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IMPLICATIONS AND CHALLENGES OF NEGATIVE INTEREST RATES

Inda Mulaahmetović,
Master of Advanced Financial Management,
Faculty of Economics and Business, University of Sarajevo
Bosnia and Herzegovina
inda.mulaahmetovic @gmail.com

Abstract

The main task of this scientific paper will be to explain how, why, and in which circumstances negative interest rates occur, as well as to discuss implications and challenges, that these interest rates bring with themselves. Research on the efficacy of Negative Interest Rate Policy, based on real historical examples of introducing this measure will be conducted. Key domestic financial research variables and its' movements before and after NIRP introduction, including GDP, unemployment, inflation, the evolution of money market, deposit and lending interest rates, and bond yields will be compared in this section, for five countries that introduced NIRP (Sweden, Switzerland, Denmark, Japan, Hungary), as well as for Euro Area. Another variable relevant for this research will be banking sector performance. Although it might seem as a strange and an illogical occurrence, negative interest rates occasionally happen in the world of finance, tailored by financial experts from central banks.

Key words: interest rates, Negative Interest Rates Policy (NIRP), zero-lower bound, central banks, implications, challenges, GDP, unemployment, inflation, the evolution of money market, deposit and lending interest rates, and bond yields

I. INTRODUCTION

INTEREST RATES AND NEGATIVE INTEREST RATES EXPLAINED

According to the iLibrary of the Organisation for Economic Cooperation and Development (OECD), ***interest rates*** represent "*the price paid by the borrower for the use of funds saved by the lender and the compensation to the lender for deferring expenditures*" (OECD iLibrary, 2021). The stated relation consists of two main parts: first part is a payment which is same to the deprivation of purchasing ability of the principal, during the period of time in which loan is active, as well as a second part, which is the actual interest belonging to the lender. These principles are not prolonged to the rate-determination domain, considering to the fact that rates are the subject of change as a consequence of inflation, as well as the consequence of various other impacts, what includes:

- characteristics of transaction (amount, purpose, time)
- extent to which a person or company is considered suitable to receive financial credit
- the collateral and other types of guarantee
- laws

Simpler terms, the interest rate is a price of credit, led by the credit supply and demand. The capability of credit supply partially affects the interest rate level. The interest rate is determined by the governing rules of supply and demand, in two possible ways:

1. ***Net***: regarding new credit
2. ***Gross***: regarding old credits

The ability of specific group of people during a specific period to build their possession of different cases and different sorts of resources, less the readiness of others to lower their comparing possessions, creates the supply curves for the various types of new credit during the period. Normally, it is the amount every individual is eager to flexibly rely upon the premium rates. The plans are in the idea of elective buy and deals plans. Likewise, the complete supply of new cases, less the decrease in the remarkable volume of old one, creates the demand for different loans. The costs fixed available for these various cases, together with their interest rates, are administered by this level of demand and supply (Maynard Keynes, 1937). As a consequence of the global financial crisis, including historically earlier crises, then 1973 OPEC Oil Crisis, Asian Crisis of 1997–1998, the 2007-2008 Global Financial Crisis, as well as the global economic crisis caused by COVID-19 pandemic, central banks cut nominal interest rates in an aggressive manner. These interest rates are cut to zero, or close, what is called the ***zero lower bound*** (International Monetary Fund, 2021). Considering to the fact that financial and monetary operations can go above or below zero, same happens with the interest rates. Negative interest rates have an economy-stimulating effect, because they induce both individual investors and companies to invest more financial assets, instead of holding it in a bank account. In such circumstances, in a bank account, money could be affected by inflation. However, as always, there is an incertitude and several risks, related to investing during the time of negative interest rates. The problem of zero lower bound is designed by a specific intervention a government has to undertake: the provision of currency in its physical form-storing a value which is not able to provide any interest rate, in that form (Kocherlakota, 2017).

