

The Impact of Nominal Negative Interest Rates on the Economy – Literature Review

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ABSTRACT

Until recently, negative nominal interest rates of the central bank were in the sphere of theoretical considerations. In 2009, the Swedish Central Bank was the first to implement a negative interest rate policy (NIRP). Since then, the NIRP has been implemented by the National Bank of Denmark, the European Central Bank, the Swiss National Bank and the National Bank of Japan. Unfortunately, due to the large number of simultaneous factors affecting the economy, it is extremely difficult to determine the long-term effects of NIRP implementation. Furthermore, the magnitude of the impact and the global extent of the coronavirus pandemic would have a significant impact on the dilatation, so the focus was on pre-pandemic issues. This paper is a literature review and it aims to synthesize information about the impact of negative interest rates on the market – in financial and real spheres. In this paper, both the results of scientific research and the opinions of experts were used, then the impact of negative nominal interest rates on the financial and real sectors was assessed. The results show that most authors highlight an adverse impact of negative interest rates on the stability of the banking sector regardless of the country. The greatest fear of the NIRP implementation by central banks is that the potential behavior of economic entities cannot be predicted with certainty, especially when it comes to cash deposit withdrawals from banks.

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1. INTRODUCTION

A completely new phenomenon in the world of finances are negative nominal interest rates that, until the global financial crisis of 2007–2009, were widely recognized as an unrealistic economic phenomenon (Brózda-Wilamek, 2017). Following the turmoil in the global financial markets, major central banks in the world economy gradually lowered their key interest rates, eventually bringing them down to a very low level, even below zero. It is worth emphasizing that the implementation of a negative interest rate policy (NIRP) itself raised many questions

and uncertainties, as nominal interest rates had never been negative in the history of economics (Altavilla et al., 2020).

The existing relations between the creditor and the debtor related to the flow of money from the borrowed capital were as follows: the creditor provides the capital and in return, the debtor pays the creditor for this capital (Gafrikova, 2016). In the case of negative interest rates, the relationship is reversed: the creditor pays for making capital available to the debtor. Kolany (2015) calls this a fantasy and considers it absurd. Klepacki's (2016) view of the NIRP is less severe – unconventional and controversial. Thornton and Vasilakis (2019) have a similar viewpoint.

However, the scale of the effects of the implementation of the NIRP, primarily for financial markets, is indisputable. Monetary policy affects the size of money supply, and the use of the NIRP as an atypical instrument is visible in many spheres (Arteta et al., 2016). Therefore, the effects of the NIRP implementation are felt by many groups of stakeholders, especially those whose activities are based on generating a profit in the financial sector (Lopez et al., 2018).

Due to the relatively short period of time since the introduction of negative interest rates, there are many questions about their impact on the economy, both in the short run and in the long run. The impact of the NIRP phenomenon on the economy was immediately investigated in many studies, which results in an upward trend in the number of scientific publications on this topic. Nonetheless, the number of unknowns related to the NIRP implementation makes it necessary to further investigate the phenomenon. This paper is the collection and synthesis of information on the NIRP. Its value for science is a combination of theory (scientific papers) and the opinions of practitioners (experts), thus it may constitute a starting point for further research. The aim of the paper is to synthesize the information about the impact of negative interest rates on the market – in financial and real sphere. In order to achieve it, the following research question was posed: What is the impact of the NIRP implementation on the financial and real sphere?

The research method used was a critical literature review which includes both scientific research and statements of experts in the field of finances. Due to the “new reality” created by the coronavirus pandemic and emergency interventions by both central banks and governments to protect the economy from the crisis, the study focuses only on experiences before the outbreak of the COVID-19 pandemic. Therefore, the stage of selecting the references was as follows: the Google Scholar database was used to search for scientific papers, limiting the year of publication to 2020. Then, articles were selected that extensively dealt with the subject of NIRP. In order to find expert opinions on the issue, the Google engine was used to search for the phrase “negative interest rate policy” in both Polish and English. The last stage was a comparison of the research results and expert opinions on the impact of the NIRP implementation on the financial and real sphere.

