

Practice and Theoretical Research on Negative Interest Rate Policy

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Abstract

So far, many central banks have implemented negative interest rate policies. As an unconventional monetary policy, negative interest rate policy is not a simple replacement of other monetary policies, but a plugging and continuation of front-end monetary policy. Through the research on the practice and theory of negative interest rate policy, this paper finds that under the current global economic and financial situation, negative interest rate policy still has the space and potential to exert power. However, as negative interest rate policy also has inherent limitations and uncertainty of policy effect, the disadvantages of negative interest rate policy will become increasingly obvious, and negative interest rate policy may be replaced by innovative monetary policy or used in conjunction with new monetary policy.

Keywords: Negative Interest Rate, Monetary policy, Practice, Theory

1. Concept and Theoretical basis

The so-called negative interest rate means that the nominal interest rate is negative, and the real interest rate is not negative. From the perspective of the implementation of negative interest rate policies in some developed economies in the world, there are two types of negative interest rate policies. The first is the negative interest rate policy adopted by the central bank for the excess deposit reserves of commercial Banks, and the second is the negative interest rate policy adopted by commercial Banks for the deposits of enterprises and residents. At present, all the negative interest rate policies implemented are of the first type, that is, the central bank does not pay positive interest on the excess deposit reserves deposited by commercial Banks in the central bank, but collects fees from commercial Banks, which is equivalent to the interest paid by commercial Banks to the central bank.

Since 2009, up to now, five central Banks around the world have implemented negative interest rate policy. However, each central bank's operation mode of negative interest rate policy has its own characteristics, which can be divided into two typical ways. One is to cut the policy target rate directly into negative territory in the interest-rate corridor, represented by the Swedish central bank and the European central bank. The other is to implement differential negative interest rate policy on deposit reserves, set up a multi-level interest rate system, and implement negative interest rate policy on deposit reserves exceeding a certain standard stipulated by the central bank, represented by the Swiss central bank, the Danish central bank and the Japan central bank.

If central bank of a cancels the reserve requirement system, the central bank usually sets a fixed reserve requirement scale. Within this standard, zero interest rate policy will be carried out, and negative interest rate policy should be carried out beyond the standard. In addition, it needs to be pointed out that negative nominal interest rate does not mean negative real return rate. Under the condition of deflation or negative interest rate asset with huge potential to rise in the value of investment assets, positive real return rate can be achieved completely. According to the formula:

$$\text{Yield during bond holdings} = \frac{(\text{Government bond sale price} - \text{Government bond purchase price} + \text{Total interest during the holding period})}{(\text{Government bond purchase price} * \text{Holding time})} * 100\%$$

For treasury bonds with negative coupon rate, if the difference between the selling price of Treasury bonds and the buying price of treasury bonds is positive and greater than the total interest during the holding period, the appreciation value of Treasury bonds obtained by investors during the holding period exceeds the total interest paid externally, then the actual yield of bonds is still in a positive range.

Before the appearance of negative nominal interest rate, the phenomenon of negative real interest rate was relatively common, but the view that the nominal interest rate could not break the lower limit of zero interest rate firmly held the dominant position. The idea of negative nominal interest rates is extremely rare. The theory of the zero lower bound established by Fisher in 1896 holds that if the nominal interest rate is negative, financial institutions and others will prefer to hold cash on their own rather than lend cash, so the nominal interest rate will not be lower than zero. In fact, Fisher's theory of the zero lower bound of interest rates only works if the cost of holding your own cash is zero or so small that you can ignore it. Silvio Gesell, a famous 19th century German economist, argued that negative nominal interest rates were equivalent to taxing cash, increasing the cost of hoarding it and forcing its owners to invest. In 1932, Robert Eisele proposed a method that could separate and decouple the two functions of monetary measurement and medium of exchange, thus providing possible conditions for the implementation of negative interest rate policy.

In real life, financial institutions will incur certain storage, insurance and other management costs when holding cash, and self-holding cash will incur costs. As long as the absolute value of the nominal negative interest rate is no more than the cost of self-holding cash, commercial Banks are still willing to deposit excess reserves in the central bank even if the negative interest rate policy is implemented. Therefore, even if the negative interest rate policy exists, commercial banks are still willing to deposit cash into the central bank, which explains to some extent the rationality and feasibility of the negative interest rate policy. In addition, the cost of self-held cash is usually fixed cost, that is, the marginal cost of self-held cash is decreasing, so the longer the duration, the smaller the average cost of self-held cash is. Therefore, the longer the central bank carries out the negative interest rate policy, the less attractive the negative interest rate will be. Commercial Banks are more willing to hold cash by themselves.