The answer to the question whether interest rates can be negative, is positive. Yes, interest rates can be negative. Negative interest rates exist in an "away from appropriate banking circumstances". When a client is holding cash in a bank account, as a deposit, that client is paying bank to hold onto a cash, instead of bank paying positive interest rate on deposited money. Bank charges "storage fee". Basically, client's cash is a subject of negative interest rate, what means a loss. Negative interest rates do not occur on its own: a central bank determines them. As a consequence of negative interest rates policy, an owner of a deposit should be worried not about return ON capital, but, actually, about the return OF capital. ***Negative interest rates*** are defined as interest rates that go under 0 percent, originating from two different perspectives going

negative: bond's yields, and Treasury securities. In addition, country's funds rate can go negative. The cost of borrowing money determines other economical rates. When central bank of a country decides to raise the interest rates, taking a loan gets more expensive, what can partially slow down whole country's economy. On the other hand, as soon as central bank of a country brings decision of lowering interest rates, taking out a loan gets less costly, accelerating the economy and giving it larger possibilities of an advancement. Sometimes, negative interest rates are called black holes of financial capitalism.
This proposal will address following questions:

- What triggered the introduction of Negative Interest Rates Policy?
- What central banks tried to accelerate their economies, after the global financial crisis (2007-2008), by using NIRP?
- What are implications of NIRP?
- What are challenges of NIRP?
- Have the specific goals of NIRP been accomplished, according to financial indicators?

1.1 NIRP Assumptions and Problem Statement

In terms of negative interest rates, it was assumed that the transmission instruments will keep on working as before. Moreover, longer period of time of negative interest rates policy was restricted to the Eurozone and neighbouring economies. The initiation of decently negative approach rates by the national banks was accomplished inside their current economic and financial structures. The assumption is that negative rates are placed to currency market rates similarly as positive ones, what likewise created the impression that they are designed to be longer-development and higher-hazard rates, in spite of the fact that this evaluation is obscured by the effect of correlative financial strategy measures. Macroeconomic principles hypothesize the tight relationship between saving and investment, in which a part of saved, disposable income is further utilized in certain period of time, with the purpose of investing. Zero lower bound policy (ZIRP) and negative interest rates policy (NIRP) question the foundations of these macroeconomic principles, because there is a fee on money saved in accounts, with an aim to force consumption because of economic growth simulation. This economic growth could be for a limited period of time, in limited amount, as well as through various economic segments, but periodically this economic growth could unevenly groove into specific economic fields. Therefore, it can be assumed that:

- NIRPs could adversely affect the economy
- NIRP could potentially increase the inflation rate of an adopter country
- Negative interest rates could cause banks to pass the reduction of interest rates to at least part of their deposit structure
- NIRP could bring significant earning to commercial banks, where holding a deposit costs a client

1.2 Research Gap

There is no a clean laboratory in which we can study monetary policy**.** Identifying exogenous changes in monetary policy is difficult, while identification of exogenous changes regarding NIRP is even more difficult. In the world of finance, there is a debate about NIRPs effectiveness, whether it accelerates, to what degree it accelerates the economy, and are there counterbalance effects. Measuring the results of NIRP represents a difficult process, because, this policy has usually been implemented in combination with other policies, as ***quantitative easing*** (an unconventional monetary policy according to which a central bank buys a large amount government bonds, or some other financial assets, with an aim of injecting money into the system and expanding economic activity), and during the times of inflation and weak economic growth (Krisch, Zhiang, 2021). Therefore, it is difficult to define if the economy would perform even weaker, without the introduction of NIRP. Consequently, it is an empirical question is zero lower bound, actually, represents a black hole of uncertainty, breaking the economic laws, or it can serve in terms of a usual economic activity. Hence, limited experience of Negative Interest Rate Policies and data availability have prevented researchers from answering the stated question (Altavilla, Burlon, Giannetti, Holton, 2019).