2. LITERATURE REVIEW

2.1. Negative interest rates in theory and practice

Hicks (1937) stated that interest rates must always be positive. When there is no cost of owning money, it is better to be able to have it at one's disposal than to borrow it if the interest rate is equal to zero. As central banks' interest rate cuts approached zero, some economists believed that it was impossible to go below that level (see Buiter, 2009). The introduction of the NIRP was all the more risky as there was very little economic theory supporting it (Eisenberg & Krühner, 2018). The response to the implementation of a negative nominal interest rate policy may vary in different countries (Thorntona & Vasilakis, 2019).

As Kolany (2015) notes, zero interest rates “are not the product of the market, but the result of arbitrary decisions by a narrow group of central bankers”. This is the result of a political game of priorities such as bank safety and state solvency. The budget deficit is financed by debt instruments that bear interest. Therefore, the lower the interest rate on the instrument, the lower the cost of debt. In the case of negative interest rates, the lender pays the borrower’s debt. Randow and Kennedy (2016) argue that the NIRP is an effect of desperation because traditional monetary policy tools have failed.

Goodfriend (2000, p. 41) and Brózda-Wilamek (2017) claim that the interest rate could be negative if maintaining and managing cash were associated with some extraordinary costs or mental discomfort. In this reasoning, the deposit is seen as a cost source for the bank. However, in the classic model of the banking system, banks’ activity consists in transforming deposits into loans, the interest on which (higher than interest on deposits) is the bank’s income. Therefore, the capital transferred by depositors is the basis for financing the bank’s activities, an opportunity and a source of profit generation. The more money is deposited with the bank, the more funds it will have to spend on loans (*ceteris paribus*). As a result, it will be possible to obtain proportionally higher income.

Randow and Kennedy (2016) report that as of mid-2016, about 500 million people lived in the world of negative nominal interest rates. In their opinion, economically, this is a new financial era. The implementation of the NIRP was smooth and trouble-free, although there are still no mechanisms that would prevent withdrawing deposits and escaping to paper currency if the rates are even lower (Lilley & Rogoff, 2019).

In terms of economic activity, the introduction of negative interest rates on outstanding securities or existing types of contracts has been associated with a high degree of uncertainty of the effects. As noted by Bech and Malkhozov (2016), the experience to date suggests that the impact of the policy of moderate negative rates on money markets and other interest rates is similar to the positive rate mechanism. In turn, theoretically, interest rates may fall indefinitely, and financial institutions, instead of maximizing profit, will minimize losses.

The NIRP implemented by central banks had various origins that resulted mainly from the current financial situation. The aim of the National Bank of Denmark was to mitigate the side effects of unconventional monetary policy and counteract the pressure on the appreciation of the Danish krone (Gafrikova, 2016; Brózda-Wilamek, 2017). The Swiss National Bank had similar reasons for the application of the NIRP which was primarily concerned with discouraging foreigners from investing in francs, which was to translate into slowing their appreciation. By contrast, the Swedish Central Bank, by applying the NIRP, wanted to counteract deflation and stimulate lending to the private sector to stimulate economic growth. The purpose of introducing negative interest rates by the European Central Bank (ECB) was to increase inflation and boost economic activity in the short term, following the region’s debt crisis. However, central banks have maintained interest rates below zero for longer than expected (Horowitz, 2020). The dates of the introduction of negative nominal interest rates by central banks are as follows:

- July 2009 – Swedish National Bank (Sveriges Riksbank)²,
- July 2012 – National Bank of Denmark (Danmarks Nationalbank),
- June 2014 – European Central Bank,
- December 2014 – Swiss National Bank (Schweizerische Nationalbank, Banque Nationale Suisse),
- January 2016 – National Bank of Japan (Nippon Ginkō).

² In December 2019, Sveriges Riksbank became the first bank to hike its key interest rate above zero.

