Analysis

# ECB's expanded asset purchase programme has supported growth in Finland

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The expanded asset purchase programme (EAPP) has had a significant positive impact on macroeconomic developments in Finland. The ECB's decisions of December 2015 and March 2016 are forecast to boost Finland's GDP by approximately 0.5%. The EAPP has also had a significant impact on price developments: without the purchase programme, inflation in 2016 would have been around 0.3 of a percentage point slower. The programme has also substantially increased both corporate and household credit demand.



# Impact of the monetary policy stimulus on Finland

During the international financial crisis and the subsequent period of prolonged slow inflation most central banks have lowered their key policy rates to around zero or even lower. The scope for supporting economic growth and accelerating inflation through interest rate policy has been narrowed by the steep fall in short-term nominal interest rates. The set of monetary policy instruments available to central banks has therefore been augmented to also cover extensive asset purchase programmes and the provision of long-term financing for banks. The effectiveness of monetary policy has also been enhanced by the use forward guidance, whereby central banks communicate the future path of their interest rates to the public.

This article presents an assessment of the impact of the Eurosystem's expanded asset purchase programme (EAPP) on the Finnish economy. At the beginning of 2015, the ECB Governing Council decided to extend the asset purchase programme launched in October 2014 to also cover debt instruments meeting the eligibility criteria issued by euro area governments. Under the purchase programme, debt instruments to the value of EUR 1,740 billion were to be purchased by March 2017, and if the inflation outlook then did not match the monetary policy objective, the programme could be extended beyond that date.[1]

The extensive securities purchases are strongly expanding the Eurosystem's aggregate balance sheet and relaxing financial conditions, but how much the stimulus is visible in Finland's real economy and inflation is a difficult question. In this article, we assess the impacts using an empirical model for a small open economy developed at the Bank of Finland. We use the model to estimate the impacts of the purchase programme for both the euro area economy and the Finnish economy.[2]

Our results indicate that the EAPP has had a significant positive impact on developments in Finland's macro economy. The ECB's decisions of December 2015 and March 2016 are estimated to boost Finland's GDP by approximately 0.5%. At the same time, the volume of corporate and household loans will grow by slightly under 1%. According to our model simulations, the EAPP has also had a significant impact on price developments: without the programme, inflation in 2016 would have been around 0.3 of a percentage point lower.

Based on other analyses conducted within the Eurosystem, the EAPP is estimated to accelerate euro area inflation by around ½ a percentage point in 2016–2017, and to boost GDP growth cumulatively by around 1.5 percentage points over the years 2015–2018.[3] A recent publication by the Banque de France summarizes recent studies of the effects of non-standard monetary policy measures.[4]

## How is non-standard monetary policy transmitted in theory?

Securities purchases conducted by the Eurosystem – in other words, quantitative easing as a monetary policy tool – expand the central bank balance sheet and the amount of central bank money. When the Eurosystem purchases a bond from a commercial bank (increases central bank claims), the central bank augments the balance on said bank's settlement account at the central bank with a sum equivalent to the purchase (increases central bank liabilities).

The purchase programme also affects the price differentials between short and long-term bonds or, viewed from the opposite end, the yield differentials of the bonds.

When the Eurosystem purchases longer-term bonds (average maturity 8 years), the amount of these bonds available on the markets declines and the price rises (yield declines).

Meanwhile a decline in the yields of short-term bonds is constrained by the central bank's key interest rates. So the yield differential between long-term and short-term debt instruments narrows, which provides investors an incentive to purchase further longer-term bonds, causing their price to rise and their yield to decline further.

The latter transmission mechanism is referred to as the portfolio channel.[5] This mechanism means that the asset purchase programme will most probably flatten the yield curve. Standard monetary policy and quantitative easing thus affect the yield curve in different ways. This observation is also one of the key factors enabling us to distinguish an interest rate shock caused by standard monetary policy from one caused by quantitative easing.

