of Labor Statistics.

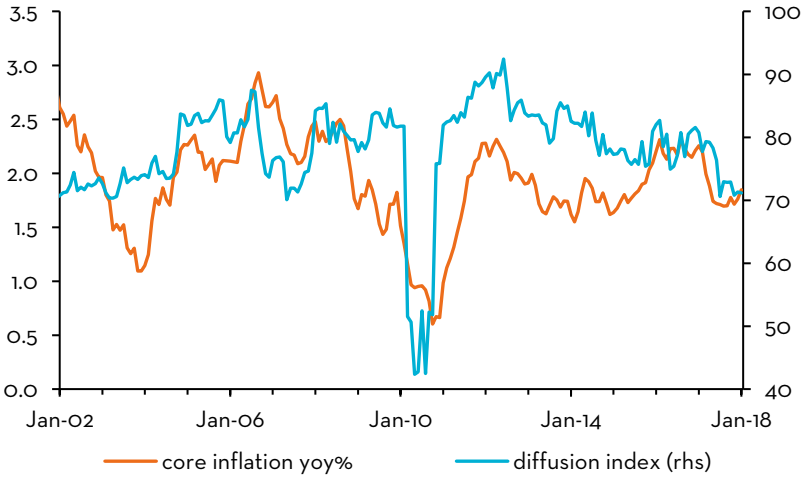
1 *A similar result is obtained when considering the number of items rather than their relative weight in the basket, not shown here.*

... and surveys do not anticipate higher expected inflation. According to the most recent monthly surveys (February), 1-year-ahead expected inflation remains in line with the Fed target of 2 per cent, while inflation expected 5-years-ahead has been substantially stable in the last few months (Figure 4). The upward turn in Q1-2018 is common to the three indexes (1-year-ahead and 5-year-ahead inflation by the University of Michigan, 1-year-ahead inflation by the Survey of Professional Forcasters, SPF). The SPF was edging up moderately during 2017, but it has fallen recently.

Figure 3

Diffusion Index of core inflation still below historical average

weight of items with positive yoy inflation

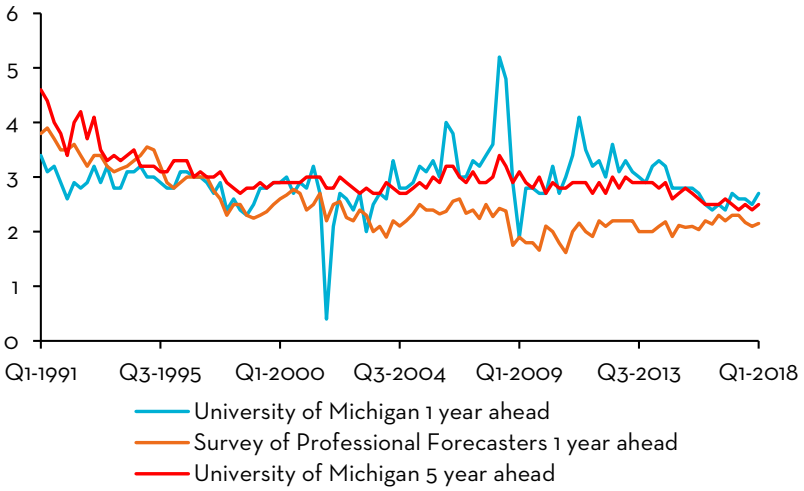


Source: Prometeia's calculation on Bureau of Labor Statistics.

Figure 4

Stable expected inflation from the surveys

per cent, quarterly data



Source: Source: University of Michigan and Federal Reserve Bank of Philadelphia.

Note: The Survey by the University of Michigan reflects household expectations. The survey of Professional Forecasters (SPF) collects information from analysts and economists.

Furthermore, there is little evidence that labor costs are diverging from productivity growth, which remains feeble. Nominal unit labor costs have been growing modestly in the present recovery compared to past experiences (Table 1). In addition, the most recent data that refers to 2017 does not show any acceleration.

Table 1 Productivity and Nominal ULC in recent expansionary phases of the cycle *(average annual per cent variations)*

	labor productivity	hourly compensation	ULC
Q1-1991 Q1-2001	2.3	4.1	1.8
Q4-2001 Q4-2007	2.7	3.8	1.1
Q2-2009 Q4-2017*	1.2	2.0	0.8
of which 2017 only	1.2	1.5	0.3

Source: Prometeia's calculation on BEA.
** last available data.*

Financial markets however have recently asked a higher term premium. US 10-year Treasury bond yields have increased by about 22bp since the beginning of the year. We have broken down this yield change and found that markets are expecting higher inflation and are therefore asking a higher term premium, as higher inflation is generally associated with higher volatility. The same movements are shared by other advanced economies, i.e. Germany, but with less intensity (Figure 5).