2.2. Threats of the NIRP implementation

The President of the European Central Bank Christine Lagarde treats the transfer of negative interest rates onto depositors as a concern (Goldstein, 2019). However, negative interest rates may enhance market development by ensuring stronger economic development, lower unemployment, and lower costs of borrowing money. Lagarde argues that if not for the introduction of this unconventional policy, euro area citizens would be, overall, worse off (Goldstein, 2019). Furthermore, Lagarde claims that this was the reason for economic growth in the euro zone and this is an argument for such a monetary policy to be correct (Horowitz, 2020). However, Bundesbank President Jens Weidmann and Dutch central bank Governor Klaas Knot are skeptical of the easing policy and are reluctant to further cut interest rates, while the Bank of Italy Governor, Ignazio Visco, believes that asset purchases are better than the policy of negative interest rates (Stirling, 2019).

The NIRP may lead to the loss of central banks' control over the implemented monetary policy, with such risk increasing the more, the more negative rates are. Klepacki (2016) calls this phenomenon the risk of excessively low interest rates. Moreover, the NIRP is mainly applied in Europe and it is unpredictable how other economies will behave in the face of the introduction of negative interest rates.

According to Lilley and Rogoff (2019), the biggest counterargument to the introduction of the deep NIRP is that it has not been tried out before, so the effects remain in the sphere of guesswork and speculation. Among the concerns about the introduction of the NIRP, Bech and Malkhozov (2016) distinguish between the ways of treating floating rate instruments and the ability of the market infrastructure to accept them. There is considerable uncertainty about the behavior of actors, including consumers, in the event of deepening negative interest rates.

Among the risks of the NIRP, Klepacki (2016) notices:

- very low predictability of the effects of this phenomenon,
- different date of risk materialization (short, medium and long-term),
- no historical reference (comparable sequence of events) in linear terms,
- advanced effect of globalization and the accompanying phenomena of centralization and contagion,
- the possibility of the emergence of new accompanying risks.

Reinbold and Wen (2017) point out that the use of negative interest rates in relation to monetary theory raises several doubts. The first is the mere implementation of negative nominal interest rates. The second is their stimulating effect and their impact on aggregate demand. The third is the effectiveness of maintaining negative nominal interest rates in the long term. Generally, the NIRP entails certain threats, it may (Narodowy Bank Polski, 2016, pp. 18–19):

- 1) increase the propensity of economic entities to convert bank deposits to cash,
- 2) worsen the profitability of the banking sector,
- 3) pose threats to the financial stability of pension funds and insurance companies,
- 4) be conducive to the emergence of speculative bubbles in financial markets.

Hence, the policy of negative interest rates affect investment. Investors, particularly insurers, may be reluctant to invest in securities with negative cash flow. Here, attention should be paid primarily to pension funds which invested capital in safe assets, but with low interest rates. Their negative profitability resulted in the search for other, more profitable, although less safe financial instruments.

Gafrikova (2016) points out that the continued negative interest rates are accompanied by an increased risk of imbalance in the real estate and mortgage markets, as low interest rates encourage households to borrow and consume. This results in an increase in the prices of real estate that is purchased on credit by households. High household debt is dangerous for the entire

financial sector and is the reason for the crisis of 2007–2009. Moreover, pursuing a policy of negative interest rates, with a purpose other than stopping the appreciation of the currency, can pose a risk when the currency is already low in value.

Some commercial banks, especially large ones, use this form of central bank policy because a large percentage of loans comes from wholesale markets that also have negative interest rates. Bounou (2020) observed that banks' risk-taking was lower in countries where negative rates were adopted. Moreover, the size and capitalization of a country's banking system have a meaningful effect on this result. The analysis by Lopez et al. (2018) shows that banks withstood the introduction of the NIRP well, with the exception of small banks. A widely discussed issue in the literature is that commercial banks pass interest rates to retail depositors (Bech & Malkhozov, 2016; Randow & Kenedy, 2016).

Fries et al. (2017) show a simulation model designed to handle negative and close-to-zero risk factors. However, forecasting NIRP effects using models is burdened with a large error because the time period since their introduction is still too short and they are accompanied by decisions made by central banks (Honda & Inoue, 2019).

