



## Summary

### United States

Interest rate uncertainty: how big an issue?

Several measures point to the same conclusion: the uncertainty surrounding the future Fed's policy is increasing. How could this impact the real economy?

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### Market overview

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Also in



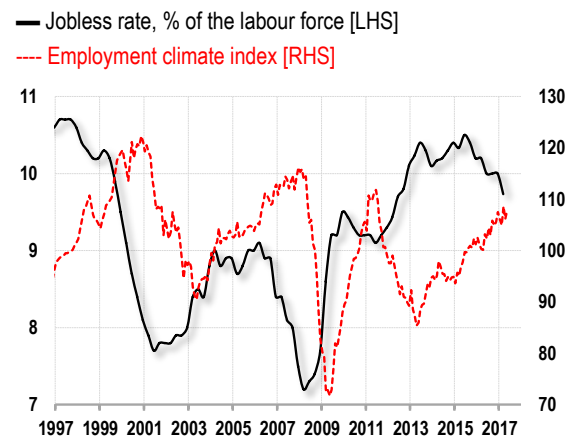
## France: unemployment down, confidence up

■ The unemployment rate at its lowest since early 2012 ■ Business confidence at its highest since late 2010

The sharp drop in the unemployment rate in first-quarter 2017 (down 0.4 points to 9.6% of the labour force as measured by the INSEE) is remarkable on several counts. It confirms and amplifies the downward trend that began in mid-2015, with a cumulative decline of nearly one point. The jobless rate has finally fallen well below the 10% threshold and stands at its lowest level for five years.

It is rare to see the unemployment rate decline so sharply in just one quarter. In the past, this has only happened during periods of strong growth, like in 2000 and 2006-2007. Yet, today we can hardly say that French growth is strong. This leads us to conclude that the big drop in Q1 unemployment probably paints a more optimistic picture than the actual situation. Other indicators are more mixed: the long-term unemployment rate slipped only 0.1 points for the quarter and 0.2 points for the year (to 4.1% of the labour force); underemployment is steady (at 6.2% of the working population); and the unemployment halo is still on the rise. As gradual as it may be, the improvement in the unemployment situation is nonetheless expected to continue. Growth and employment prospects are both looking strong. The outlook even looks brighter in the second quarter than in the first, based on the improvement in May survey results for business sentiment (+1 point to 105) and the employment climate (+2 points to 108).

### FRANCE: UNEMPLOYMENT AND EMPLOYMENT CLIMATE



Source: INSEE

### THE WEEK ON THE MARKETS

Week 19-5 17 > 23-5-17

↗ CAC 40	5 324	► 5 348	+0.4 %
↗ S&P 500	2 382	► 2 398	+0.7 %
↘ Volatility (VIX)	12.0	► 10.7	-1.3 %
↗ Euribor 3M (%)	-0.33	► -0.33	+0.1 bp
↗ Libor \$ 3M (%)	1.19	► 1.19	+0.6 bp
↗ OAT 10y (%)	0.81	► 0.84	+2.5 bp
↗ Bund 10y (%)	0.37	► 0.40	+3.2 bp
↗ US Tr. 10y (%)	2.24	► 2.28	+3.8 bp
↗ Euro vs dollar	1.12	► 1.12	+0.3 %
↗ Gold (ounce, \$)	1 253	► 1 260	+0.5 %
↗ Oil (Brent, \$)	53.6	► 54.1	+0.9 %

Source: Thomson Reuters

## United States

### Interest rate uncertainty: how big an issue?

- An increase in interest rate uncertainty can weigh on the real economy either directly or via its impact on financial markets. This is particularly important during a process of monetary policy normalization.
- Interest rate uncertainty can be assessed in different ways. In this article we look at observed volatility, implied volatility and surveys.
- Survey-based measures suggest that uncertainty about the federal funds rate has increased as of late.

Uncertainty about the future path of interest rates can have a direct negative influence on the real economy. Households may be reluctant to borrow if they consider that interest rates might increase more than generally expected whereas companies may invest less because they feel less certain about the return on investment projects. There is also an indirect influence via financial markets: higher interest rate uncertainty can weigh on equity prices or cause a widening of the yield differential between corporate and government bonds. Both of these developments can impact confidence and the cost of capital of companies. To address this issue, central banks have made considerable efforts in providing forward guidance and by shedding light on their future policy intentions. Providing economic forecasts or, in the case of the Federal Reserve, projections of FOMC members, in particular on the path of the policy rate, is an integral part of that effort. Does this mean that uncertainty has been reduced? The answer to the question may depend on how uncertainty is measured. In what follows we review three approaches: observed interest rate volatility, implied volatility based on option pricing and survey-based uncertainty.