II. LITERATURE REVIEW

As Basten and Mariathasan state in their research paper "How Banks Respond to Negative Interest Rates: Evidence from the Swiss Exemption Threshold", negative interest rates have long been considered impossible (Basten, Mariathasan, 2018). However, history has shown the opposite. For the purpose of writing this research article, a large number of relevant sources, including journal articles from economic journals (i.e. The Economic Journal - Royal Economic Society), databases of international organizations (International Monetary Fund, World Bank Data, Bloomberg, European Central Bank), has been taken into consideration for collecting important information to write this proposal. The article "Alternative Theories of the Rate of Interest", written by an English economist John Maynard Keynes, whose ideas fundamentally changed the theory and practice of macroeconomics and the economic policies of governments, serves as an excellent base for the interest rates and negative interest rates discussion, since it describes the general concept of interest rates, and how they function. "Negative Interest Rate Policy (NIRP): Implications for Monetary Transmission and Bank Profitability in the Euro Area", published in International Monetary Fund Working Papers, within eLIBRARY, by authors Andreas Jobst and Ms. Huidan Huidan Lin, represents an excellently-constructed collection of statistical data, tables and figures, relevant for this research, because it units data from different relevant sources, including European Central Bank, Sveriges Riksbank, Danmarks Nationalbank and other. As Eisenschmidt and Smets state in their paper "Negative Interest Rates: Lessons from the Euro Area", "the ECB's decision to cut rates below zero was solely motivated by the desire to provide further monetary easing to the economy in response to emerging deflation risks (Eisenschmidt, Smets, 2018)". Additionally, publication of European Central Bank, Economic Bulletin, Issue 3/2020, was used for the purposes of obtaining relevant data and enriching this paper, and it serves as an update of economic and monetary developments in Euro Area. Policy Research Working Paper "Negative Interest Rate Policies: Sources and Implications", written by

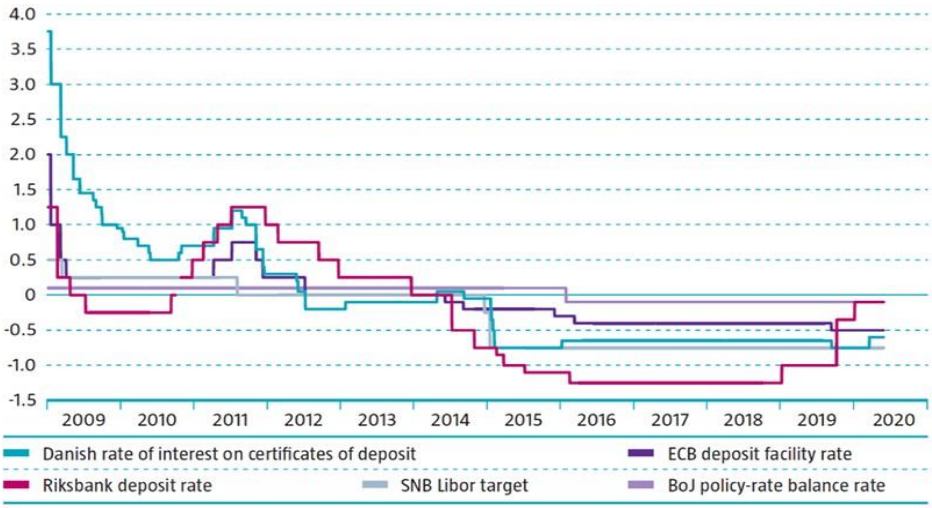
Carlos Arteta, M. Ayhan Kose, Marc Stocker and Temel Taskin, published by Development Economics, Development Prospects Group of World Bank Group in August 2016, contributes to providing an open access to research and makes a contribution to development policy discussions around the world, regarding NIRP Policies, which is also the purpose of Policy Research Working Papers. As the author of the scientific paper "The Future of the Zero Lower Bound Problem", Narayana Kocherlakota recommends, the government should eliminate physical currency (Kocherlakota, 2017). However, it is arguable how would such decision be (un)accepted by citizens, especially older people, who do not even have bank accounts, who are not using mobile banking etc., but waiting for a postman to bring them their pension. The author suggests that people may have an account in the central bank, which could implement the interest rates policy directly, without intermediaries. However, this would create an enormous amount of work for the central bank, overwhelm it and its employees, and could potentially imperil the existence of commercial banks. Theoretical background and hypotheses explanations include systematically breaking down the relevant literature into its composing elements, followed by the results, discussion and conclusion which are strongly connected to previously identified hypothesis, supported by relevant, referenced literature. Considering all literature, listed in References, we can conclude that the author's paper "*Implications and Challenges of Negative Interest Rates*" is generally consistent with historical events and previous literature, seeking to deepen the future of this subject and it's potential in the future.