2.3. Impact on the financial and real spheres

Negative nominal interest rates mean that investors who hold securities till maturity will not get back the full amount invested (Randow & Kennedy 2016). Moreover, a decline in the purchasing power of money, which additionally reduces profitability, in this case increases the loss on investment. Government bonds, so far providing low rates of return but guaranteeing the security of funds, can no longer be used as instruments for investing pension capital. Gatnar (2019b) notes that on August 23, 2019, the government bond yields of four countries – Denmark, the Netherlands, Germany and Switzerland – reached a negative level along the entire length of the curve, i.e. from one to 50 years.

Negative rates put pressure on the profitability of financial institutions (Brunnermeier & Koby, 2017). The NIRP has reduced the profitability of banks (Molyneux et al., 2017). This is due to the fact that NIRP effects cause the erosion of the net interest margin (Genay & Podjasek, 2014; Hannoun, 2015; Chaudron, 2018). The implementation of the NIRP generates costs, including those incurred by commercial banks for maintaining central bank liabilities (Bech & Malkhozov, 2016). Commercial bank representatives claim that negative interest rates translated into lower earnings of their institutions – this can also be seen in scientific research papers (Brunnermeier & Koby, 2018; Eggertsson et al., 2019; Horowitz, 2020). It is essential especially for small banks as it increases the risk of their operations (Nucera et al., 2017). Moreover, such a policy does not encourage saving money and raising capital, but rather encourages borrowing and spending (Horowitz, 2020). Gafrikova (2016), analyzing the impact of negative interest rates on commercial banks' deposits, commercial banks' loans and their financial results, points out that analyses of the impact of negative interest rates on the economy are extremely difficult, as central banks may conduct other activities at the same time. Attention should also be paid to the influence of the political situation in a given country, as well as the general economic situation of a country and financial behavior of its citizens.

The application of the policy of negative interest rates and other non-standard measures adopted by central banks lowered interest rates on loans, even to a negative level and therefore increased the demand for them (Gafrikova, 2016). Lopez et al. (2018) showed that when positive and negative interest rates are low, losses in banks' interest income are almost exactly offset by savings on deposit expenses and gains in non-interest income. Bottero et al. (2019) showed that Italian banks with more liquid assets increased the supply of credit when the NIRP was implemented. On the other hand, negative interest rates on deposits encourage withdrawals from the bank. A rational depositor will prefer to hold cash rather than pay the bank to hold it.

A larger number of depositors secures the bank's financial liquidity, as it reduces the probability that the deposits will be withdrawn at one time. On a macroeconomic scale, the risk of a run on banks is related, *inter alia*, with the outbreak of the financial crisis and high inflation. In turn, on a microeconomic scale, individual entities will massively withdraw their deposits if they notice that they have to pay the bank for them. This mainly applies to large enterprises with huge cash holdings (Altavilla et al., 2020). Research conducted on the Swedish market shows that deposit and lending rates do not follow policy rates when they turn negative (Eggertsson et al., 2019). Khayat's (2018) research shows that commercial banks are reluctant to pass interest rates to depositors because they are afraid of their deposit withdrawals. Instead, commercial banks choose alternatives, for instance, to store assets in foreign currencies, which leads to currency depreciation. Nonetheless, other studies show that banks pass negative rates to their corporate depositors without experiencing a decline in funding, and that the degree of influence increases as rates move stronger into the negative territory (Altavilla et al., 2020).

An alternative to depositing cash in a bank is to keep it in the savings sock (Gafrikova, 2016). Keeping it at home or in one's wallet does not generate profits or costs, therefore the return on investment is 0%. In the case of positive, even slightly above-zero rates, interest-bearing deposits are rational. Therefore, the policy limiting cash demand is an important complement to the policy of negative interest rates (Rognile, 2016). According to Rognile (2016), the far reaching step is the departure from cash, although the elimination of larger denominations from circulation should be sufficient.