#### Observed interest rate volatility

Chart 1 shows the standard deviation of the 2 year and 10 year treasury yield over a rolling window of six months based on daily observations. Between 2000 and the financial crisis of the autumn of 2008, the volatility of the 10 year yield was on average slightly higher than for the 2 year yield. Subsequently, the two year yield has seen a higher volatility than the 10 year yield although the latter has been on a rising trend since the spring of 2013 when Ben Bernanke raised the prospect of tapering QE. The trend of the standard deviation of the 2 year yield has been flat and despite the federal funds rate hikes since the end of 2015, the spikes in volatility have been rather limited which suggests that Federal Reserve communication has been effective in controlling market expectations. All in all we can say that realised interest rate volatility has remained low.

#### Implied interest rate volatility

Chart 2 presents the MOVE index of 3 month implied volatility on treasury options. After a long downward trend before the financial crisis of 2008, this indicator spiked during the crisis and its immediate

#### Standard deviation of 2 and 10 year US treasury yields

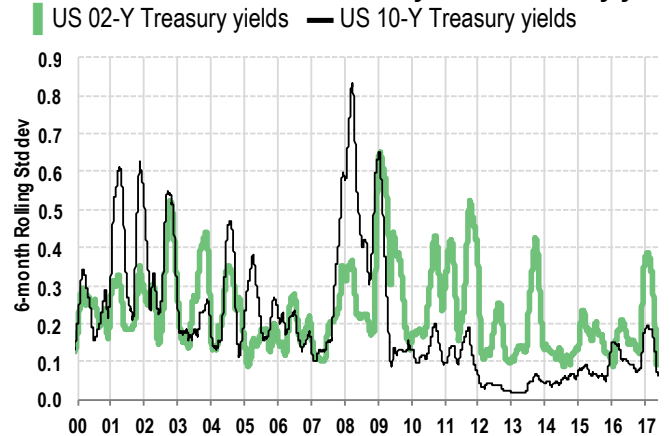


Chart1

Sources: Thomson Reuters, BNP Paribas

#### Implied volatility on options on US treasuries and observed standard deviation on 10 year yields

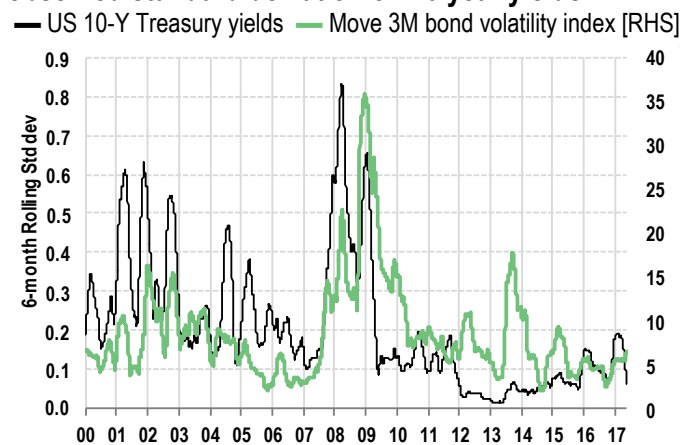


Chart2

Sources : Thomson Reuters, BNP Paribas

aftermath. Subsequently it has been on a downward trend interrupted by jumps in 2012 (Eurozone sovereign crisis), 2013 (taper tantrum) and the end of 2014-start of 2015. There is quite a high correlation with jumps in realised yield volatility. Interestingly, current implied volatility is very low, which echoes a similar observation seen in equity markets where the VIX index of implied volatility on S&P500 options is also very low.