The Eurosystem has amplified the effectiveness of the purchase programme with forward guidance, i.e. indicating in advance the monetary policy it will pursue in the near future. Forward guidance allows economic agents to assess in particular coming interest rate decisions and reduces the uncertainty surrounding interest rate developments.[6]

The effects on the real economy of the non-standard monetary policy are transmitted largely in the same manner as the effects of standard monetary policy. When the central bank lowers its key policy rate, the effects are seen as follows:

1. Money market interest rates decline, while households decrease their savings and increase their uptake of debt. This leads to an acceleration of growth in consumption.
2. The decline in interest rates also reduces corporate funding costs and boosts private investment.
3. The decline in interest rates weakens the nominal exchange rate and strengthens the price-competitiveness of exports.

The relevant factor in this transmission mechanism is how quickly the changes in long market interest rates feed through into the interest rates on household and corporate loans. In Finland, the transmission of interest rate changes has been rather rapid, as most household and corporate loans in Finland have variable interest rates. Another key factor in monetary policy transmission is how quickly in general households and companies react to changes in interest rates.

In addition to above mentioned intertemporal channel, interest rate changes also feed into the macro economy indirectly, through the general equilibrium effect.[7] The interest rate fall will boost domestic demand, in turn boosting labour demand in the private sector and households' disposable income. This will further increase consumption.[8]

Non-standard monetary policy is also transmitted into the economy via the wealth effect, as the asset purchase programmes push up securities prices, thereby boosting household and corporate wealth.

Long-term refinancing operations can also boost bank-lending, which in turn can support macroeconomic developments, particularly when the economy has been suffering from a credit slump.

In an open economy like Finland's, the monetary policy pursued by the ECB also transmits to the economy by another indirect channel: the relaxation of monetary policy within the Eurosystem boosts aggregate demand across the euro area as a whole. Part of this growth in demand feeds through to Finland by increasing exports. Moreover, depreciation of the external value of the euro boosts Finnish exports to outside the euro area.

Via accelerated growth, monetary policy eventually feeds through into price developments, i.e. inflation. In modern macroeconomic models, the link between growth and inflation is modelled with the help of an expectations-augmented Phillips curve. This describes the relationship between inflation and aggregate demand, in which growth in aggregate demand speeds up inflation.

## Modelling the effects of non-standard monetary policy

Next we turn to empirical results We use a vector autoregressive model (VAR).[9] In VARs, the variables depend on both their own and other variables' time lags. The set of variables is supplemented with error terms that describe that part of the variables' variation that is not explained by their own time lags or by other variables. Our model comprises of both the euro area and variables relating to the Finnish economy, as detailed below.

Variables relating to the euro area:

> GDP, consumer prices, the balance sheet corresponding to ECB monetary policy measures, interest rate yield differentials (= difference between long and short-term market rates) and the interest rate on the ECB's main refinancing operations (MRO interest rate).

Variables relating to the Finnish economy:

> GDP, consumer prices, differential between loan interest rates and short-term market rates, loan volumes and corporate bankruptcies.

The estimates draw on quarterly data from the period 2000/I–2016/I.[10]

The key problem is how to identify a non-standard monetary policy shock in distinction from other internal and external factors that influence developments in the economy. In this article, identification of non-standard monetary policy shocks draws on a common method in which sign

restrictions based on economic theory are set for the responses of the model's variables (Table 1). If the sign restriction is positive (negative), the shock is assumed to affect the relevant variable positively (negatively) during the first two periods. A question mark indicates that the response of the variable in question can be positive or negative.

