

# Discussion of “The Effect of Unconventional Monetary Policy on Inflation Expectations: Evidence from Firms in the United Kingdom”\*

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The New Keynesian paradigm stands on the premise that firms face rigidities that make them adjust prices infrequently (Galí 2008).<sup>1</sup> As a consequence, firms need to be forward looking and form expectations about future production costs and future demand in order to change prices. To the extent that expected inflation reflects changes in expected production costs, firms’ inflation expectations will partially determine today’s prices and inflation. In this context, an important lesson of this literature is that a central bank may keep inflation under control not only by affecting aggregate demand through the traditional interest rate channel but also by anchoring agents’ expectations about future inflation (see Bernanke et al. 1999, Woodford 2005, and Gürkaynak et al. 2007). A natural policy question is thus, how does monetary policy, either conventional or unconventional, affect price setters’ inflation expectations? The paper under discussion sheds light on this topic, although it focuses only on unconventional policy measures.

Lena Boneva, James Cloyne, Martin Weale, and Tomasz Wieladek analyze the effect of various unconventional monetary policies by the Bank of England on inflation and wage growth expectations of UK manufacturing firms since the onset of the financial crisis. With its policy rate near 0.50 percent since March 2009, the

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<sup>1</sup>An alternative rationale for the existence of nominal rigidities, popularized by Mankiw and Reis (2002), argues instead that firms do not count with the most updated information to adjust prices optimally in response to macroeconomic events.

Bank of England adopted three types of unconventional policies: large-scale asset purchases (dubbed quantitative easing, or QE), forward guidance on its future monetary policy stance (or FG), and the Funding for Lending Scheme (or FLS, which is a program addressed to banks and other entities to encourage them to increase their loans).<sup>2</sup> Boneva et al. use firm-level data from the Industrial Trend Survey (ITS), collected quarterly by the Confederation of British Industry since 2008, about expected industry-specific inflation, expected own-firm inflation, and expected wage growth. Then, they run single-equation panel regressions of each of these variables on *announcement* measures of QE, FLS, and FG, and include controls for firm-specific and industry-level variables, and other macroeconomic and financial variables.<sup>3</sup> By adding these control variables, and thus discarding the effect of common trends, Boneva et al. identify the marginal effect of unconventional policies on firms' expectations. Interestingly, the authors find that only QE announcements have a significant and positive effect on firms' expectations, while FLS and FG announcements have no effect on these variables, at least in levels. These results hold in a number of robustness exercises, which include changing the regression model (e.g., to a probit or tobit), the sample selection, the measure of QE, etc.

This type of analysis is very important for the evaluation of unconventional policies, as it tells us which policy announcements seem to shape firms' expectations. My first comment on Boneva et al.'s results is that, although they are interesting in themselves, they tell us little about how the expectation channel works on those policy-sensitive firms. A further step in the analysis is to provide a story about why firms seem to pay attention to certain policy announcements and not to others. My second comment is that Boneva et al.'s analysis is limited to the *level* of firms' expectations (the first moment), but it does not explore the policy effects

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<sup>2</sup>As is well known, the Federal Reserve, the European Central Bank, and the Bank of Japan have adopted similar unconventional policies in response to the 2008 financial crisis.

<sup>3</sup>Boneva et al.'s approach solves the reverse causality problem that appears when running similar regressions using only aggregate variables. This is the case because the expectations of an individual firm do not Granger-cause any unconventional policy measure, and thus the orthogonality conditions of the estimating equations are satisfied.

on the *dispersion* of firms' expectations (the second moment). This is important because if a certain policy dissipates future uncertainty in the economy, it could have an impact on the second moment of firms' expectations. I develop these two comments in the following paragraphs.

## 1. How Do Firms Form Their Expectations?

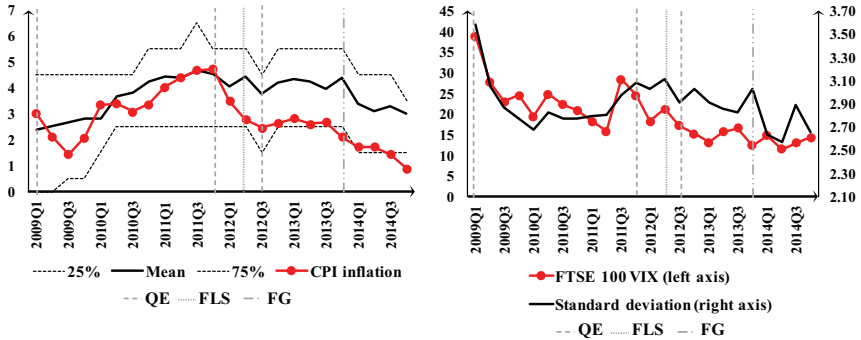
Interpreting firms' inflation expectations is a difficult task. There are three reasons for this: First, business surveys with quantitative questions about expected changes in inflation are scant.<sup>4</sup> Second, the measures used to proxy inflation expectations differ from study to study. And third, firm heterogeneity is so large (in terms of size, industry, number of competitors, price updating frequency, etc.) that taking central measures, such as the mean or median, might provide poor indicators about firms' beliefs.