### Survey-based interest rate uncertainty

A third approach in gauging uncertainty is survey-based. The Federal Reserve of New York produces a regular survey of primary dealers<sup>1</sup> as well as a survey of market participants (SMP), i.e. asset managers<sup>2</sup>. In the comments which follow the latter survey has been used with a focus on the following question: "Please indicate the percent chance that you attach to the target federal funds rate or range falling in each of the following ranges at the end of 2018 and 2019, conditional on **not** moving to the zero lower bound (ZLB) at any point between now and the end of 2019. If you expect a target range, please use the midpoint of that range in providing your response."<sup>3,4</sup> The answer to this question provides a probability distribution of the federal funds rate at a given future date (the end of the forecasting window), which means that it can be used as an uncertainty indicator. Chart 3 shows this distribution for the federal funds rate at the end of 2017 with the dates showing when the answers to the survey had been submitted. It is clear from the chart that the distribution has clearly shifted over time, which shouldn't come as a surprise given that the first survey was undertaken in October 2014. Since then the Federal Reserve has tightened policy on three occasions (December 2015, December 2016, March 2017), which has obviously caused a change in the distribution for the December 2017 rate forecast. Chart 4 uses the same information but shows the cumulative probability distribution. The curvature of the distribution can be considered as a measure of uncertainty: if the survey participants have no view whatsoever on the future level of the federal funds rate, each range in the forecast would have the same probability and the line would be a straight line and reflect maximum uncertainty. However, visual inspection of the curvature of the cumulative distribution can be a tricky exercise and to address this issue Theil's uncertainty coefficient has been calculated based on the following formula:

$$\text{Theil's uncertainty index} = 1 - \left[ \frac{1}{N} \sum_{i=1}^N \frac{y_i}{\bar{y}} \ln \frac{y_i}{\bar{y}} \right] / \ln N$$

whereby  $y_i$  is the frequency of an answer,  $N$  is the number of possible answers and  $\bar{y}$  is the average. Dividing by  $\ln N$  normalises the equation to a range between 0 and 1.

Uncertainty is at a maximum when the index is equal to 1 and at a minimum when the index equals 0.

Chart 5 plots the evolution of the uncertainty curves. They show how the Theil uncertainty coefficient has evolved for a sequence of federal funds rate forecasts for a given end date (e.g. year-end 2014). The horizontal axis shows the remaining time in number of months between the survey date and the end date of the forecast window. For the December 2014 rate we only have a very small number of forecasts (i.e. surveys) and the uncertainty was very low. This is at

<sup>1</sup> "Primary dealers are trading counterparties of the New York Fed in its implementation of monetary policy. They are also expected to make markets for the New York Fed on behalf of its official accountholders as needed, and to bid on a pro-rata basis in all Treasury auctions at reasonably competitive prices." (Source: Federal Reserve of New York)

<sup>2</sup> In the most recent survey (March 2017), there were 30 participants.

<sup>3</sup> This quote comes from the March 2017 SMP of the Federal Reserve. For older surveys the end date for the federal funds rate forecast window was of course different.

<sup>4</sup> We didn't use the probability distribution for the bond yield forecast because of a more limited number of observations: the question wasn't always asked in the survey.