Table.

| **Identifying a monetary policy shock with the help of sign restrictions on impulse response functions** | | |
|---|---|---|
| Identification of monetary policy shock | | |
| +/- and zero restrictions | | |
| | Non-standard monetary policy | Non-standard monetary policy |
| **Variables** | | |
| GDP, euro area | + | + |
| HICP, euro area | + | + |
| Key policy rate[1)] | 0 | - |
| Yield curve[2)] | - | + |
| ECB balance sheet | + | ? |
| [1)] Interest on the Eurosystem's main refinancing operations (MRO). | | |
| [2)] Euro area's 10-year interest rate – Eonia. | | |

***Source: Bank of Finland.***

The securities purchases can thus be expected to expand the central bank balance sheet and producing a flatter yield curve (–) through the portfolio effect. As an additional assumption, we also use a zero restriction according to which the ECB's expanded asset purchases will not impact immediately on its key policy interest rate (0). It is also assumed that the central bank's expanded asset purchases will boost euro area GDP and accelerate inflation (+).

We should note that under normal cyclical conditions the flattening of the yield curve reflects weakening expectations over future GDP and inflation. Therefore, it is very likely that the attributed sign restrictions will efficiently identify the non-standard monetary policy shocks, as these have a very distinct effect on the macro economy.

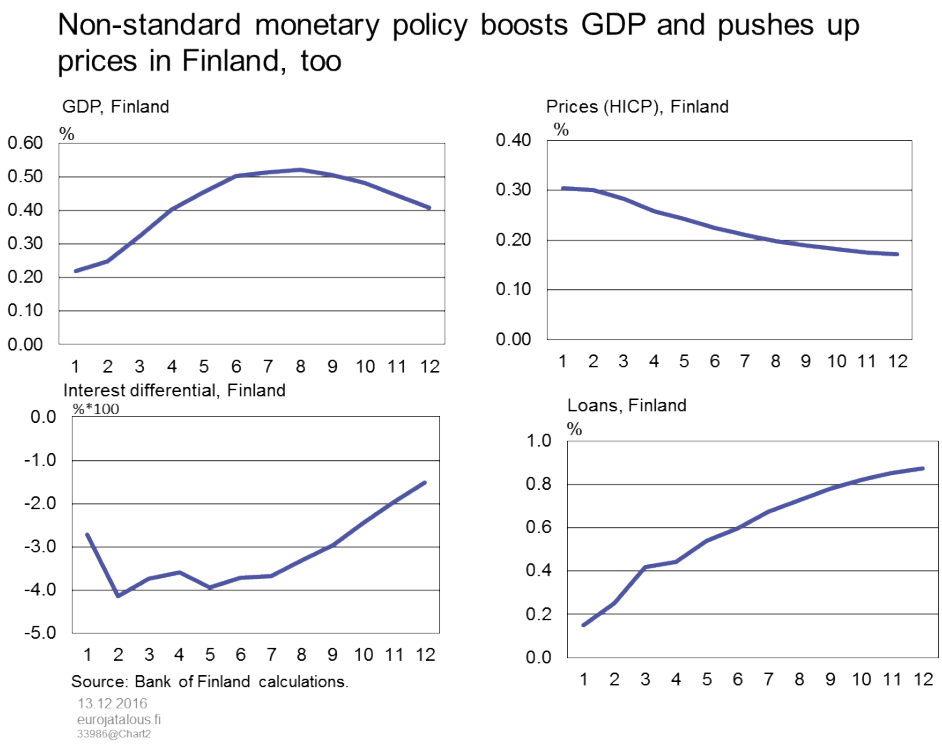
In the case of a standard accommodative monetary policy shock (policy rate lowered) it would be assumed that GDP would grow and inflation accelerate as above, but the yield curve would steepen, as short market rates would react more than long ones. Hence the sign restriction relating to the yield curve is also key in distinguishing between unanticipated standard and non-standard monetary policy shocks.

Despite this strong identification, a general challenge for estimating the effects is that during the estimation period non-standard monetary policy has only been pursued for part of the time and the purchase programme is still ongoing.

## EAPP's effects in euro area and Finland

Taking into account the caveats and limitations discussed above, the dynamic effects of a non-standard monetary policy shock on the euro area economy can be described with the help of average impulse responses (Chart 1).

