Are market expectations in line with the forward guidance of the ECB?

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By promising low interest rates in the future, a central bank can provide stimulus for the economy today. The effectiveness of this kind of forward guidance can be assessed by the impact it has on market expectations regarding interest rates. This article examines how successful the forward guidance of the ECB has been in steering market expectations. We find that the recent forward guidance linking explicitly to the duration of the Asset Purchase Programme has been particularly effective.

Forward guidance as a monetary policy instrument

Forward guidance can be defined as announcements made by the central bank about the future course of monetary policy, traditionally referring to guidance about the future of its policy rate. Forward guidance can be an effective monetary policy tool to boost the economy, especially when short-term interest rates are limited by the effective lower

bound. The effectiveness of the policy relies on the fact that not only current short-term interest rates but also the future path of short-term rates matters for the economy, as current investment and consumption decisions depend on both current and future rates.[1]

The effectiveness of forward guidance is based on the central bank's ability to influence market expectations on the future path of short-term interest rates. If the central bank can lower the expected path of short-term interest rates by using forward guidance, it can also lower long-term interest rates, as these are formed by the short-term rates. However, if market expectations are not affected by the forward guidance, its effects will be limited.

This article examines whether market expectations are in line with the forward guidance provided by the ECB Governing Council. Market expectations over the timing of interest rate lift-off, the date when the ECB is expected to raise its policy rate for the first time, is compared against the forward guidance provided by the ECB. Especially, the role of the ECB's Asset Purchase Programme (APP) is discussed as a means of influencing expectations on short-term interest rates.

We find that market expectations are in line with the ECB's forward guidance. Moreover, it seems that the guidance stemming from sequencing the end of net asset purchases and rate hikes has proved to be an effective tool in affecting market expectations on future interest rates.

Forward guidance: Delphic or Odyssean

Forward guidance can be divided into two categories: Delphic and Odyssean, introduced by Campbell et al. (2012). Delphic forward guidance is a form of openly stated prediction or expectation from the central bank regarding the future stance of the economy or monetary policy. It is effective if the central bank is perceived to have superior information on these. However, Delphic forward guidance never commits the central bank to any actions; it is merely a prophecy. Typical Delphic-style forward guidance can be found in the statement of the FOMC in December 2008,[2] that '…the Committee *anticipates* that weak economic conditions are likely to warrant exceptionally low levels of the federal funds rate for some time.'

A potential problem with Delphic-style forward guidance is the lack of commitment. The effectiveness of forward guidance is based on its power to move market expectations on the future course of monetary policy. But without any commitment to a certain path of monetary policy actions, it is not obvious that market expectations will be affected by the guidance. Hence, Delphic forward guidance may not be that effective, and other types of forward guidance can be designed to provide stronger commitment.

Odyssean forward guidance commits the central bank publicly to a set of pre-defined monetary policy actions, and it can therefore be more effective than Delphic forward

1. Another possible channel of influence is the creation of higher inflation expectations for coming periods, which sinks the real interest rate and encourages current consumption. For this see Eggertsson and Woodford (2003).
2. FOMC Statement December 16, 2008.

guidance. However, Odyssean forward guidance may suffer from time-inconsistency: when the economy starts to recover, the central bank may be tempted to raise interest rates faster than it has promised. If the markets anticipate the time-inconsistent behaviour by the central bank, the guidance is not likely to impact expectations on the course of future monetary policy and the forward guidance does not provide additional stimulus to the economy. Central banks have tried to increase the credibility of their forward guidance by using different contingencies in their guidance: time contingency and state contingency.

Time-contingent Odyssean forward guidance has a clear link to the calendar, as the FOMC stated in August 2011:[3] 'The Committee currently anticipates that economic conditions...are likely to warrant exceptionally low levels for the federal funds rate *at least through mid-2013*.' State-contingent Odyssean forward guidance, in turn, makes policy actions dependent on the economic outlook or certain economic variables. The FOMC used this kind of guidance in December 2012 when it stated 'the Committee...currently anticipates that this exceptionally low range for the federal funds rate will be appropriate at least as long as the *unemployment rate remains above 6-1/2 percent*....'[4] The central bank may also link other non-standard monetary policy tools to its forward guidance to increase the credibility of its guidance.