### Survey of Market Participants: probability distribution of federal funds rate forecasts

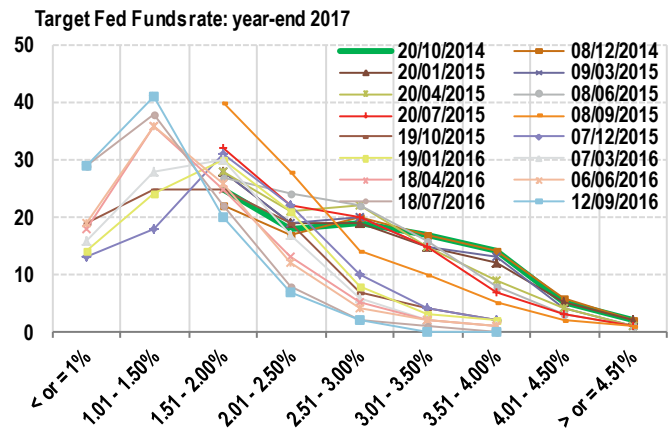


Chart3

Sources: Fed New York, BNP Paribas

### Survey of Market Participants: cumulative probability distribution of federal funds rate forecasts

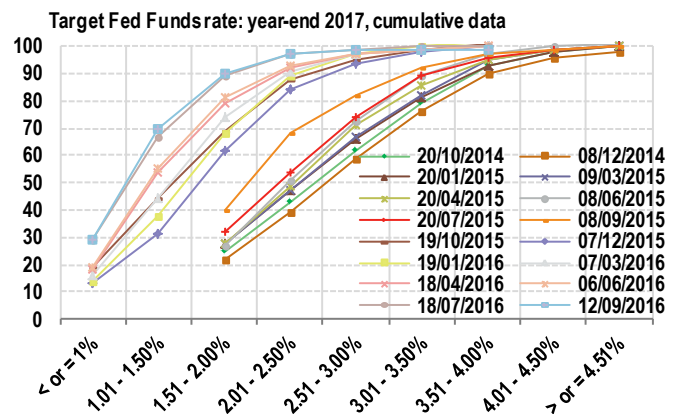


Chart4

Sources : Fed New York, BNP Paribas

### Theil's uncertainty index for the federal funds rate

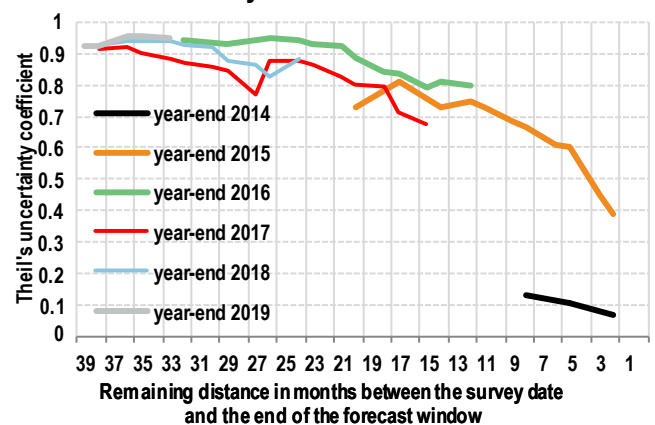


Chart5

Sources : BNPP calculations from data by Fed New York



least in part related to the proximity between the survey dates (shown on the horizontal axis) and the end date of the forecast. This also explains why the 'year-end 2015' line drops significantly as we get closer to that date. The more recent uncertainty curves show a high level of uncertainty, which, in part at least, will be related to the distance between the survey date and the end-date of the forecast window. However, for an equivalent distance to the end-date, the uncertainty for the year-end 2019 forecast is higher than for the year-end 2017 forecast. In general it means that investment managers feel less comfortable in forecasting the federal funds rate for distant dates. This raises the possibility that if they feel more at ease because the forecast window gets shorter, they could modify their investment strategy (increasing or shortening duration, i.e. the interest rate sensitivity, of their portfolios), which could influence the level of bond yields. To put it differently: a high uncertainty level for distant forecasts raises the possibility of significant swings in bond yields later on. Whether this will be the case depends on the federal funds rate level to which the distribution will eventually converge.

### **Conclusion: navigating between visibility, constructive ambiguity and full-fledged uncertainty**

Whether US interest rate uncertainty is considered to be high or low very much depends on the data which are being used. Observed historical volatility as well as implied volatility are (very) low whereas the uncertainty about the federal funds rate at the end of 2018 and 2019 is high. This last point raises the possibility (though not the certainty) of significant changes in bond yields as we get closer to these respective dates. Against this background, the low implied volatility may be puzzling. Probably this reflects confidence in the cautiousness of the Federal Reserve when gradually changing its guidance and in deciding whether and when to hike its policy rate. This could explain why the term premium (the risk premium for investing in a long-dated bond rather than rolling over treasury bills) is again close to zero. An explanation based on a market conviction that still low inflation would not warrant multiple hikes would be at odds with the uncertainty which shows up in the probability distribution of the future federal funds rate. Another interpretation would be that the implied volatility captures near-term uncertainty whereas the probability distributions which underpin chart 5 reflect longer term uncertainty. Clear policy guidance increases visibility for the near-term rate outlook and it can trigger increased risk taking by investors in their quest for attractive returns. One can only hope that as time passes by, the data evolve in such a way that the guidance does not require abrupt changes. Creating a bit more ambiguity in the short run could make one more relaxed about the transition to a more uncertain environment but the introduction of this 'constructive ambiguity' could weigh on the valuation of risky assets like equities and bonds. It seems the Federal Reserve and central banks in general face a difficult choice: clear guidance may increase the sensitivity of the economy and markets to future jumps in uncertainty whereas constructive ambiguity could entail a short term cost (negative market impact) in return for the hope or expectation of a reduced sensitivity to future increases in uncertainty.



Markets overview

The essentials

Week 19-5-17 > 23-5-17

Table with 4 columns: Index, Value, Change, % Change. Includes CAC 40, S&P 500, Volatility (VIX), Euribor 3M, Libor \$ 3M, OAT 10y, Bund 10y, US Tr. 10y, Euro vs dollar, Gold, and Oil (Brent).