2. Background and Practical experience

At present, the main countries implementing the negative interest rate policy are Denmark, Sweden, Switzerland, the European central bank and Japan. All these economies introduced negative interest rate policies after the global financial crisis in 2008. After the financial crisis, and to stimulate economic recovery and growth, many economies generally use a series of conventional and unconventional monetary policy tools to build a loose monetary policy environment, injected liquidity to the market, market interest rates have greatly depress, but with the deepening of the loose monetary policy, the policy effect is continuously decreasing, the short-term effects of monetary policy has become increasingly apparent. In addition to the impact of external factors, the effectiveness of the transmission of short-term interest rate to long-term interest rate and the target of macro-control were not as expected. Therefore, the intention of monetary policy regulation was largely defused and adjusted by the market. After the interest rate is reduced to zero, due to the restriction of the lower limit of zero interest rate, the operating space of interest rate policy tends to be saturated, which leads to the inherent contradiction between monetary policy and the remaining deviation of regulatory target. The interest rate policy is gradually deadlocked, and there is an urgent need for new monetary policy tools to break the barriers of interest rate transmission mechanism and enhance the regulation of price-based monetary policy on the macro economy. The situation in the euro zone and Japan is relatively more serious. In the background, the negative interest rate policy was the first to experiment in the euro zone countries and Japan.

The first economy to adopt the negative interest rate policy was Sweden's Center Bank, which sets the reserve requirement rate at -0.25% in 2009. After that, Denmark (2012), Sweden (2014), Europe (2014) and Japan (2016) successively implemented negative interest rate policies. The specific measures and effects of the above central bank's negative interest rate policies are shown in Table 1.

Table 1: Basic situation of countries implementing negative interest rate policies

Country or economy	Starting time	Background of implementing negative interest rate policy	Policy rate	Negative interest rate level	Monetary policy objectives	Supporting policies and measures	Implementation Effects
Eurozone	2014.6	The deflationary trend has intensified.	Excess deposit reserve	Initial value -0.1%, Present value -0.4%	Achieve a 2% inflation target	Quantitative easing policy, interest rate corridor	The inflation rate was weak at the beginning of the policy and reached the inflation target in February 2017.
Denmark	2012.7	A large inflow of external capital, the pressure on the appreciation of the Danish Krone increased	7-day fixed deposit rate, overnight deposit rates above the upper limit	Initial value -0.2%, Present value -0.65%	Restrain currency appreciation and keep exchange rate stable	Increase the overnight deposit limit from 231.5 krona to 69.7 billion krona	The exchange rate is basically stable.
Swiss	2014.12	Rapid inflow of external capital, increased pressure on Swiss francs	3 months Swiss Franc Libor exceeding the upper limiter	Initial value -0.25%, Present value -0.75%	Suppress excessive capital inflows and maintain exchange rate stability	Interest rate corridor	The pressure on the appreciation of the Swiss franc has been restrained and the exchange rate has basically been stable.
Swedish	2009.7-2010.8, 2015.2	Deflation pressure is greater.	7-day repo rate	2015: Initial value -0.1%, Present value -0.5	Suppress deflation	Quantitative easing policy	At the beginning of 2016, core inflation reached 2%.
Japan	2016.1	Deflation is intensifying and exchange rate appreciation pressure is increasing.	Excess deposit reserve	-0.1%	Increase inflation and lower exchange rates	Qualitative and quantitative easing policy	The inflation rate has not reached the expected target, and the yen has not risen against the US dollar.

3. The transmission mechanism of negative interest rate policy

Negative interest rate subvert the traditional monetary theory, break the shackles of the lower limit of zero interest rate, change the traditional understanding that the interest rate cannot be lower than zero, and expand the operating space of monetary policy. When the interest rate is near zero, it can continue the regulation ability of interest rate, which has an important influence on the reconstruction and construction of the transmission mechanism of interest rate.

Negative interest rate policy is transmitted through credit supply channels. Negative interest rates are equivalent to the central bank levying a "currency tax" on commercial Banks, increasing the cost and cost of hoarding money by commercial Banks, preventing them from hoarding money, and forcing them to support the development of the real economy. The purpose of the negative interest rate policy is to effectively boost inflation, suppress the appreciation of the local currency, and stimulate economic growth during the economic downturn.

The central banks that adopts the negative interest rate policy basically use the negative interest rate policy to reduce the long-term and short-term market interest rate to achieve the above regulatory purposes. The key reason why the negative interest rate policy can drive down the market interest rate is that it can adjust the money supply and demand situation in the financial market, drive commercial Banks to increase the money supply, and thus promote the decline of interest rate, which ultimately creates necessary conditions for the rise of inflation rate, stability of exchange rate and economic growth. The implied logic is that whether the negative interest rate policy can effectively transmit the market interest rate is the key to the success of the negative interest rate policy. This is because the negative interest rate directly reflects the price relationship between the central bank and the commercial bank, and does not represent the price relationship between the commercial bank and enterprises, residents and other real sectors. The effectiveness of the negative interest rate policy ultimately depends on the interest rate level between the commercial bank and the real sector.

So how is negative interest rate transmitted to credit market interest rates? An important factor and variable is the change of money supply in the credit market. Negative interest rate policy is more likely to affect the money supply in the credit market, driving commercial Banks to increase the money supply in the credit market. Under the condition of relatively stable demand, it promotes the reduction of interest rate in the credit market, thus promoting macroeconomic variables such as price, output and exchange rate.