Asset purchases as a commitment device

In addition to forward guidance, other non-standard monetary policy measures can also be used when the standard policy tool is limited by the lower bound for interest rates. These include, first and foremost, large-scale asset purchases by the central bank, which are also known as quantitative easing, or QE. QE has two main channels through which it influences the markets: the portfolio balance effect and the signalling effect. The portfolio balance effect materialises when the compensation required by investors for holding risky assets decreases due to the central bank removing risky assets from investors' portfolios. As a result, the yields of risky assets – such as long-term government bonds and corporate bonds – decrease, which lowers interest rates in the economy.

The second channel, the signalling effect, is sometimes difficult to separate from forward guidance.[5] By committing itself to a large QE programme with a known duration, the central bank can signal its commitment to an easier monetary policy stance for a prolonged period, at least until the end of the programme. QE acts as a commitment device for forward guidance, as an interest rate hike during the QE period seems rather unlikely. So, forward guidance and other non-standard monetary policy tools can be mutually re-enforcing for the monetary policy stance.

3. FOMC Statement August 09, 2011.

4. FOMC Statement December 12, 2012.

5. For a deeper discussion on the effects of quantitative easing that are similar to forward guidance, see Krishnamurthy and Vissing-Jorgensen (2011).

ECB forward guidance and the duration of asset purchases

The ECB introduced forward guidance in July 2013, when the Governing Council stated: 'The Governing Council expects the key ECB interest rates to remain at present or lower levels for an extended period of time.' At that point, the measure was intended more to insulate euro area money market conditions from the volatility imported from the United States than to act as an active instrument for increasing stimulus.[6] Thereafter, forward guidance has been an important part of ECB monetary policy, and Table 1 presents the most important changes in ECB forward guidance over time. Table 1 also shows the changes in the intended minimum duration for the APP announced by the Governing Council, as the APP and forward guidance are connected, especially in the later phase of forward guidance.

Table 1.

6. Praet (2016) discuss the reasoning behind the start of forward guidance by the ECB.

Changes in ECB forward guidance and in the intended minimum duration of the APP

Date	Forward guidance	Intended minimum duration of the APP announced by the Governing Council
4 July 2013	"The Governing Council expects the key ECB interest rates to remain **at present or lower levels for an extended period of time**."	-
22 January 2015	"...**in line with our forward guidance**, we decided to keep the key ECB interest rates unchanged."	"They [asset purchases] are **intended to be carried out until the end of September 2016** and will in any case be conducted until we see a sustained adjustment in the path of inflation which is consistent with our aim."
3 December 2015	"we expect them [interest rates] to remain **at present or lower levels for an extended period of time**"[1])	"The monthly purchases of €60 billion under the APP are now **intended to run until the end of March 2017,** or beyond, if necessary"
10 March 2016	"the Governing Council expects the key ECB interest rates to remain at present or lower levels for an extended period of time, and **well past the horizon of our net asset purchases**"	"...we decided to expand the monthly purchases under our asset purchase programme from €60 billion at present to €80 billion. They are **intended to run until the end of March 2017,** or beyond, if necessary"
8 December 2016	"we continue to expect them to remain at present or lower levels for an extended period of time, and **well past the horizon of our net asset purchases**"	"From April 2017, our net asset purchases are **intended to continue** at a monthly pace of €60 billion **until the end of December 2017,** or beyond, if necessary"

[1]) Strictly speaking, there seems to be no forward guidance regarding the future path of interest rates in December, after the deposit rate had been lowered to -0.30%. However, as the forward guidance took the form 'present or lower levels' both in the earlier meeting in October and in the later meeting in January, we ignore the change in forward guidance in December for simplicity.

Source: Bank of Finland.

Three phases can be identified in the ECB's forward guidance. First, Delphic-style open-ended forward guidance ran from July 2013 to January 2015. The second phase started with the introduction of the APP in January 2015, when state and time contingency were provided regarding the programme duration but the forward guidance regarding interest rates was left unchanged. However, the credibility of the interest rate forward guidance in this phase was reinforced by the signalling channel of the APP. In the third phase, starting from March 2016, a time-contingent component was explicitly introduced to the forward guidance regarding interest rates when the Governing Council stated that the interest rate lift-off would not take place before the end of the net asset purchases. Whereas in the second phase the APP and the forward guidance on interest rates are connected only via the signalling channel of the APP, in the third phase the sequencing between the end of net purchases and rate hikes brings in a time-contingent Odyssean-style forward guidance for interest rates. So, the APP provides stronger support for interest rate guidance in the third phase than in the second phase. In addition, the third phase includes a Delphic component considering interest rate guidance after the end of the APP, with the statement 'well past the horizon of our net asset purchases'.