10 y bond yield, OAT vs Bund



Euro-dollar



CAC 40



Money & Bond Markets

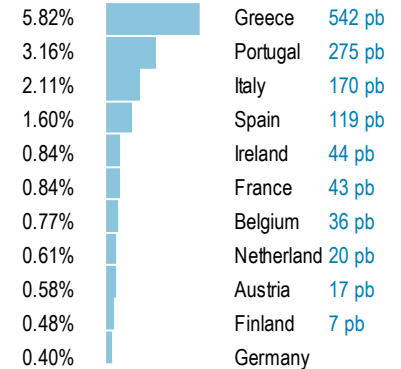
Table of Interest Rates for ECB, FED, and BoE, showing current rates and historical high/low points.

At 23-5-17

Table of Yield (%) for various bonds (AVG 5-7y, Bund 2y, Bund 10y, OAT 10y, Corp. BBB, Treas. 2y, Treas. 10y, £ Treas. 2y, Treas. 10y) with high/low points.

At 23-5-17

10y bond yield & spreads



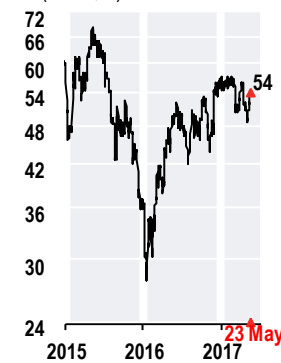
Commodities

Table of Spot prices in dollars for Oil (Brent), Gold, Metals, Copper, CRB Foods, wheat, and Corn, including low/high points and 2017 values.

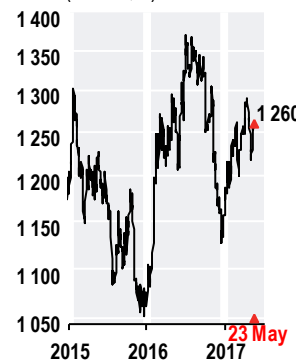
At 23-5-17

Variations

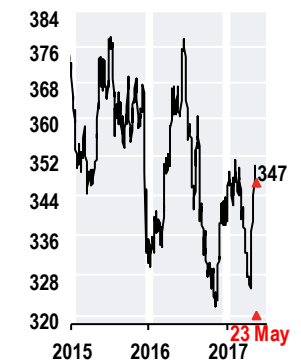
Oil (Brent, \$)



Gold (Ounce, \$)



CRB Foods



Exchange Rates

Table of Exchange Rates for various currencies (USD, GBP, CHF, JPY, AUD, CNY, BRL, RUB, INR) with high/low points and 2017 values.

At 23-5-17

Variations

Equity indices

Table of Equity Indices (CAC 40, S&P500, DAX, Nikkei, China, India, Brazil, Russia) with high/low points and 2017 values.

At 23-5-17

Variations

\* MSCI index





## Economic forecasts

En %	GDP Growth			Inflation			Curr. account / GDP			Fiscal balances / GDP		
	2016 e	2017 e	2018 e	2016 e	2017 e	2018 e	2016 e	2017 e	2018 e	2016 e	2017 e	2018 e
<b>Advanced</b>	<b>1.6</b>	<b>2.0</b>	<b>2.1</b>	<b>0.8</b>	<b>2.0</b>	<b>1.9</b>						
<b>United States</b>	<b>1.6</b>	<b>2.1</b>	<b>2.6</b>	<b>1.3</b>	<b>2.4</b>	<b>2.6</b>	<b>-2.5</b>	<b>-2.4</b>	<b>-2.4</b>	<b>-3.4</b>	<b>-4.2</b>	<b>-5.0</b>
Japan	1.0	1.2	0.9	-0.1	0.6	1.0	3.8	4.2	4.6	-4.7	-4.4	-4.1
United Kingdom	1.8	1.8	1.1	0.6	2.7	2.6	-4.7	-4.1	-3.2	-3.0	-2.7	-3.1
<b>Euro Area</b>	<b>1.7</b>	<b>1.6</b>	<b>1.6</b>	<b>0.2</b>	<b>1.8</b>	<b>1.3</b>	<b>3.4</b>	<b>3.0</b>	<b>3.1</b>	<b>-1.7</b>	<b>-1.4</b>	<b>-1.2</b>
Germany	1.8	1.8	2.0	0.4	1.9	1.7	8.8	8.3	8.5	0.6	0.7	0.6
France	1.1	1.3	1.5	0.3	1.4	1.0	-1.2	-0.9	-1.1	-3.3	-3.0	-2.7
Italy	1.0	0.6	0.6	-0.1	1.7	1.0	2.1	2.2	2.1	-2.4	-2.4	-2.5
Spain	3.3	2.6	2.0	-0.3	2.3	1.5	1.8	2.1	2.1	-4.6	-3.6	-3.0
Netherlands	2.1	2.1	1.6	0.1	1.2	1.4	8.7	8.7	8.3	-0.5	0.0	0.3
Belgium	1.2	1.4	1.5	1.8	2.1	1.9	0.7	0.5	0.5	-3.0	-2.3	-2.2
<b>Emerging</b>	<b>4.2</b>	<b>4.5</b>	<b>5.0</b>	<b>4.8</b>	<b>4.6</b>	<b>4.4</b>						
China	6.7	6.2	6.4	2.0	2.7	2.5	1.9	1.6	1.4	-3.0	-3.5	-3.3
India	7.5	7.3	7.8	4.9	4.9	5.2	-1.1	-0.8	-1.7	-3.8	-3.5	-3.2
Brazil	-3.5	1.0	3.0	8.8	4.1	4.3	-1.2	-1.4	-2.1	-8.9	-9.6	-8.3
Russia	-0.6	1.2	2.0	7.1	4.2	4.3	1.9	3.4	3.2	-3.7	-2.7	-2.1
<b>World</b>	<b>3.1</b>	<b>3.4</b>	<b>3.8</b>	<b>3.1</b>	<b>3.5</b>	<b>3.3</b>						