III. THEORETICAL BACKGROUND AND HYPOTHESES

In this section, the elements that will lead to the hypotheses and research material will be explained. The period after the global financial crisis of 2007-2008 brought the interest rates policy close to zero. At that point of time, few central banks have led into different approaches to supply extra money. The decision of moving interest rates below zero lower bound, made by by five central banks-Danmarks Nationalbank (DN), the European Central Bank (ECB), the Swiss National Bank (SNB), Sveriges Riksbank, the Bank of Japan (BoJ), was triggered by a willing to accelerate the economy. The inspirations behind the choices contrasted to some degree over locales, driving to contrasts in approach execution. Four central banks in Europe kept their arrangement rates underneath zero for more than one year, centering only on the specialized angles of the implementation of negative interest rates policy, their effect on the money market, and consequences to the other interest rates. One of the first central banks that used the negative interest rates strategy was the oldest central bank in the world, Sveriges Riksbank (Sweden). This happened in 2009, when Riksbank informed the public it would start charging banks for holding deposits. Three years later, the central bank of Denmark brought its interest rates policy below the value of zero, or under the zero lower bound. The European Central Bank (ECB), in June 2014, encouraged by the procedure undertaken by Denmarks Nationalbank (DN), was the first major central bank, which decided to turn its policy rate into negative. It was done effectively, as a consequence of macroeconomic triggers. Consequently, inflation was brought back to the European Central Bank's price stability range, which is below, but near to, two percent over the medium term (Jobst, Lin, 2016). Staying above zero lower bound meant that if inflation stays low, real rates do not have a capacity of dropping anymore, in order of obtaining aggregate demand

support and reduction of high debts. The following figure shows the level of interest rate of five economies, before, during and after entering negative territory, during the period 2009-2020:

FIGURE 1: Policy-rates of five NIRP-adopter countries (Vliet, 2020)



Source: Robeco

Although the European Central Bank, the Swiss National Bank, Danmarks Nationalbank and Sveriges Riksbank led into negative interest rates policy at the similar periods of time, in 2014 and 2015, their reasons for such an act were slightly different. One common reason was a challenging macroeconomic environment. Other reasons and focuses were currency appreciation, fighting a "hidden" inflation, restrictions on exchange rates. The European Central Bank, the central bank of the European Union countries that have adopted the euro, introduced the negative interest rate in June 2014, in order to support the strong tying down of medium to long-term possible inflation outcomes. Sveriges Riksbank was encouraged to introduce negative interest rates policy, by the similar reasons. This bank did it at the beginning of 2015, in order to ensure the role of the inflation goal as a nominal anchor for pricing and forming wages. In both cases, negative interest rates policy supplemented other measures. The European Central Bank continued its buys of secured bonds and extended its resource buying program to incorporate government bonds. In addition, banks were offered term-funding options. In the 2016, Sveriges Riksbank started purchasing bond that were set to cover about thirty percent of outstanding nominal bods of the government. As a consequence of monetary easing measurements, the Swiss franc appreciated. The Swiss National Bank had to introduce a floor, in relation to the euro. With the aim of maintaining that floor, the Swiss National Bank introduced negative interest rates, amounting -0.25%. Negative interest rates were applied to deposit accounts in the end of 2014, and became effective in January 2015. In the same month, negative interest rates were shifted to -0.75%, in order to minimize capital inflows, what should cause monetary tightening and the appreciation of domestic currency. The Swiss National Bank kept accumulating foreign exchange reserves until the second half of 2015, because of the continued stress on domestic currency - Swiss franc (Bech, Malkhozov, 2016). Table 1 shows

an overview of central banks with negative interest rate policies, including FX regime of a central bank, objective of introducing negative interest rates, policy rates, and date of introduction:

TABLE 1: Overview of central banks with negative policy rates (Jobst, Lin, 2016)