The common feature for all the ECB's forward guidance is that it indicates interest rates to be at lower or present levels for some period of time. Put differently, the forward guidance says that the ECB at least will not raise interest rates from the prevailing levels for some time. Hence, a measure which can be used to describe this forward guidance is the interest rates lift-off horizon, i.e. the period of time that is expected to pass before the ECB raises its policy rate for the first time.

It is hard to express forward guidance in the first phase in terms of lift-off horizon, because the Governing Council used open-ended forward guidance. However, given the experiences from the United States, we can argue that a reasonable expectation on the lift-off horizon for successful open-ended forward guidance should be between 12 and 18 months.[7] For the other two phases a more precise benchmark for the lift-off can be given, because the Governing Council has stated an intended minimum duration for the APP. As the ECB's forward guidance regarding interest rate hikes entails a reference to 'net asset purchases', an assessment for the potential tapering period also needs to be added.[8] The Bloomberg economists' consensus survey is used to define how expectations regarding the duration of the tapering period have developed.[9] Chart 1 shows both components and their sum, which gives the expected duration of the net asset purchases. This measure is used to provide a minimum horizon for the lift-off implied by the ECB's forward guidance during the APP.

7. See, for example, Swanson and Williams (2014), Swanson (2017) and Moessner (2013).
8. The tapering period is the phase during which the central bank shrinks the net purchases down to zero.
9. The Bloomberg survey is not available for all the periods, but we have interpolated and extrapolated linearly to replace the missing values.

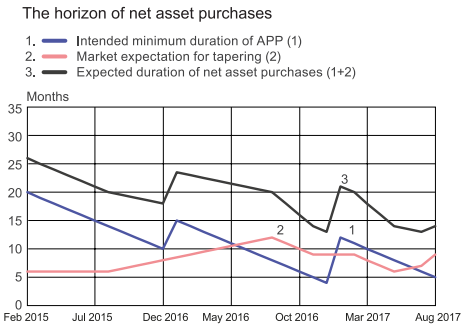

Chart 1

Chart 1 shows that the intended minimum duration of the APP has jumped twice as the ECB Governing Council has extended the APP (in December 2015 by 6 months, and in December 2016 by 9 months). After the jumps, the intended minimum duration declines linearly as time passes and the announced date for asset purchases comes closer. The expectations for the tapering period have varied between 6 and 12 months since the introduction of the APP. The sum of these gives the expected minimum duration of the net asset purchases. The announcements for the intended minimum duration of the APP dominate the early part of the expected duration measure, because the intended minimum duration for the APP was quite long. However, the expectation for the tapering becomes important as the announced intended minimum duration shortens. Towards the end of the sample, changes in the tapering period begin to dominate the expected duration measure.

One cause of concern could be that the expected duration of net asset purchases is generated directly from market expectations. This could introduce a connection between market expectations and our duration measures that could generate an endogeneity problem, as these measures are compared against each other. However, the expected duration for net asset purchases is also influenced by the shortening of the minimum duration of the APP, which is independent of the tapering expectations. Moreover, the increase in the expected duration measure at the end of the sample shows that the time-varying expectations on the tapering period are a key driver for the expected durations of net asset purchases. Thus, the use of a constant tapering period – for instance, 6 months – would lead to biased results. Therefore, there is an argument that it is better to control for the changing tapering expectations.

The expected duration of the net asset purchases gives a benchmark for the lift-off horizon, which should be reflected by market interest rates if market expectations are in line with the forward guidance of the ECB. That is, if market expectations are in line with the forward guidance of the ECB, the market expectation for the lift-off should be equal to or longer than the previously introduced expected duration of the net asset purchases. The expected duration measure is compared with market expectations regarding the lift-off date, but first we must discuss the measurement of market expectations regarding the interest rate lift-off.