Source : BNP Paribas Group Economic Research (e: Estimates & forecasts)

## Financial forecasts

Interest rates		2016				2017				2016	2017e	2018e
		Q1	Q2	Q3	Q4	Q1	Q2e	Q3e	Q4e			
<b>US</b>	Fed Funds	0.25-0.5	0.25-0.5	0.25-0.5	0.5-0.75	1	0.75-1.00	1.00-1.25	1.25-1.50	0.5-0.75	1.25-1.50	2.25-2.50
	3-month Libor \$	0.63	0.65	0.85	1.00	1.15	1.25	1.50	1.75	1.00	1.75	2.50
	10-year T-notes	1.79	1.49	1.61	2.45	2.40	3.00	3.25	3.50	2.45	3.50	4.00
<b>EMU</b>	Refinancing rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
	3-month Euribor	-0.24	-0.29	-0.30	-0.32	-0.33	-0.33	-0.30	-0.30	-0.32	-0.30	-0.05
	10-year Bund	0.16	-0.13	-0.19	0.11	0.33	0.50	0.75	1.00	0.11	1.00	1.60
	10-year OAT	0.41	0.20	0.12	0.69	0.97	0.95	1.15	1.45	0.69	1.45	2.00
	10-year BTP	1.23	1.35	1.19	1.84	2.13	2.20	2.60	3.00	1.84	3.00	3.40
<b>UK</b>	Base rate	0.50	0.50	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	3-month Libor £	0.59	0.56	0.38	0.37	0.34	0.40	0.40	0.40	0.37	0.40	0.40
	10-year Gilt	1.42	1.02	0.76	1.24	1.07	1.55	1.75	1.90	1.24	1.90	2.50
<b>Japan</b>	Overnight call rate	-0.00	-0.06	-0.06	-0.06	-0.06	-0.10	-0.10	-0.10	-0.06	-0.10	-0.10
	3-month JPY Libor	0.10	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.06	0.05	0.05
	10-year JGB	-0.04	-0.23	-0.08	0.05	0.07	0.10	0.10	0.30	0.05	0.30	0.40

Exchange rates		2016				2017				2016	2017e	2018e
		Q1	Q2	Q3	Q4	Q1	Q2e	Q3e	Q4e			
<b>USD</b>	EUR / USD	1.14	1.11	1.12	1.05	1.07	1.02	1.02	1.00	1.05	1.00	1.06
	USD / JPY	112	103	101	117	111	121	124	128	117	128	130
<b>EUR</b>	EUR / GBP	0.79	0.83	0.87	0.85	0.86	0.82	0.82	0.80	0.85	0.80	0.82
	EUR / CHF	1.09	1.08	1.09	1.07	1.07	1.10	1.12	1.12	1.07	1.12	1.15
	EUR/JPY	128	114	114	123	119	123	126	128	123	128	138

Source : BNP Paribas Group Economic Research / GlobalMarkets (e: Estimates & forecasts)



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