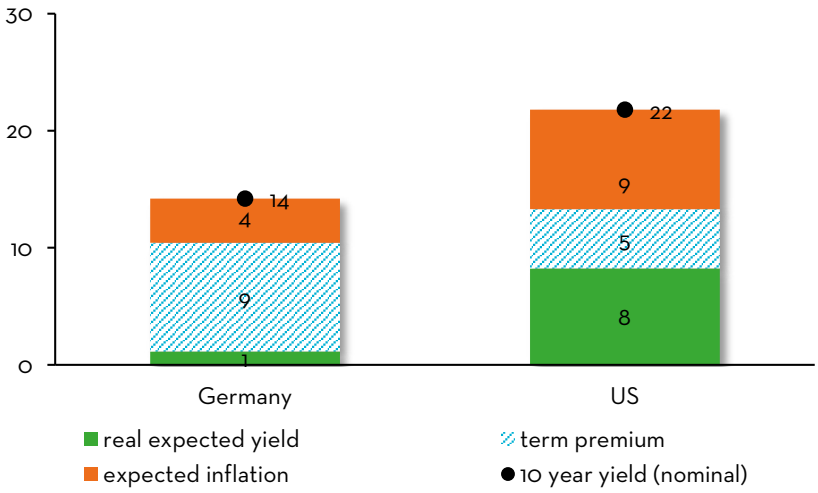


Figure 5

Markets are asking higher term premium

breakdown of 10 year Treasury yields variation between December 2017 and February 2018 (monthly average), basis points

Source: Prometeia's calculation on Thomson Reuters.

Note: The breakdown is based on a model that for each country takes into account the term structure of Government bonds and the inflation swaps.

III. Estimates of a "non-accelerationist" Phillips curve

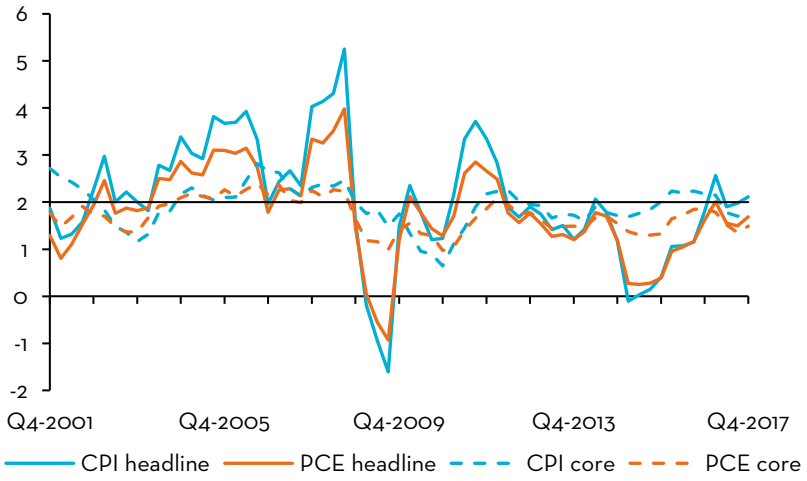
Projecting inflation forward. Although at the moment available data do not signal any significant inflation pressure, concern that inflation might increase in the next few months has been recently supported by a number of factors. Higher oil prices, the recent expansionary fiscal measures and the announcement of tariffs all point to the possibility of higher prices going forward. A standard approach to formulating inflation forecasts is to estimate a Phillips curve (more below) and feed the estimates with forecast on its determinants. We will discuss such estimates below, noting though that they have to be considered preliminary as they are based on a limited number of macro aggregates. We will then refine these figures incorporating more granular price information in the next section.

We estimate the Phillips curve with reference to both the Personal Consumer Expenditure (PCE) and the Consumer Price Inflation (CPI) indexes. Despite CPI inflation being the most used in measuring US inflation[2], the FED refers primarily to the PCE mainly because the changing composition of the basket in this index is more consistent with actual consumer behavior.[3] The two indexes differ in a number of aspects, the most important being the different weights (the PCE is similar to the consumption deflator).[4] In general the CPI tends to report somewhat higher inflation (Figure 6) resulting in a progressive larger divarication between the levels of the two indexes over time.