Chart 1.




Based on the impulse responses, the 0.20 of a percentage point decline in the euro area yield curve due to the quantitative easing

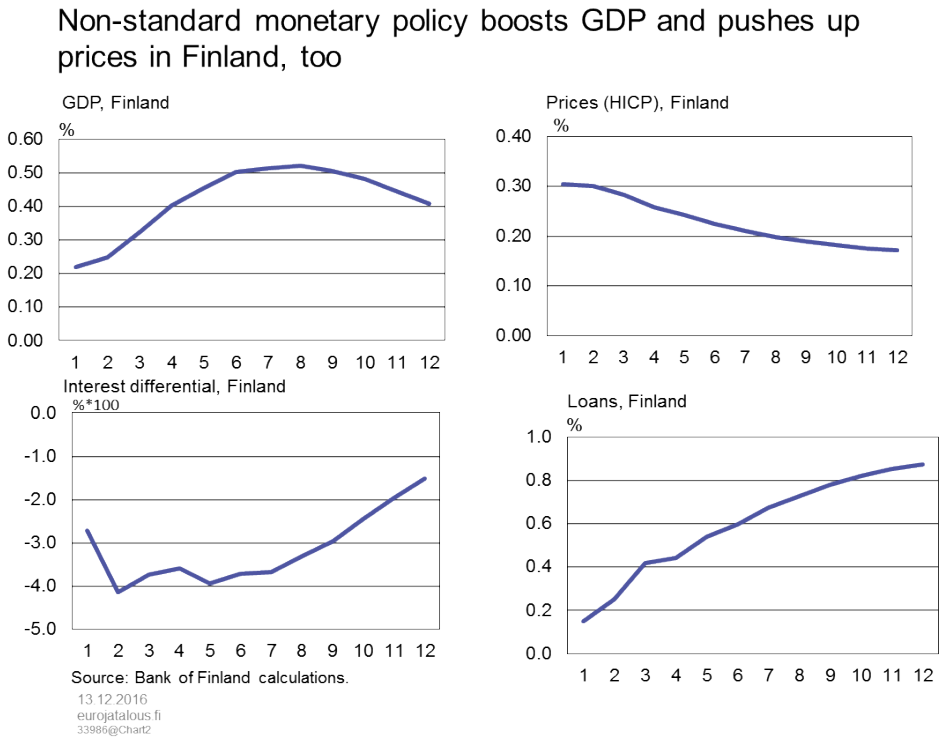
- increases GDP by a maximum of just under 0.50% and
- increases prices by around 0.20% in the euro area.

Above, we used sign restrictions on impulse responses to analyse the effects on the euro area of an identified non-standard monetary policy shock. Next we shall analyse specifically the effects of the EAPP on the Finnish economy. The estimated model's yield curve is assumed to drop 0.20 of a percentage point in response to the non-standard monetary policy shock (as in Chart 1) and to return thereafter in accordance with the dynamics of the model towards its initial level at the outset. The 0.20 of a percentage point drop in the yield curve corresponds to ECB experts' estimates of how much the yield curve fell as a consequence of the Governing Council's decisions in December 2015 and March 2016.

The signs of the impulse response thus correspond to the limits imposed in the first period, but the shock's size, effects and time-lag on the economy are determined based on the model's estimated parameters. With regard to the impulse responses, we also observe that the maximum impact of the non-standard monetary policy shock on developments in the real economy in the euro area becomes visible after a considerable time-lag, particularly in respect of GDP. With regard to

inflation the effect is faster. These results correspond fairly well to other similar studies conducted by the Eurosystem experts.

Chart 2.




In respect of GDP and prices the results (Chart 2) are congruent with those for the euro area (Chart 1). The gentle flattening of the euro area yield curve by 0.20 of a percentage point

- increases GDP by up to approximately 0.50% and
- pushes up prices by around 0.30%.