Recent quantitative studies about firms' perceptions on current and future states of macro variables include Bryan, Meyer, and Parker (2014) for firms in the southeastern United States; Coibion, Gorodnichenko, and Kumar (2015) for firms in New Zealand; and the paper under discussion for UK manufacturing firms. These studies are not exactly comparable, because they measure inflation expectations differently. Bryan, Meyer, and Parker use expectations about unit costs as their core measure, and argue that the latter approximates closer the notion of price setters' expectations as embedded in the New Keynesian Phillips curve; Coibion, Gorodnichenko, and Kumar ask firms about expected changes in prices *overall*; and, as mentioned earlier, Boneva et al. investigate expectations on industry-specific prices, own-firm prices, and wages. Despite these differences, the studies share some common features. For instance, in all three, the dispersion of firms' inflation expectations is larger than that of professional forecasters. When compared with households, results are mixed. For Bryan, Meyer, and Parker, unit-cost expectations have a lower variance than households' inflation expectations; however, for Coibion, Gorodnichenko, and Kumar and Boneva

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<sup>4</sup>Most of the available surveys on firms' expectations are qualitative. See Mitchell, Smith, and Weale (2013) and Bryan, Meyer, and Parker (2014) for details.

**Figure 1. Households' Inflation Expectations in the United Kingdom**



**Notes:** The left panel compares the current general CPI inflation in the United Kingdom with the mean and twenty-fifth and seventy-fifth quartiles of the households' inflation expectations a year ahead, as computed from the Bank of England's Inflation Attitude Survey conducted by GfK. The survey can be found on the Bank of England's website. The right panel compares the FTSE 100 VIX index, a measure of aggregate uncertainty, with the standard deviation of households' inflation expectations a year ahead.

et al., firms' inflation perceptions are as wide as those of households. Although Boneva et al. do not compare the dispersion of firms' expectations with that of households, we can verify that the standard deviation of households' inflation expectations in the United Kingdom stayed close to 3.0 from 2010 up to the end of 2013 (see figure 1 in this discussion).<sup>5</sup> This number is similar to that reported by Boneva et al. in their table 2 for firms' industry-specific and own-firm inflation expectations.

Regarding how informative firms' perceptions are about actual inflation, Bryan, Meyer, and Parker find that unit-cost inflation expectations correlate with firms' expectations on core CPI inflation and, on average, they both agree with the levels reported by professional forecasters. For Boneva et al., the firms' industry-specific and own inflation expectations, in mean levels, are always lower

<sup>5</sup>The data on households' inflation expectations were extracted from the Bank of England's Inflation Attitude Survey. As is discussed later, the dispersion of inflation expectations of firms and households displayed a similar trend from 2009 to 2014.

than annual CPI inflation. However, these three measures clearly co-move, with the mean of firms' expectations leading CPI inflation a few quarters (see figure 1 in their paper). In contrast, figure 1 in this discussion shows that UK households' one-year-ahead inflation expectations were, on average, closer in levels to current CPI inflation up to 2010; however, households' expectations do not seem to lead CPI inflation. In this context, firms' inflation expectations seem more informative about future CPI inflation in the United Kingdom.

On the other hand, when firms are asked about more general notions of inflation, like *prices in general*, the picture changes dramatically. Coibion, Gorodnichenko, and Kumar find that firms' general inflation perceptions poorly forecast future CPI inflation, and in fact they do not relate with actual inflation either. A similar feature is shown by Bryan, Meyer, and Parker, who present evidence that firms perform as badly as households when asked about their beliefs on changes in prices in general, and that these beliefs are unrelated to those on unit cost or the core CPI index.

In sum, firms perform reasonably well for measures of inflation that closely relate to them (e.g., unit costs, own prices) or for specific measures (e.g., the core CPI index, industry specific), and they do poorly for more general measures of inflation. To reconcile these facts, Coibion, Gorodnichenko, and Kumar call for a rational inattention hypothesis, such as the one posited by Mackowiak and Wiederholt (2009). In such a context, agents endogenously choose which pieces of information to process, since breaking down information is costly and resources are limited. The theory predicts that firms will choose to pay attention only to factors with large effects on their profits. Along these lines, Boneva et al. and Bryan, Meyer, and Parker report evidence that indicators such as GDP or—unsurprisingly—production costs are more important than general inflation for a firm's price-setting decision. If so, it is likely that firms spend more resources to predict output growth, and in turn they will disagree less on these predictions as opposed to their inflation forecasts. Interestingly, this prediction seems to hold. Coibion, Gorodnichenko, and Kumar show that the variance of firms' expectations on GDP growth is several times lower than that of inflation expectations; Boneva et al. report similar numbers for the variance of output growth expectations against the variance of inflation

expectations.<sup>6</sup> This evidence provides support to the rational inattention hypothesis.