2 *It is used to adjust social security payments and it is the reference rate for inflation swap and Treasury Inflation Protected Securities (TIPS).*

3 *https://www.federalreserve.gov/boarddocs/hh/2000/February/FullReport.pdf*

4 *J.G.Haubrich, S.Millington, PCE and CPI inflation: What's the difference?; Federal Reserve Cleveland, 2014.*



Source: BLS, BEA.

Figure 6

Personal Consumption Expenditure inflation below Fed target

Consumer Price Index and Personal Consumption Expenditure inflation, per cent

We consider a "non-accelerationist" Phillips curve. According to standard specifications of the Phillips curve, inflation depends on the unemployment gap (as a measure of economic slack), on inflation expectations and import prices. Moreover, several analysts suggest that the present relationship between the labor market and inflation is better described by a "non-accelerationist" Phillips curve, where the unemployment rate influences the level of inflation, rather than the so-called "accelerationist" where the unemployment rate influences inflation variations. This mainly reflects the improved credibility of central banks and the fact that their targets have become the main focal point of inflation expectations.[5] Moreover, given low and stable inflation since the nineties, inflation is now likely to be assumed constant in the price and wage-setting processes.

We adopt a standard specification. As far as economic slack is concerned, we use the unemployment gap, defined as the difference between actual unemployment and the non-accelerating inflation rate of unemployment, or NAIRU.[6] In order to capture import prices, we use import prices relative to GDP prices.[7] Overall, the specification we have estimated is the following:[8]

$$\pi_t = \alpha + \theta(U_t - U_t^*) + \rho(\pi_{5t}^*) + \gamma\Delta\left(\frac{pm_t}{py_t}\right) + \varepsilon_t$$

where:

π_t is headline inflation;

U_t is the current unemployment rate;

U_t^* is the NAIRU, as estimated/projected by Federal Reserve Economic Data (FRED);

π_{5t}^* is the 5-year-ahead inflation expectation from the survey of the University of Michigan;

$\frac{pm_t}{py_t}$ is the relative price of total imports of goods to the GDP deflator.

5 *Blanchard O. (2018). Should We Reject the Natural Rate Hypothesis? Journal of Economic Perspectives, volume 32, number 1, pages 97-120.*

6 *As described by Okun's law, the unemployment gap is strongly linked to the output gap. The output gap is defined as the difference between the level of GDP and level of potential GDP.*

7 *Some authors use a direct measure of external output gap, see Berson C., et. al. (2018). Does the Phillips curve still exist? Rue de la Banque n.56. Banque de France. Auer R. et alt. (2017) The globalization of inflation: the growing importance of global value chains. BIS working papers n. 602. Bank for International Settlements.*

8 *We also estimated a Phillips curve using the output gap instead of the unemployment gap. The results are very similar.*

Table 2 Phillips curve estimations for US CPI[a] and PCE[b] *(quarterly data, 1993-2017)*

Explicative variables	**CPI** lhs variable coefficients	**PCE** lhs variable coefficients
π^*_{5t}	0.89 ***	0.70 ***
$(U-U^*)_t$	-0.25 ***	-0.13 ***
Δ relative import price$_t$	0.14 ***	0.11 ***
Adjusted R-squared	0.84	0.83
S.E. of reg.	0.44	0.34

*The ***,** and * signs indicate the significance at the thresholds of 1 per cent, 5 per cent and 10 per cent respectively.*
Source: Prometeia's calculations.
a) Consumer Price Index,
b) Personal Consumption Expenditure index.

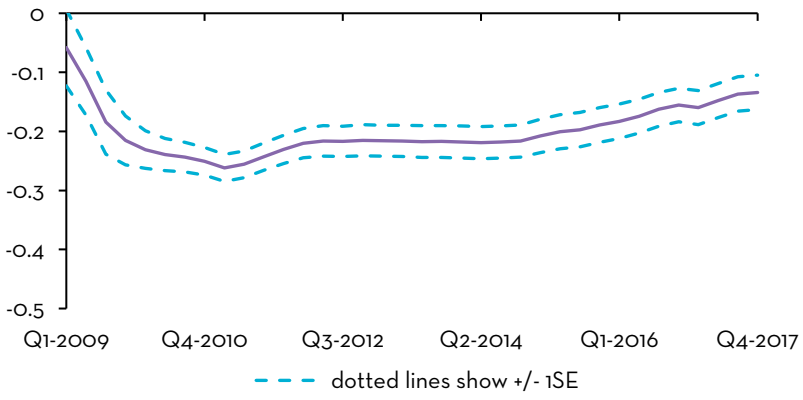
Estimates confirm the main role of expectations in driving inflation. The two versions of the Phillips curves, the one using the PCE and the other using the CPI, differ slightly (Table 2). The slope of the unemployment gap is significantly different form zero although rather low. This implies that a one percent increase in the unemployment rate above the (estimated) NAIRU is associated with lower inflation by roughly 0.1-0.3 percentage points. The coefficient of the long-term inflation expectation is also statistically significant and relatively high (0.7-0.9), while an increase in import prices, reflecting either a weaker dollar or higher international prices, has a modest effect on US inflation.[9]

