THE IMPACT OF NEGATIVE INTEREST RATE POLICY ON CONSUMER INFLATION EXPECTATIONS

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ABSTRACT

Negative interest rate policies were implemented by several central banks to put downward pressure on real interest rates and stabilize the excessively low inflation rate resulting from the 2008 global financial crisis. This study contributes to the existing literature on negative interest rate policies by analyzing the effects of negative interest rates on changes in median consumer inflation expectations using data from the EU Consumer Survey focusing on the Eurozone and the Bank of England Inflation Attitudes Survey. This study uses the Difference-in-Differences (DiD) method to analyze the effectiveness of negative interest rate policies in increasing inflation expectations. The results show that the implementation of negative interest rate policies does not have a significant effect on changes in median consumer inflation expectations, as parallel trends between the treatment and control groups persist after the policy is implemented without any significant disruption.

Introduction

The zero lower bound on nominal interest rates presents a unique challenge for central banks. Central banks typically use interest rate and money supply controls as monetary policy instruments to respond to changing economic conditions, such as external shocks and business cycle fluctuations. However, following the 2008 global financial crisis, a contractionary shock stemming from the housing crisis in the United States prompted the Fed and then central banks in other developed economies to drastically cut interest rates to counteract a potential deflationary spiral. From then until the post-pandemic inflation spike in 2022, the world experienced very low inflation and interest rates. Further monetary expansion efforts, through lowering interest rates to near-zero, did not directly increase consumption or investment, as the tight economic outlook for households and firms prompted them to be more cautious in their consumption and investment spending, resulting in a decline in aggregate demand. This indicates that central banks are losing the effectiveness of their primary instrument for stimulating growth and aggregate demand through interest rates—a situation known as a liquidity trap.

The literature on liquidity traps highlights the important role of expectations, particularly inflation expectations, in stabilizing and promoting economic recovery (Eggertsson et al., 2003; Krugman, 1998). Although expectations have long been a central part of macroeconomics and the conduct of monetary policy, the problem of the zero lower bound has pushed the role of expectations into a central focus in the formulation of monetary policy.
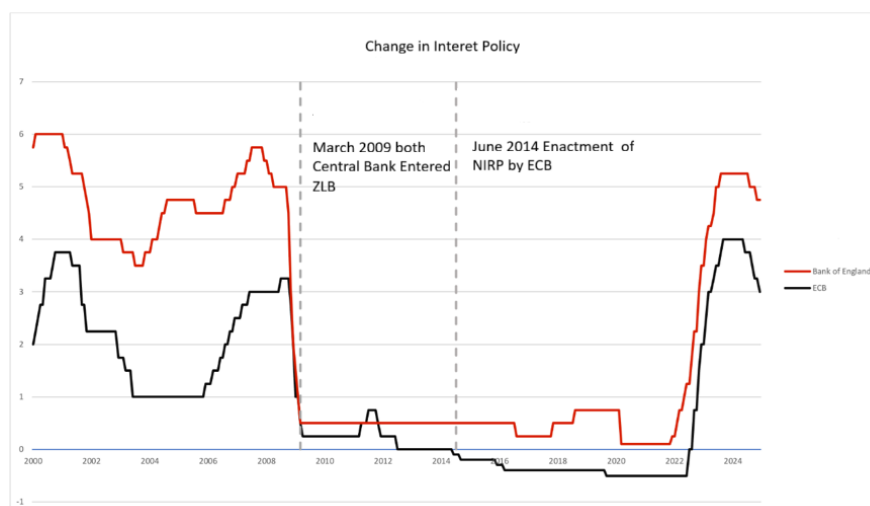
Figure 1
Change in Interest Policy

When nominal interest rates cannot be lowered further due to the zero lower bound, rising inflation expectations can lower real interest rates through the Fisher effect, which then encourages consumption through the intertemporal substitution effect, where rising inflation expectations cause households to tend to increase consumption in the current period and postpone saving. Various non-conventional monetary policy instruments such as quantitative easing and forward guidance are also designed to influence inflation expectations (Eggertsson & Woodford, 2003).

The research gap in this study lies in the limited empirical evidence regarding the effectiveness of negative interest rate policies (NIRP) in influencing inflation expectations, particularly at the household level. Most previous studies, such as Czudaj (2020), focused on inflation expectation data from financial professionals with good financial literacy, including an understanding of central bank policies. This has led to most research results tending to suggest that NIRP has a positive impact on inflation expectations. However, few studies have examined the impact of NIRP on inflation expectations among general consumers, even though monetary policy aims to stimulate household consumption as a driver of economic recovery. Therefore, this study fills this gap by analyzing the impact of NIRP on inflation expectations using consumer survey data.

Literature Review

Negative interest rate policy (NIRP) is an unconventional policy adopted by several central banks in response to the zero lower bound. This policy involves charging interest on excess reserves held by commercial banks at the central bank, essentially penalizing banks for holding excessive reserves. The goal of this policy is to create incentives for banks to channel their funds through lending rather than leaving them idle, thereby stimulating credit expansion, consumption, and aggregate demand. Officially, this policy is intended to exert downward pressure on real interest rates and stabilize low inflation (Draghi, 2013). However, the effectiveness of NIRP remains a matter of debate among researchers and policymakers. Several studies suggest that this policy may not have the expected expansionary effect

(Eggertsson, Ragnar E. Juelsrud, Ella Getz, Wold et al., 2017) (Glover, 2019) and may even have a contractionary impact due to reduced bank profitability and increased risk-taking by financial institutions (Eggertsson et al., 2003).