Central banks that adopted the NIRP gave their primary motivations for the policy as the stabilization of inflation expectations and support of economic growth (Jobst & Lin, 2016). Indeed, the NIRP appears to be effective in boosting economic growth and overcoming a deflationary spiral (Czudaj, 2020). However, it should be noted that too much inflation can imbalance financial stability (Reinhart & Rogoff, 2009). The risk of instability in the financial sector has been increasing since the introduction of the NIRP, especially due to the negative impact on the bond market and the banking sector (Kurowski & Rogowicz, 2017). It is essential to understand how the NIRP affects the stability of the entire financial system (English et al., 2018). Bruna and Tran (2020) point out that unexpected decisions made by central banks regarding crucial interest rates may cause shocks in the financial market. Asset purchases and forward guidance must be connected with NIRP (Boungou, 2020).

Although the introduction of the NIRP is an element of monetary policy, it has implications for fiscal policy. Most of all, negative interest rates reduce the cost of public debt. Therefore, they not only enable cheap debt rollover, but also encourage the government to become indebted (Arteta et al., 2016). Excessive indebtedness at a time when interest rates remain low creates enormous threats to the financial stability of the state, as in the event of an increase in interest rates, the cost of public debt will increase and thus will necessitate drastic cuts in fiscal policy (Blanchard, 2019).

The interest rate is one of the basic instruments influencing the price level, as it directly affects aggregate demand and aggregate supply (Iwaszczuk & Szydło, 2016). Thus, it also affects the components that make up GDP – consumption, investment, government expenditure and net exports. Rognile (2016) argues that negative interest rates help stabilize aggregate demand, but at the cost of an ineffective subsidy for the paper currency.

Negative interest rates become a source of monetary policy opportunities, which may (Klepacki, 2016):

- stimulate the currency policy in order to discourage foreigners from investing, and this prevents the appreciation of national currencies,
- encourage banks to lend money to the private sector, which increases consumption, economic growth, but also inflation,

- lead to forward guidance (the belief that central banks will take action to stimulate the economic situation and keep inflation within the established inflation target channel),
- provide cheap financing of government debts.

Analyses carried out by Dong and Wen (2017) show that it is optimal for central banks to introduce negative nominal interest rates at a time when aggregate demand for investment and consumption is extremely weak, because the NIRP should theoretically not only translate into a reduction in the cost of loans, but also stimulate investment expenses. Research by Altavilla et al. (2020) indicates that negative interest rates are a stimulus for the entire economy through firm asset rebalancing. Boucinha and Burlon (2020) showed that the NIRP stimulus to the economy has been effective in easing financing conditions and thus it ultimately contributes to price stability. As a result, the policy of negative interest rates improved the macroeconomic situation, as also pointed out by Lagarde (Horowitz, 2020).

Monetary policymakers need to know what effects changes in interest rates have on banks' health because this may influence their willingness to lend, providing an additional mechanism through which monetary policy can affect the real economy (see Van den Heuvel, 2012). According to Coeuré (2016, as cited by Boungou, 2020), the NIRP aims at increasing the supply of credit by taxing banks' excess reserves at the central bank and, in fine, at supporting growth. The larger the loan, the more visible the effects of a lower interest rate are (Horvath et al., 2018).

Another of the impacts of the NIRP on the real economy is the fact that the zero interest rate limit prevents the safe asset market from being accounted for, which may result in the need to decrease production in order to adjust demand to supply (Caballero & Farhi, 2017).

Gatnar (2019a) believes that negative interest rates are a problem as they encourage debt and discourage saving. It should be emphasized that negative interest rates reduce the costs of loans for business entities and households, thus creating demand for them. On the other hand, long-term saving allows for building capital that can then be invested. The accumulated assets can be a source of capital which, in the event of retirement, will become a source of income.

It is worth noting that in the event of negative interest rates, it is mainly debtors that benefit because they can earn from their debt. An interesting phenomenon is the occurrence of negative mortgage interest rates in the face of negative interest rates, which means that the bank-lender pays the borrower to take the loan (Osborne, 2020). Therefore, it is possible to obtain a dual source of income from real estate investments. First, when buying a property, an investor takes out a mortgage which is partially repaid by the lender at the time of negative interest rates. Secondly, positive inflation means that the real mortgage is worth less and less due to the falling value of money. However, the second potential source of income from investment in real estate is the possibility of renting it for a fee.