We detect a strong role of inflation expectations and a slight increase in the slope since the crisis. We have done recursive estimates on rolling windows of 10 years of the PCE based Phillips curve and find that its slope increased slightly after the Great Recession and remained relatively stable afterwards (Figure 7). With regard to inflation expectations, we find that inflation depends firmly on expectations (Figure 8).

Figure 7

Slope of the Phillips curve rather stable after the great recession

rolling regression on a window of 40 quarters; first estimate starts in Q1-1993

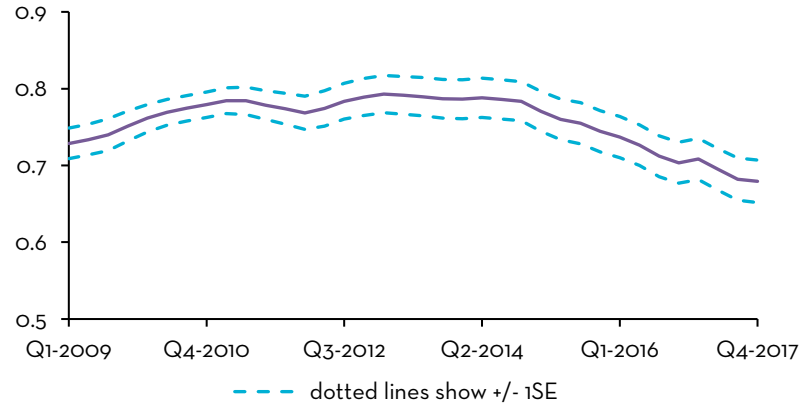


Source: Prometeia's calculations.

Figure 8

The anchoring of long term inflation expectations

Estimated coefficient of inflation expectation, rolling regression on a window of 40 quarters; first estimate starts in Q1-1993



Source: Prometeia's calculations.

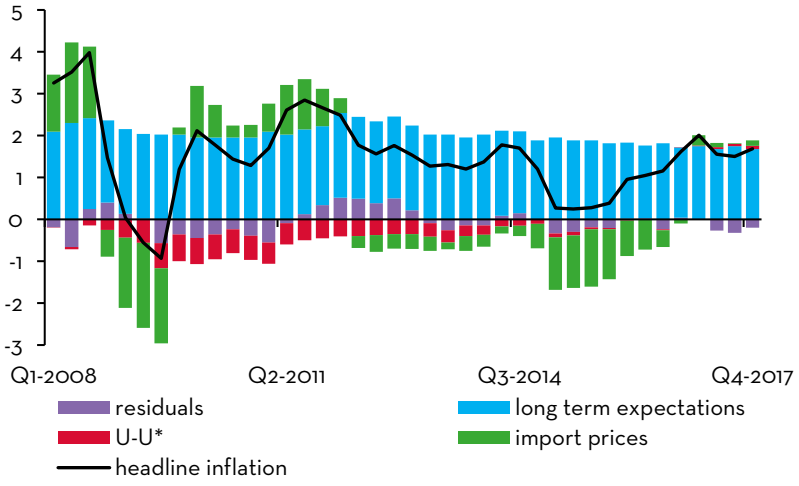
9 *This reflects also the relatively small share of imports relative to GDP in the US, at 13 per cent.*

Import prices are the main driver of the inflation increase in 2017. The breakdown of the inflation dynamics based on the estimated coefficients (Figure 9) suggests that import price surges at the turn of 2016 contributed to the rise of inflation in 2017. This increase in import prices is partly due to the dollar depreciation that in terms of trade weighted exchange rate weakened 6 per cent in December 2017 yoy (by around 1 per cent on average in 2017). The contribution of price expectations has remained stable and positive, in line with previous years.

Figure 9

Higher import prices and improved labor market conditions contributed to push-up inflation

percentage points



Source: Prometeia's calculations.