The NIRP also attempts to influence inflation expectations through a signaling channel. With interest rates at the zero lower bound, economic actors tend to expect future interest rates to rise. However, the implementation of the NIRP can send a signal that interest rates can be lowered further and remain low for a longer period (de Groot & Haas, 2019). While theoretically promising, supporting empirical evidence is limited. To date, the study (Czudaj, 2020) is the only known study examining the effect of the NIRP signaling channel on inflation expectations. In his research, Czudaj (2020) used the Difference-in-Differences (DiD) method with data from fx4cast.com, a survey of inflation expectations among professionals from various global financial institutions. He found that the implementation of NIRP significantly increased inflation expectations among professionals, supporting the theoretical framework proposed by de Groot & Haas (2019).

However, (Coibion et al., 2020) show that there is a striking difference in inflation expectations between professional forecasters and households. Unlike professional forecasters—who tend to be better able to interpret and respond to signals from central banks—households tend to be less responsive to changes in monetary policy, especially in countries that have experienced low and stable inflation over a long period. Therefore, to provide a more comprehensive assessment of the effectiveness of negative interest rate policies, this study seeks to determine whether the implementation of NIRP in countries with a zero lower bound and a long-term history of inflation stability results in a significant upward revision of inflation expectations, particularly among households.

This study will attempt to re-examine the relationship between NIRP and inflation expectations, using the same DiD method applied by (Czudaj, 2020) but with several modifications. First, instead of using data from many countries with varying economic conditions, we selected only two central banks: the European Central Bank (ECB) as the treatment group and the Bank of England as the control group. This selection was based on historical and socioeconomic similarities, as both central banks experienced similar impacts of the 2008 global financial crisis and both implemented unconventional monetary policies such as quantitative easing and forward guidance. The only major difference is that the ECB adopted the NIRP in the second quarter of 2014. Second, the observation period is limited from the first quarter of 2009 to the last quarter of 2019, the first quarter of 2009 was the period when both central banks entered the zero zone where both central banks cut their interest rate policies to 0.5%, while the last quarter of 2019 was the last period before the COVID-19 pandemic, this was done to avoid external shocks caused by the pandemic contaminating the analysis to be carried out. Third, this study does not use professional forecaster survey data, but consumer inflation expectations data from the EU Consumer Survey focusing on the Euro Area and the Bank of England Inflation Attitude Survey, because the main purpose of increasing inflation expectations is to encourage household consumption, the use of consumer data is considered more relevant (Coibion et al., 2020).

Method

The methodology used in this study is largely adapted from (Czudaj, 2020), with some modifications as explained in the introduction above. The Difference-in-Differences (DiD) approach was chosen because it is considered the most ideal for this analysis. First, the

implementation of negative interest rate policies by some, but not all, central banks create ideal quasi-experimental conditions for the application of the Difference-in-Differences (DiD) method. Second, this approach allows for the identification of causal effects by comparing changes in inflation expectations between the treatment and control groups over time. Third, the DiD framework allows for the isolation of the impact of negative interest rate policies on inflation expectations from the influence of other non-conventional monetary policies, such as quantitative easing and forward guidance, which were also implemented by both central banks during the same period.

In this approach, the study compares changes in the dependent variable (inflation expectations) before and after treatment in the treatment group, then compares these differences with those in the control group. The following is the regression estimate using the difference-in-differences method that we will use.

$$Y_{it} = \beta_0 + \beta_1 A_t + \beta_2 B_i + \beta_3 A_t B_i + \varepsilon_{it}, \quad i=1,2, t=1,...,T, \tag{1}$$

Y_{it} represents median consumer inflation expectations over the next 12 months. A_t and B_i are dummy variables representing:

$$A_t = \begin{cases} 1 & \text{since Q2 2014} \\ 0 & \text{before Q2 2014} \end{cases}$$

$$B_i = \begin{cases} 1 & \text{European Central Bank (treatment)} \\ 0 & \text{Bank of England (control)} \end{cases}$$

$A_t B_i$ is an interaction relationship that estimates the difference in changes in the treatment group against changes in the control group, and ε_{it} is a random error relationship.

Data

Although many central banks have adopted NIRP as part of their monetary policy instruments, this study selects only one central bank for each group: the European Central Bank (ECB) as the treatment group and the Bank of England as the control group. This selection is intended to isolate the impact of NIRP on changes in median inflation expectations. Both banks share similar socioeconomic and historical characteristics, and were both affected by the 2008 global financial crisis and entered the zero lower bound in the first quarter of 2009 when both banks cut their policy rates by 0.5%. This study uses quarterly median inflation expectations data from the EU Consumer Survey focusing on the Eurozone and the Bank of England Inflation Attitudes Survey.