Measuring market expectations for the lift-off

horizon

The markets' position regarding forward guidance can (roughly speaking) be measured by a forward rate, because this gives the market expectations on the path of short-term interest rates.[10] A forward rate is an interest rate in the future that can be obtained today and is implied by the current term-structure of interest rates.[11] So, when the forward rate exceeds a certain threshold, we can conclude that this is the market expectation for the lift-off. The lift-off threshold is defined as follows: 25 basis points over the prevailing deposit facility rate.[12]

The forward rate is frequently measured directly from observed yields. However, there are two potential flaws in this procedure. Firstly, the forward rate measured directly from the observed yields does not depend solely on the expected path of short-term interest rates, but is also affected by a term premium. The term premium is the compensation required by investors to hold long-term debt versus investing in short-term debt and rolling it over. Term premia could have recently turned negative, due to the ECB's Asset Purchase Programme, and this could cause an overestimation of the lift-off date. A forward rate that measures market expectations cannot be observed directly, but must be estimated. Our estimates are based on the term structure model introduced by Kortela (2016).[13]

Secondly, the effective lower bound complicates the measurement of the future path of short-term interest rates. That is, the effective lower bound restricts interest rates when the distribution of the forward rates are censored from below. Then, the forward rate, which is based on the mean of the forward rate distribution, is not an optimal forecast for the lift-off and would lead to an underestimation of the lift-off horizon.[14] Here we choose to use the path given by the mode of the forward rate distribution to estimate the lift-off horizon expected by the markets.[15]

Chart 2 presents three forward rate paths and the lift-off threshold as on 31 July 2017. The forward rate called 'Market prices' is based on observed yields when the path may have been affected by the term premia. The other two forward rates, 'Expectation, mean' and 'Expectation, mode' give forward rate paths for which the effects of the premia have been removed. The mean path is not an optimal forecast, whereas the path given by the

10. Here we ignore the effects coming from Jensen's inequality. For short-term interest rates, the effect of Jensen's inequality term is typically small.
11. For the euro area, the expectations of the markets on monetary policy can be measured from the overnight index swap rates (OIS), which give a term-structure for the overnight unsecured interbank interest rate (EONIA).
12. The typical size of a policy rate hike has so far been 25 basis points, and the deposit facility rate is the key policy rate when the banking sector operates with significant excess liquidity.
13. In a low interest rate environment the effects of the lower bound on interest rates must be taken into consideration in the estimation or the results could be biased. A widely used approach to adapt the effective lower bound to a term structure model is to use what are known as shadow-rate models. In addition to Kortela (2016), see also Lemke and Vladu (2016) and Wu and Xia (2017).
14. The optimal forecast for the lift-off day depends heavily on the loss function used to evaluate the accuracy of the forecasts. Here we choose to use the absolute-error loss function.
15. This path is very close to the median of the lift-off distribution, which is an optimal forecast under absolute-error loss. For more details on the estimation of the lift-off horizon, see Bauer and Rudebusch (2016).

mode is. Chart 2 shows that at the end of July the markets expected that the Governing Council would increase the policy rate from the effective lower bound after 14 months – i.e. in September 2018.

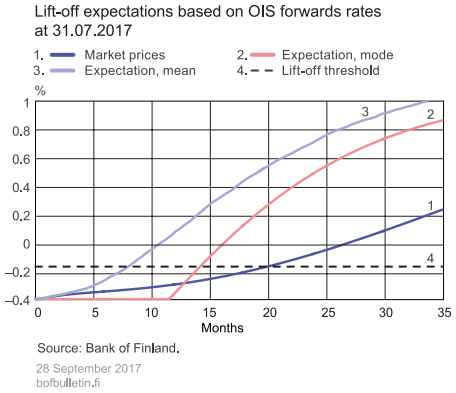

Chart 2

Chart 2 also shows the features of different forward rates discussed above. On one hand, the lift-off would be overestimated if it were measured by using observed yields: it would occur after 20 months ('Market prices' in Chart 2). On the other hand, the presence of the effective lower bound makes the distribution of the forward rate path asymmetric – when the mean is higher than the mode – which could lead to an underestimation of the lift-off, to occur after 8 months. The optimal forecast (under absolute-error loss) is given by the mode and is 14 months, as noted above.

Are market expectations in line with the ECB's forward guidance?