Using our macroeconomic outlook (for unemployment and import prices, Table 3), the estimated Phillips curve suggests PCE inflation at 2.0 per cent in 2018 and 1.8 in 2019. CPI inflation would be higher, 2.5 per cent in 2018 and 2.3 per cent in 2019. For 5-year-ahead inflation expectations, we assume they remain anchored at the current values of 2.5 per cent. Regarding import prices, we estimate the pass-through of our profile of the oil prices on PCE headline inflation to be around 10bp in 2018 and negligible in 2019, while the impact of the exchange rate to be around 10pb in 2018 and -10bp in 2019.

Table 3 US macroeconomic variables relevant for the Phillips curve

(annual per cent changes if not stated otherwise)

	2017	2018	2019
Real GDP	2.3	2.8	2.3
Unemployment rate (per cent)	4.3	3.9	3.6
Import prices of goods	2.6	5.7	2.0
GDP deflator	1.9	2.6	1.8
US dollar trade weighted exch. rate	-0.8	-1.5	1.0
WTI oil price (dollar per barrel)	51.3	59.2	58.5

Source: Prometeia's forecast on BEA, BLS.

IV. Some other factors could push inflation up in 2018

The projections obtained with the Phillips curve need to be complemented by additional information. In order to come up with a reasonable forecast of inflation, however, the analysis based on the Phillips curve needs to be complemented by a more granular assessment of factors that can influence inflation beyond the macroeconomic elements considered in the Phillips curve (i.e. the labor market slack, inflation expectations and imported prices). This is what we address in this section.

Starting from the recent fiscal expansionary measures, we do not see them having substantial direct effects on prices. The December Tax Reforms and the public expenditure increase legislated in February (Bipartisan Budget Act of 2018) do not include measures that directly affect do-

mestic prices (as consumption tax increases or similar). On the contrary, from a theoretical point of view the lower fiscal burden on businesses should put downward pressure on production costs and final prices. With regard to lower labor taxes for households, part of the Tax Reform, pressure on prices could materialize only in the case that these activate stronger demand, although this effect is already captured in the Phillips curve by the impact of activity on prices.

The recent announcement of tariffs, assuming no retaliations by trade partners, should have negligible effects on consumer prices. As far as steel and aluminum tariffs are concerned, total imports represent a mere 2 per cent of total US merchandise imports and after the signature of the measure many countries have been exempted, among which: NAFTA countries conditional on a "fair" agreement to change current NAFTA rules and the EU countries for 40 days. The largest share of US steel and aluminum imports comes from these countries and this therefore further reduces the already small effect on consumer prices that a full implementation of the measures could have produced (about 3 basis point in 2018, according to our estimations). A new wave of tariffs is now under preparation by the US administration: details are not available yet but it is targeting 100 products for an amount of 60 billion dollar (about 2.5 per cent of total merchandise imports) against Chinese exporters.

Other factors will lift inflation temporarily in 2018. Specifically, in 2017 and the first two months of 2018 some transitory factors gave a negative contribution to the formation of headline and core inflation. In the first months of 2017 Verizon offered its customers a flat rate for unlimited download of data that resulted in a negative contribution of communication to core inflation (-25bp on average in 2017, compared with -6 in 2016). In addition, mandated cuts to medical care payments reduced core inflation in the health sector by about 10bp in 2017 compared to 2016 (Figure 2).

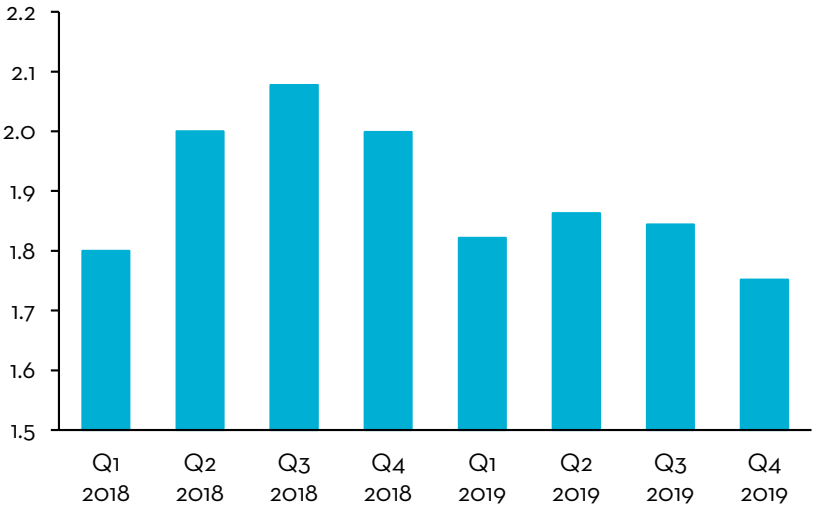
V. The implications for the Fed rate decisions