3. DISCUSSION

The main effect of the policy of negative interest rates is their negative impact on the stability of the banking sector in Europe and in the world. Limiting the returns on savings and creating the borrowing capacity of institutions with low credibility causes consumption to increase, and therefore increases the circulation of money and inflation, with the simultaneous risk of insolvency of borrowers. When inflation is higher than desired, with the simultaneous bankruptcy of indebted entities, the banking sector may become illiquid and this may cause an economic domino effect, analogous to the one that formed the basis of the crisis of 2007–2009.

Banks offer their clients benefits not only in the form of interest. As institutions of public trust, they owe their status primarily to ensuring the security of the funds deposited. In addition, transactions made through banking services are quick and convenient. Storing cash, especially

a larger amount, involves the cost of security measures against theft or damage, i.e. the cost of installing a safe, monitoring, insurance, etc.

People who act rationally decide to keep less cash in banks when high inflation is expected and the interest on the funds in the account is low. Therefore, they reduce their deposits, which results in a reduction in the money supply in the banking sector. As a result, nominal bank lending rates must rise more than the expected rise in inflation for the profit-maximizing banks to break even. Under the NIRP, the conventionally defined real interest rate (nominal interest rate \approx real interest rate + inflation) tends to overestimate the real interest rate level (namely, the real interest rate may be more negative than the traditional Fisher rule suggests).

Some of the research studies suggest that monetary policy can still be effective at the zero lower bound (Swanson, 2018; Czudaj, 2020). Lilley and Rogoff (2019) emphasize that in the face of negative interest rates, protective tools should be implemented to prevent them from being transferred to retail clients who have small bank deposits. An interesting approach is that the central bank may legally require large corporations to keep cash, savings and loans in the banking system once the NIRP is implemented (Reinbold & Wen, 2017). Similar requirements can be imposed on commercial banks that deposit cash with a central bank.

Many authors emphasize that too little time has passed since the NIRP was first implemented. Therefore, analyses of its effects upon the economy can at best be defined in the short term. As presented in the study, the state of the art is largely based on exploratory research that deals with the NIRP impact and focuses mainly on describing the behavior of market entities in the reality of negative interest rates. The first area to expand research is the identification of long-term NIRP effects.

Another area to be analyzed is the determination of the level of financial knowledge of citizens regarding issues related to interest, especially in the area of negative interest rates. Next, the potential impact on the purchasing behavior of consumers should be identified. Does the NIRP increase consumption? Does society save in the face of NIRP? If so, what are the ways to save? It would also be worth taking into account the culture of a given country.

In addition, it is worth carrying out simulations that take into account the variant of deepening interest rates. Therefore, it would be possible to check how economic agents will behave when interest rates reach, for example, 5%, 10% and 20%. Is there a limit below which there are only losses and what is the limit?

It should be noted that the research disrupting factor is the outbreak of the coronavirus pandemic, the effects of which are visible both in the real and financial spheres. Unfortunately, the pandemic causes changes in the behavior of all economic operators, making it difficult to determine ex-post effects of COVID-19. Thus, it cannot be inferred that the behavior would have been the same prior to the pandemic and that it is impossible to apply the ceteris paribus clause when treating the long-term impact as a continuous process. Moreover, the specter of the financial crisis as a potential pandemic effect has prompted central banks around the world to implement a number of preventive measures. The simultaneous use of many monetary policy instruments effectively disrupts the research process on the separate impact of the NIRP on the economy.

4. CONCLUSIONS

The implementation of the NIRP was associated with great uncertainty as it impacts the entire economy. Although several years have passed since the implementation of the NIRP, the effects on the economy cannot be clearly assessed. Interest rates, despite being negative, are still close to zero. Some, as pointed out in the study, argue that their mechanism of influence is similar to that of positive interest rates. Moreover, the long-term consequences of their application and a further

reduction in their level are unpredictable. In addition, the research conducted so far has not given any clear answers when it comes to the impact of interest rates in the short term.