So, the missing link in Boneva et al.'s findings is why firms, on average, decided to pay more attention to QE announcements than to others. A possibility is that firm managers interpreted the Bank of England's QE policy as an important steering factor of aggregate output, while they judged other policies neutral on output. To test this hypothesis goes beyond the scope of Boneva et al.'s paper. But, given their rich database, they could still provide some answers to questions such as the following: Which firms seem to react more to a QE policy? What are their characteristics? Do they share a common pattern? This information might improve our understanding of how firms form their expectations, and ultimately answer the question of how QE announcements seem to affect firms' profits functions while other policies do not.

## 2. Effects on the Dispersion of Expectations

The level of agents' expectations is not the only dimension that monetary policy can affect; there is also the uncertainty surrounding these expectations. Take for instance the options traded for the three-month future LIBOR rate at different horizons. As Martin Weale (2013) discussed in a speech before the National Institute of Economic and Social Research in London, the prices of these options give us information about both the average expected level of LIBOR rates and the degree of disagreement among financial agents about these levels. Such a disagreement is given by the dispersion of option prices. Weale (2013) presented evidence that the FLS and FG announcements affected financial markets differently. For instance, the mean of future LIBOR rates at various horizons decreased in response to the FLS announcement but stayed put in response to the FG announcement. However, the variance of option prices of future LIBOR rates decreased significantly after both FLS and FG announcements. Interestingly, FG had a significant impact

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<sup>6</sup>See table 2 in their paper. Furthermore, Mitchell, Smith, and Weale (2013) show that an aggregate indicator for output growth built from the same ITS survey for UK firms provides accurate early estimates of realized output growth.

only for short-term horizons (three and six months), while FLS had a significant impact for horizons of a year or longer.

The fact that FLS modified the mean and dispersion of agents' expectations on LIBOR rates is not surprising. FLS was precisely intended to ease liquidity for banks and reduce their dependency on the interbank market.<sup>7</sup> *Why did FG seem to affect only the dispersion of agents' expectations and not their mean?* A rationale might be found in Campbell et al. (2012), who distinguish between two types of FG policies: *delphic* and *odyssean*. Although both policies reveal predicted paths in the monetary policy stance, the difference between them is whether the announced future policy rates relate with normal-times actions (the delphic type) or whether they explicitly deviate from them (the odyssean type). Delphic FG intends to communicate the central bank's view about the current state of the economy, and it might thus reduce uncertainty.<sup>8</sup> In contrast, odyssean FG could be explicitly used to stimulate the economy beyond normal-times policy, e.g., a central bank announces that it will keep its policy rate lower than what it would normally do, given its expected paths of inflation and output. Odyssean FG relates to the type of policy put forward by Eggertsson and Woodford (2003) as a remedy for an economy stuck with a policy rate at its lower bound.<sup>9</sup>

As it turns out, one would expect that odyssean FG announcements will shape the mean of agents' expectations, and even perhaps their variance (similar to the effect of a future monetary policy shock that is unveiled today, i.e., a monetary news shock). In turn, delphic FG announcements might or might not affect the mean of agents' expectations; instead, if such announcements contain information that reduce aggregate uncertainty, then the dispersion of agents' expectations might decrease as well. Figure 14 in Boneva et al. shows that the variance of firms' inflation expectations reached a peak at the beginning of 2009, stayed relatively stable from 2010 to 2012, and decreased thereafter until the end of the sample. A remarkably

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<sup>7</sup>See Weale (2013) for further details.

<sup>8</sup>For instance, the Norges Bank implements delphic FG when it announces predicted paths for its policy rate.

<sup>9</sup>This is a remedy that has been critically revisited by Del Negro, Giannoni, and Patterson (2012), given the moderate effects of these policies seen in the data.

similar behavior is also shown in households' inflation expectations in the United Kingdom, displayed in figure 1 in this discussion. Coincidentally, the latest downward trend in the dispersion of households' inflation expectations begins after the FLS announcement in 2012, and it seems further reinforced by the FG announcement in 2013. In the context of Boneva et al.'s analysis, it would be extremely interesting to test whether the dispersion of firms' inflation expectations significantly responded, in statistical terms, to the FLS and FG announcements.

### 3. Concluding Remarks

Analyses such as that of Boneva et al. are necessary efforts to help us understand how firms form their expectations, and how the latter might be shaped and anchored by monetary policy. A few conclusions drawn from the discussed paper, and from related efforts like those of Bryan, Meyer, and Parker (2014) and Coibion, Gorodnichenko, and Kumar (2015), can be summarized as follows: (i) firms form better-informed expectations for measures of inflation that closely relate to them (e.g., unit costs, own prices) and do poorly for more general measures of inflation; (ii) firms seem to pay more attention to those factors that largely affect their profit function, which supports the rational inattention hypothesis of Mackowiak and Wiederholt (2009); (iii) in the UK manufacturing sector, the mean of firms' inflation expectations seems to react only to the Bank of England's QE announcements, which prompts the question of why these announcements seemed more important for firms' profits than other type of announcements; and (iv) unconventional policies might have affected as well the dispersion of firms' inflation expectations, although this hypothesis has not been formally tested.

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