Overall, our analysis suggests that in 2018 PCE headline inflation could easily reach the Fed target (Figure 10). According to our estimates based on the Phillips curve and the mentioned transitory factors, PCE inflation might surpass the 2 per cent target in 2018. But underlying inflationary pressures are not strong and we expect PCE inflation to come back below 2 per cent again in 2019. These results are strictly conditional to our macroeconomic scenario and especially on the

Figure 10

PCE headline inflation forecasts from the estimated Phillips curve in line with the Fed target in 2018

per cent



Source: Prometeia's forecasts on BEA.

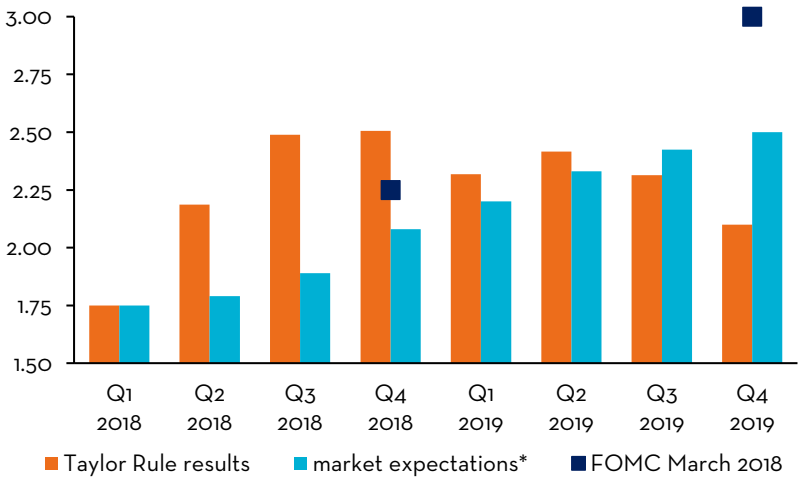
assumption of the dollar strengthening in the second part of 2018.

A simple Taylor Rule based on PCE inflation suggests four Fed funds rate hikes in 2018, despite forecast inflation in line with the Fed target.... To translate the profile of inflation that we have penciled in for 2018 and 2019 into the likely profile of the Fed funds rates, we use a traditional Taylor Rule with coefficients on inflation gap and output gap at 0.5.[10] The profile of inflation and especially the above-trend GDP growth expected for 2018 and 2019 indicate Fed funds interest rates at the end of 2018 100bp higher than in December 2017 and stable in the first half of 2019 (Figure 11). Nevertheless, the contribution of oil price increases to PCE headline inflation implicit in our estimates suggests that PCE inflation excluding energy could remain below 2 per cent, and therefore the Fed might lean more on the dovish side on rate increases, and therefore confirm the three hikes projected in the FOMC of March 2018.

Figure 11

Fed fund interest rate according to a Taylor Rule

percentage points



Source: Prometeia's calculations.
** implicit in future contracts*

VI. Summing up

PCE headline inflation could well reach 2 per cent in 2018. According to an estimated Phillips curve and conditional on our macroeconomic scenario, which entails GDP growth above potential in 2018-2019, PCE headline inflation could reach 2 per cent or slightly higher in 2018. This will also partly reflect some temporary factors, weak dollar and higher oil prices. A simple Taylor Rule suggests that the Fed funds target rate could be 100bp higher at the end of 2018 in comparison with December 2017, and remain stable in the first half of 2019. Core PCE inflation however should remain more subdued, given the contribution of oil price increases to inflation this year, suggesting that the Fed could continue to be cautious.

The elasticity of inflation to import prices is low, but the dollar exchange rate will be an important determinant of US inflation going forward. Exchange rates could have wide variations that could easily and rapidly feed domestic inflation despite the low penetration of foreign goods and services in the US economy. A depreciated dollar could partially compensate for tariffs in the ad-

10 For the output gap, we use our outlook for actual GDP and the Congressional Budget Office (CBO) estimates for projected potential GDP.

ministration attempt to foster demand for domestically produced goods. Moreover, the administration could be erroneously tempted to accept inflation above target in the hope of mitigating the deterioration of the public-sector finances. This would come with the risk of significantly tighter conditions in the future.

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