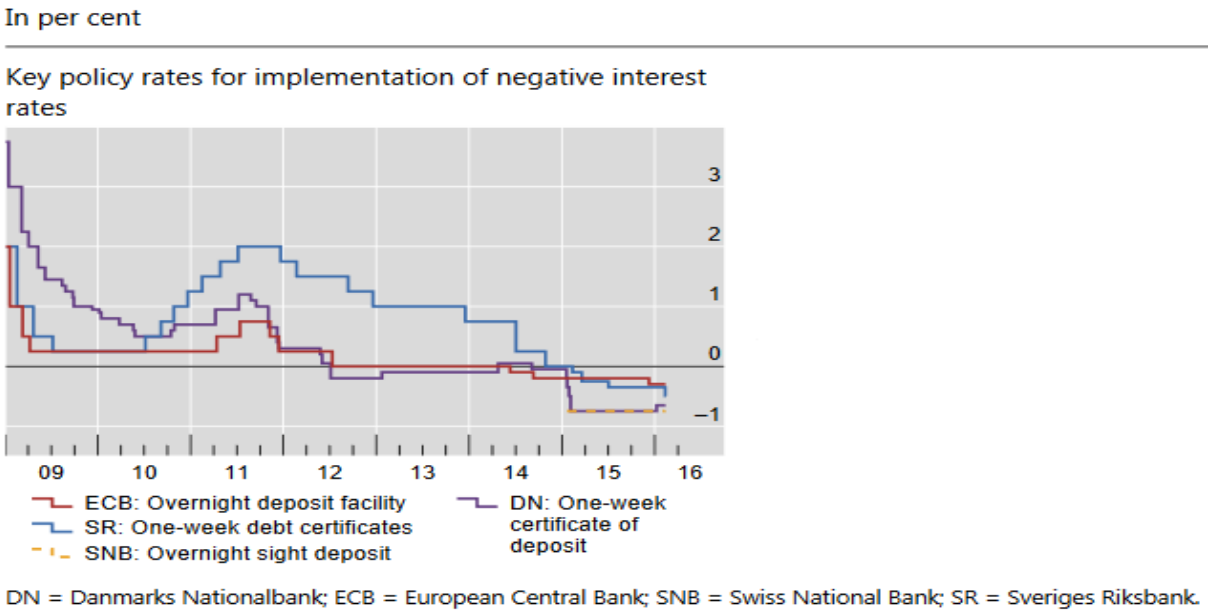
			Policy Rates *(in basis points)* 1/			
	FX regime	**Objective**	Overnight Lending 2/	Open Market Operations	Deposit Facility	**Date of Introduction**
Denmark	Conventional peg (to euro)	Countering safe-haven inflows and exchange rate pressures	5	0	-65	July 2012-April 2014, Sept. 2014
Euro Area	Free floating, inflation-targeting framework	Price stability and anchoring inflation expectations	25	0	-40	June 11, 2014
Hungary	Floating, inflation-targeting framework	Price stability and countering exchange rate pressures	115	90	-5	March 23, 2014
Japan	Free floating, inflation-targeting framework	Price stability and anchoring inflation expectations	10	0	-10	Feb. 16, 2016
Norway	Free floating, inflation-targeting framework	Price stability 3/	150	50	-50	Sept. 24, 2015
Sweden	Free floating, inflation-targeting framework	Price stability and anchoring inflation expectations	25	-50	-125	Feb. 12, 2015
Switzerland	Free floating 4/	Reducing appreciation and deflationary pressures 5/	50	n.a.	-75	Jan. 15, 2015

Source: IMF

The European Central bank moved into negative territory with the cut on deposit rate to negative 10 points. Danmarks Nationalbank acted according to similar rules, in September 2014, when it cut deposit rate from positive 5, to negative 5. Three months later, the Swiss National Bank followed the procedure, when it introduced negative -25 points. The rule started applying in January 2015. Sveriges Riksbank lowered its repo rate at the beginning of 2015. In Japan, negative interest rates were introduced a year later, when the Bank of Japan introduced negative rate of -10 points. European central banks moved forward into a negative policy, when the European central bank dropped the rate to negative 20 points in September 2014, and negative 30 points in December 2016. Afterwards, the Swiss National bank moved to negative 50 points in January 2015. Considering to the fact that Danish krone was under a pressure of appreciation, Danmarks National bank moved to negative 75 points in February 2015, on deposits. One year later, rate was changed to -65 points. Sveriges Riksbank continued dropping its' rate: -25, -35 and -50 points were being effective, with the last one set in February 2016. For Sweden, this was not first meet

with negative interest policy rates: they introduced negative policy rates in 2009-2010, shortly after the global financial crisis, when the repo rate was cut up to negative 25 points, as well as deposit rate (to the same negative level). The period from mid-2012 to April 2014 was marked by negative certificate of deposit rates in Denmark. The following graph, designed for the period from mid-2014 to early 2015, shows the cut of key policy rated below zero, executed by national central banks:

FIGURE 2: Key policy rates for implementation of negative interest rates (Bech, Malkhozov, 2016)



Source: BIS Quarterly Review, March 2016

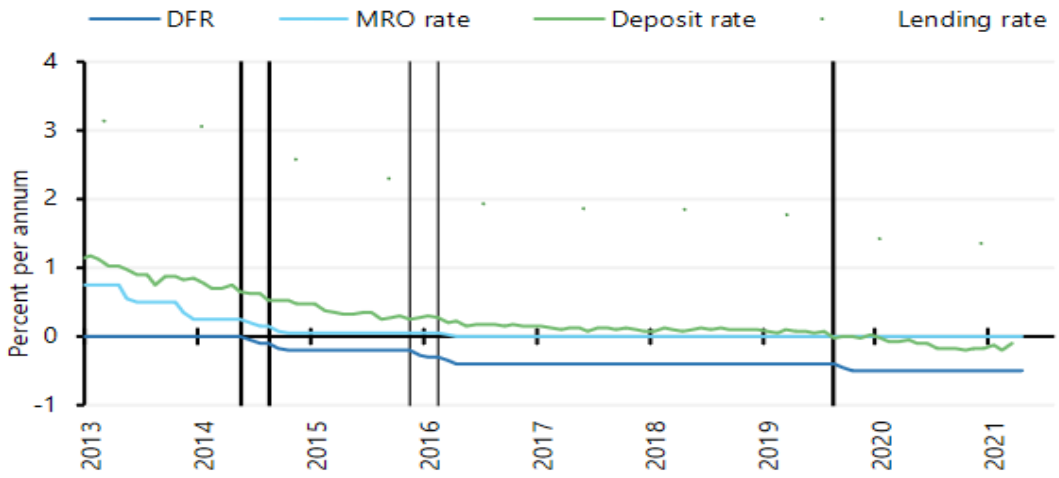
In the period of COVID-19 pandemic crisis, NIRP reappears: Chinese government issued a debt with a negative interest rate, selling bonds, known as the "Chinese sale". This type of sale is caused by plunging western economy. The amount of final orders of Chinese bonds reached about 16 billion euros for the 4 billion worth of bonds which are offered. As an additional circumstance, five-years debt was included. The debt had a price with a negative yield, amounting minus 0.152%. Also, ten and fifteen-years bonds had yields that are lower than 1 percent (Bankrate, 2020).

3.1 Negative Interest Rates: Implications

In the example of European Central Bank, negative interest rates that were set up in 2014, reduced bank funding costs, and started stimulating loan supply. Lower costs of funding in the area affected by this decision helped banks to maintain intermediation margins. In addition, average funding composition was created. Negative interest rates share few basic easing characteristics of a usual cut of an interest rate. This could be noticed in bank funding and lending rates,

compared to the negative Deposit Facility Rate. The described scenario can be seen in the following figure:

FIGURE 3: Developments in policy rates, bank funding costs and bank lending rates (Boucinha, Burlon, 2020)



Source: European Central Bank

Taking into account the above stated, following hypothesis has been proposed for this study:
H1: Longer the negative interest rates prevail, deposits relying banks pass the reduction of interest rates to at least part of deposit structure.
The negative interest rates policy, known as NIRP, should be used as a last acceptable option, after all other options have been tried. This policy would stimulate borrowing, encourage lending, lower the amount of savings, as well as encourage investments. Following this logic, we come to the second hypothesis:
H2: NIRP results in a money bringing scenario for a bank, where holding a deposit costs a client.
There are ***six main implications*** of Negative Interest Rates Policy, according to the Corporate Finance Institute:

- ***Stimulation of borrowing by individuals and companies***

In a case in which individuals or companies are taking out loans without being indebted, they should be motivated to borrow and invest. In the case of active NIRP, both individuals and investors should not even think twice about taking a loan, because they are getting a specific amount of a return. This leads us to the next hypothesis:
H2.1 NIRP motivates individuals or companies to invest.