The market expectation on lift-off is compared against the expected duration of the net asset purchases to find out if the market expectations are in line with the ECB's forward guidance. If the market expectations for the lift-off are equal to or longer than the expected duration of the net asset purchases, then the market expectations do not contradict the forward guidance. That is, the necessary condition for the market expectations to be in line with the forward guidance is fulfilled. Chart 3 shows the development of market expectations and the development of the expected duration of the net asset purchases. The Chart is divided into three phases following the previously introduced phases of the ECB's forward guidance.

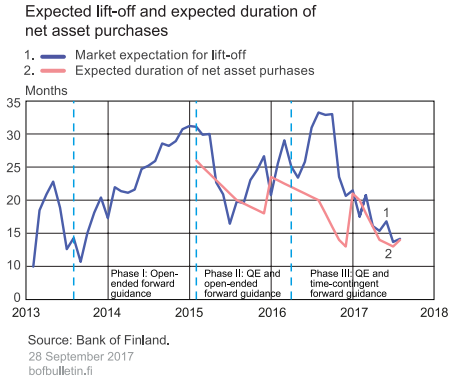

Chart 3

In the first phase, from July 2013 to January 2015, the ECB used open-ended forward guidance. Given the experiences from the United States, we could argue that successful open-ended forward guidance should give a lift-off horizon of between 12 and 18 months. As the market expectations remained roughly between 12 and 18 months, we can conclude that they were in line with the ECB's forward guidance during the first phase. The expectations on the lift-off began to rise gradually during 2014. Although it is not possible to identify the precise driving force behind the development, it might indicate that expectations about the introduction of a QE programme began to rise, especially in the autumn of 2014.

In the second phase, from January 2015 until the beginning of March 2016, the expected duration of the net asset purchases should provide a floor for the markets' lift-off expectations through the signalling channel. Hence, the market expectations regarding lift-off should be at least equal to the floor. This is in fact what happened in the beginning, as the market expectations ran somewhat higher than the expected duration of the net asset purchases. However, in the spring of 2015, inflation began to accelerate and the economic outlook improved, which led to the timing of the expected lift-off coming closer and temporarily even subsiding through the floor. When the economic outlook deteriorated again, the expectations began to increase steeply. The market expectations were in line with the open-ended interest rate forward guidance during the second phase, too, as the lift-off horizon was constantly at over 15 months. This horizon is, again, similar to the earlier results from the United States and approximately the same as in the first phase. However, the market expectations were occasionally lower than the expected minimum duration of the net asset purchases, which indicates that the signalling channel of QE was limited to controlling expectations on the path of short-term interest rates.

In the third phase, beginning in March 2016, the forward guidance by the Governing Council stated that interest rates would remain at present or lower levels 'well past the horizon of our net asset purchases'. That implied that the market should have expected the lift-off to materialize only after the ECB had finished its net asset purchases. In the months after this announcement, expectations moved further into the future, partly due to the deteriorating economic outlook and the Brexit referendum held in June 2016. At the end of the sample, the expected duration of the net asset purchases is highly correlated with market expectations for the lift-off and seems to give a floor to the

expectations. A key observation is that, whereas in the second phase market expectations did go below the expected duration of the net asset purchases, this basically never happened in the third phase. This indicates that the time-contingent forward guidance bound to the duration of the APP is effective in controlling market expectations on short-term interest rates. This result is consistent with the research on the Fed's forward guidance, as the time-contingent forward guidance provided by the Fed has been found to be effective in influencing market expectations.[16]

Forward guidance has been a successful part of the non-standard monetary policy

Since July 2013, forward guidance on future interest rates has been a constant feature at the ECB. This forward guidance can be considered to be effective if it influences market expectations of future interest rates. This analysis finds that market expectations regarding the first rate hike by the ECB have indeed been in line with the guidance provided by the ECB. Moreover, the results indicate that the time-contingent forward guidance applied since March 2016, which links the first ECB interest rate hike explicitly to the duration of the APP, has provided a particularly tight floor to market expectations over the interest rate lift-off. Even as economic recovery in the euro area has gained momentum during 2017, market expectations on the timing of the first interest rate hike have not shortened excessively. Indeed, they have persisted consistent with the ECB's forward guidance on the duration of the net purchases. Hence, forward guidance can be seen as a successful component of the non-standard monetary policy implemented in the euro area.

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Tags

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