Each month, the EU Consumer Survey monitors economic conditions and sentiment among consumers and businesses across various industry sectors. Since 2004, the survey has provided quantitative data on consumer perceptions and expectations of inflation. In the eurozone, the survey has polled approximately 25,000 respondents in total. Sample sizes for each country vary depending on population size and economic heterogeneity, ensuring an accurate representation of the population. Meanwhile, the Bank of England Inflation Attitudes Survey is a survey conducted by the Bank of England to assess public perceptions of the central bank's performance, including perceptions and expectations of inflation. The survey involves approximately 2,000 respondents from across the UK, and, like other EU surveys, the sample is weighted to reflect the population composition. The observation period runs from

the first quarter of 2009 to the last quarter of 2019, before the COVID-19 pandemic began, to avoid bias due to the shock caused by the pandemic.

Results and Discussion

Table 1 shows the results of the DiD regression estimation used in this study, and Figure 2 shows the data on changes in median inflation expectations used in this study.

Table 1. The Effect of NIRP on Inflation Expectations

	Median Inflation Expectations
$\beta 0$	3.3
(standard error)	.1375115
[p-valuee	0.000
$\beta 1$	-.6521739
(standard error)	.1690221
[p-value]	0.000
$\beta 2$	.3328442
(standard error)	.2191636
[p-value]	0.133
$\beta 3$	-.3750445
(standard error)	.2591492
[p-value]	0.152
Adj. R^2	0.3351
N	88

There are several things that can be taken from the results of the analysis above, *first*, it can be seen from the graph of figure 2 above that since the two economies entered the ZLB, there has been a parallel trend in the level of inflation expectations between the two economies. This is reinforced by the value of the parameter β2, which is the value of the difference between the treatment and control groups before the implementation of the NIRP which is small, only 0.332. *Second*, the three relevant parameters, namely β1, β2, and β3, all show very small numbers, parameter β1, is a parameter that shows the trend in the control group, in this case it can be seen that throughout the ZLB period the number of changes in the level of inflation expectations among consumers is very small, the same thing can also be seen in the parameter β2 which shows the difference in the level of inflation expectations in the two groups before the implementation of the NIRP policy. *Third*, the β3 parameter is a key parameter in this study, this parameter shows the difference between the two groups before and after the implementation of the NIRP policy, the results can be seen that the implementation of NIRP did not provide significant disruption or change in the level of inflation expectations in the treatment group.
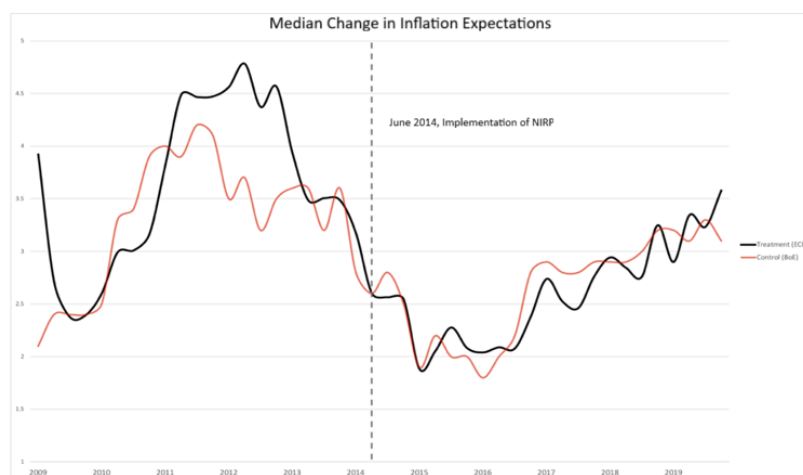
Figure 2. Median Inflation Expectations

Note: The graph above shows the change in the median inflation expectations level among consumers in the Eurozone (black) and the UK (red). Data are obtained from the EU Consumer Survey and the Bank of England Inflation Aptitude Survey.

This is emphasized by the graph in figure 2, where the existing parallel trend continues after the implementation of NIRP. This means that the estimation results show that there is no significant increase in median inflation expectations among euro area consumers after the implementation of NIRP. The trend pattern of inflation expectations between the ECB and the Bank of England remains parallel before and after the policy is implemented, which indicates that NIRP has no measurable effect in influencing consumer inflation expectations in general.

Conclusion

This study contributes to the empirical literature on the impact of non-conventional monetary policy, particularly the NIRP. Based on the estimation results, there is insufficient evidence to support the effectiveness of NIRP in increasing consumer inflation expectations. The trend in changes in median inflation expectations remains parallel between the treatment and control groups, both before and after the policy's implementation. This result appears to contradict the findings of Czudaj (2020), but this can be explained by differences in data types: this study uses consumer survey data, while Czudaj (2020) uses data from a consensus survey of professional forecasters.

This finding aligns with Coibion et al. (2020), which demonstrated differences in inflation expectations between households and professional forecasters. This study suggests that with low and relatively stable inflation, the expansionary power of the NIRP is limited because it relies solely on lower nominal interest rates without the support of rising inflation expectations. Therefore, differences in the formation of expectations among market participants need to be considered when designing effective monetary policy.

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