Negative interest rates are seen as a stimulus to the economy. However, they do not have to be the only factor causing this. Therefore, carrying out analyses concerning this area is very difficult, and their results cannot be clearly interpreted. Moreover, the *ceteris paribus* model assumption, facilitating the evaluation of the conducted research, cannot be used for several reasons. The first one is the fact that when the negative interest rate changes (regardless of the size), the behavior of market players is unknown. Second, too many factors can shape the economic situation, including the economic impact on countries with positive interest rates. The third reason is that the impact of the applied forward guidance policy may disrupt the sudden reaction of economic agents to changes in the negative interest rate. The fourth reason is the complexity of monetary policy instruments that can be used simultaneously.

Negative nominal interest rates, by definition, generate a loss in the absence of inflation. The higher the inflation, the lower the real interest rate, and with negative nominal interest rates, it is even lower. Therefore, securities that are perceived as safe and with negative interest cannot be invested in, *inter alia*, pension funds. Moreover, they are no longer attractive at all because it is better to hold cash than to invest in an instrument that will make a loss. On the other hand, it is an opportunity for governments because they are able to issue government bonds with negative interest rates and thus finance public debt if the demand side wishes to purchase them. However, cheap public debt cost creates a fear of over-indebtedness and can be a cause of financial instability in a country.

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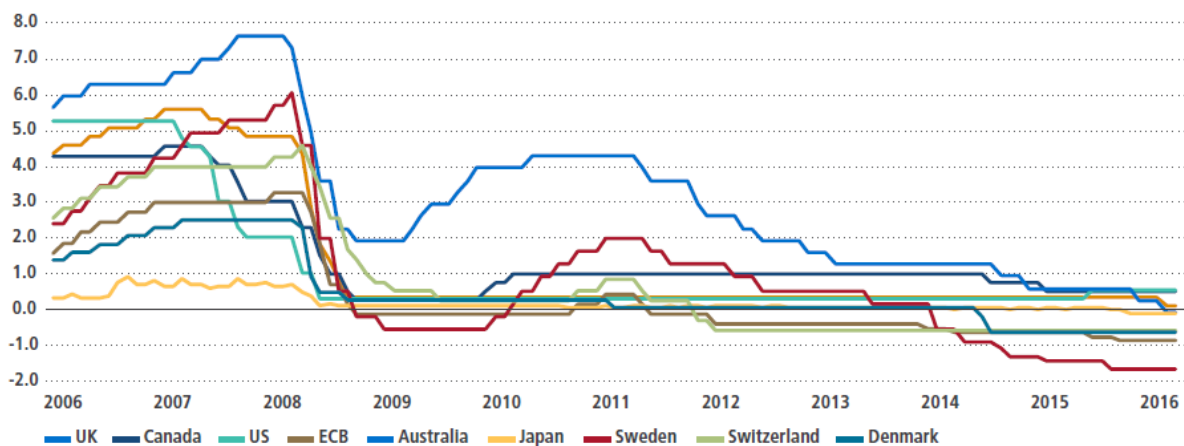
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APPENDIX

It is extremely difficult for a person who lacks knowledge of economics and finance, especially the transmission channels of interest rate effects, to understand the economic situation caused by the implementation of negative nominal interest rates. A better understanding of the policy of negative interest rates and the whole picture of the impact of the internationalization of the financial market is possible by analyzing the time series of the interest rates of central banks that have decided to go beyond the zero bound in their history. It is particularly important to take into account the period before the financial crisis of 2007–2009 (see Figure 1).

Figure 1

Interest rates of selected central banks in the period 2006–2016



Source: <https://www.pimco.no/en-no/resources/education/investing-in-a-negative-interest-rate-world/> (access: 9.10.2021).

It is true that this chart does not take into account the recent years but it perfectly illustrates the genesis of implementing negative interest rates in practice. Central banks in the face of the financial crisis drastically cut interest rates down to levels close to zero, and the bank of Sweden was the first to cross this bound.

Figure 1 shows another interesting relationship – the higher the interest rates are during economic prosperity, the greater the possibility of lowering them when a crisis occurs. The reduction in interest rates is intended to stimulate the economy in terms of increasing consumption. The larger it is, the greater the expected results are. When interest rates are low and their cut may shake the economy, the policy of shaping the expectations of market participants becomes more important.