We also observe that once economic activity has increased and loan interest margins contracted the volume of loans increases significantly during the period under review. The dynamics of the impact of extensive asset purchases on Finland's GDP and prices is also very similar to the impact on the euro area. This also reflects the close connection between the economic cycles in Finland and the euro area.

The estimates presented above are thus based on the average results of the models. We can approximate the uncertainty around the results by reviewing the minimum and maximum results yielded by the different models. Based on these estimates, the minimum impact of the purchase programme on GDP is in the range of 0.4–0.8%. With prices, rather than the scale of the impact, the uncertainty is more about how long-lasting the effect of the purchase programme is on prices.

## Impact of non-standard monetary policy

This article has studied the transmission of the Eurosystem's non-standard monetary policy to the Finnish economy. Based on our analysis, the impact has been significant. The use of quantitative easing as a monetary policy tool has prevented substantially weaker economic developments in both the euro area and Finland. It has also had an positive impact on inflation. Our results are, however, still preliminary and surrounded by a substantial degree of uncertainty. It should also be noted that the EAPP has been running for only a year and a half, and, at best, the macroeconomic variables can only reveal a partial impact of the programme. These results can therefore not be interpreted as an overall assessment of the impacts of the programme.

## Notes

1. March 2015 saw the commencement of securities purchases of around EUR 60 billion per month on the secondary markets, to continue until the end of September 2016. The Governing Council also indicated that purchases would continue beyond this date if the pace of inflation did not accelerate towards the ECB's inflation target. In December 2015, the Governing Council decided to further extend the purchases, until at least the end of March 2017; it was also decided to reinvest both the capital and yields on maturing bonds. In March 2016, the purchase programme was further extended to also cover private sector (excl. banking sector) bonds. At the same time, monthly purchases were increased to EUR 80 billion from the beginning of April 2016. ↑
2. The EAPP's impact on the Finnish economy was previously analysed in the Bank of Finland Bulletin (3/2015) article 'Finland benefits from Eurosystem's asset purchases' (http://www.bofbulletin.fi/en/2015/3/finland-benefits-from-eurosystem-s-securities-purchases/). ↑
3. Andrade, P. – Breckenfelder, J. – De Fiore, F. – Karadi, P. – Tristani, O. (2016) The ECB's Asset Purchase Programme: an Early Assessment. ECB Working Paper 1956; Wiedelak, T. – Pascual, A. G. (2016) The European Central Bank's QE: A New Hope. CEPR DP 11309. ↑
4. Marx, M. – Nguyen, B. – Sahuc, J. (2016) Monetary policy measures in the euro area and their effects since 2014. Banque de France Economics Letters 32. ↑
5. Krishnamurthy and Vissing-Jorgensen's study 'The Ins and Outs of Large Scale Asset Purchases' (2013) supports the idea of the effects of the portfolio channel in the United States. ↑
6. For a more complete description of this channel, see e.g. Suvanto, A. – Kontulainen, J. (2016) The ECB announced today – Monetary policy in the calm and the storm. Docendo. ↑
7. See e.g. Kaplan, G. – Moll, B. – Violante, G. (2016) Monetary Policy According to HANK. NBER Working Paper No. 21897. ↑
8. According to recent theoretical research, the significance of the indirect channel is the greater, the more households retain possession of slowly realisable financial assets, such as housing, or the more significant the share of households that are financially challenged. ↑

9. Sims, Christopher (1980) Macroeconomics and Reality. Econometrica 48 (1), p. 1–48. ↑
10. The estimation has been carried out for the logarithms of the afore-mentioned variables plus logarithmic changes excluding interest rates, which in both cases are level. In estimating the models we have applied both one and two-period delays. The results are presented as averages of the results yielded by these four estimated models. ↑

## Keywords

Expanded Asset Purchase Programme, Finnish economy, gross domestic product, monetary policy