In general, the transmission process of negative interest rate policy should be:

Negative interest rates → Money supply increased in credit markets → Interest rates reduced in credit markets
→ Rising prices, increasing aggregate demand, falling exchange rates

Negative interest rate policy can guide market expectations through signal effect and announce the loose monetary policy stance of the central bank. The phenomenon of liquidity traps is actually caused by market expectations that are affected by the zero interest rate floor. When the negative interest rate appears, it completely breaks the theory of zero lower limit of interest rate, forms a new guide to market expectations, and transmits the strong policy intention of the central bank to the market. On the one hand, it releases the extremely loose monetary policy signal to the market, and on the other hand, it indirectly transmits the bad signal of the real economy. By lowering the negative interest rate several times and the negative interest rate policy for a long time, the central bank hopes to achieve the expected goal of the market. In this context, commercial banks and other financial institutions have changed their own operation mode and market habits, made adjustments and changes to their market behaviors, and adopted behavioral decisions consistent with the central bank's regulatory objectives.

4. The Disadvantages of Negative Interest Rate Policy and Its Sustainable Evaluation

A negative interest rate policy may not lower market interest rates, but push them higher. One of the purposes of the negative interest rate policy is to force commercial Banks to increase the money supply to enterprises, households and other real sectors, lowering market interest rates and boosting prices, demand and output. However, the negative interest rate policy does not necessarily lead to the decline of market interest rates, but will drive up interest rates. Because the negative interest rate policy increases the cost of commercial banks and transmits the cost layer, commercial banks are forced to raise market interest rates to compensate for the losses caused by negative interest rate policies in order to pass on the costs caused by negative interest rate policies. This means that although the central bank implements a negative interest rate policy for commercial banks, market friction and cash holding costs do not force all excess reserves of commercial banks to be invested in the market.

In a certain period of time, only a part of the reserves will be put on the market, and the remaining reserves deposited in the central bank will still bear interest. Commercial Banks will try to absorb this part of the interest, and raising the interest rates in the bond market and loan market may be the response strategy of commercial Banks.

In the case where the overall liquidity of the market is not fully sufficient, although negative interest rate policies have forced commercial banks to increase liquidity to the market, changing the monetary supply and demand of the market, commercial banks can still raise interest rates, with the negative interest rate level in commercial banks to businesses and residents on the pricing of credit, increase the cost of additional on credit interest rates and make interest rates rise in the retail end.

The negative interest rate policy alone could further reinforce deflation. Without considering the impact of monetary policy tools such as quantitative easing and forward-looking guidance, since the rationality of negative interest rate policy may be based on future deflation, simply implementing negative interest rate policy may release deflationary market expectations to the market. The result of hoarding money, reducing the money supply in the financial market, and then pushing up market interest rates, forming an actual deflation, makes the negative interest rate policy play a counterproductive role. Therefore, negative interest rate policy is not suitable for use alone and should be used in combination with other monetary policy tools such as quantitative easing.

In particular, quantitative monetary policy tools and negative interest rate policy have a mutually compensating relationship, which is consistent with the practice of adopting negative interest rate policy in developed economies. Negative interest rate policy is essentially a price monetary policy tool, and a certain level of negative interest rate is not self-regulated by the market or guided by the central bank to form the market, but the level of negative interest rate mandated by the central bank. Therefore, it is extremely important that the negative interest rate policy can be recognized, accepted and actively adapted by the market. If the negative interest rate policy cannot effectively guide the market's expectation and confidence, the negative interest rate policy will also generate unlimited money demand similar to the liquidity trap, increasing the pressure of deflation.

5. Discussion

As an unconventional monetary policy, negative interest rate policy is an innovative result of the central bank's continuous exploitation of monetary policy potential. The appearance of negative interest rate policy has a specific background, which is not a simple replacement of other monetary policies, but the plugging and continuation of front-end monetary policy. It is generally believed that unconventional monetary policies will gradually enter the exit path as the economic and financial situation enters the normal track.

However, as the macro-economy of developed economies that adopt negative interest rate policies has not undergone a fundamental reversal so far, there is no sign of withdrawal of negative interest rate policies, quantitative easing and other unconventional monetary policies, and even unconventional monetary policies are gradually normalized. The timing and conditions for a return to normalization of monetary policy are far from present. In the current global economic and financial situation, the negative interest rate policy still has the space and potential to exert its power, and there are still markets in the central bank's monetary policy operation tool base, so the negative interest rate policy still has the rationality of survival.

As the negative interest rate policy also has inherent limitations and uncertainty of policy effect, with the diminishing effectiveness of the transmission mechanism of negative interest rate policy, the disadvantages of negative interest rate policy will become increasingly obvious. Negative interest rate policy may be replaced by innovative monetary policy or used together with new monetary policy, but more superior monetary policy tools are needed to make up for the bottleneck that negative interest rate policy cannot overcome.

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