- ***Encouraging banks to lend more openly***

Considering to the fact that banks will be affected by negative interest rates policy at the point of time when depositing funds to the central bank of their country, they are also encouraged to lend.

Since the central bank is willing to monetize holding the funds, commercial banks should lend them, as a more favourable substitute. In addition, commercial banks could analyse their clients and choose to refuse lending the money, as a result of client's creditworthiness. In NIRP circumstances, it is more possible they will accept loan applicants. This leads us to the next hypothesis:
H2.2 NIRP encourages banks to lend more openly.

- ***Savings decrease***

Considering to the fact that deposit accounts will be a subject of charging negative interest rate, saving is not recommended. Therefore, it is better to put money into circulation-to invest it somewhere else. This leads us to the next hypothesis:
H2.3 NIRP leads to a decrease in savings.

- ***Expenditures increase***

It is expected that expenditures increase, because individuals and companies are willing to keep less money, and to invest, what can accelerate the whole economy, if there are many such investments. This leads us to the next hypothesis:
H2.4 NIRP leads to an increase in expenditures.

- ***Investment increase***

Investments should be a subject of an increase, as a consequence of the relaxed credit circumstances. This leads us to the next hypothesis:
H2.5 NIRP leads to an increase in investments.

- ***Combat deflation***

NIRP is a powerful tool, which can be used to lower the value of country's currency and make it unattractive, when compared to other currencies. This can be a double-edged sword. In the case of weakening currency, exports have a tendency of becoming less valuable. In addition, inflation rate could increase, because of higher costs of importing (Corporate Finance Institute, 2021).
H2.6 NIRP could lead to an increase of inflation rate.

Overall, all stated implications should lower the deflation, increase demand and accelerate the economy. Although it is very powerful, NIRP should be used as a last tool, when no other tools work, or have an extremely low outcome.

3.2 Negative Interest Rates: Challenges

There are ***four main challenges***, or ***potential consequences*** of Negative Interest Rates Policy, according to the Corporate Finance Institute:

- ***Managing bank***

NIRP environment could influence bank's clients to go to banks and withdraw the money from their accounts. Considering to the fact they would have to pay a fee to save money in a bank account, they would not have a reason of holding it there. This could significantly endanger the

banking system and managing bank with lack of deposits would be very challenging and could lead to a potential failure and bankruptcy. This leads us to the next hypothesis:
H3: Having and holding a physical money would be cheaper option for clients.

- ***Money hoarding***

In the case when individuals and companies are charged for depositing their money, a guarantee they will take it and invest it does not exist. They may keep storing the money where it currently is. During unfavourable economic circumstances, people may think it is the best to keep the money where they are, not spending it, while waiting for a better and more economically favourable times to come. This scenario would cause low economic activity, what is not the sense of NIRP. This leads us to the next hypothesis:
H3.1 Money hoarding causes low economic activity, which is in contrary to NIRP principles.

- ***Lower bank profitability***

At the period of time while banks are facing negative interest rates, capital base of profitability is lowered. Therefore, lending does not happen in a free manner. As opposed to the lending stimulation, negative interest rates may discourage it. Economic rules always have exceptions. This leads us to the next hypothesis:
H3.2 NIRP may lower bank profitability.

- ***Disruption of money market funds***

Yields of money markets have a tendency of going negative, when interest rates are negative. The large disruption can be caused by NIRP (Corporate Finance Institute, 2021). This leads us to the next hypothesis:
H3.3 NIRP may cause disruption of money market funds.

IV. RESEARCH METHODS

Comparative analysis if finance, conducted in this study, identifies financial performance of an organization. Income statements identify financial parameters, that involve income, expenses, and profit over specific period of time. Report which comes as a results of comparative analysis identifies points of meeting or exceeding budgets, as well as points of good or bad financial performance. When observed not at the level of a company, but at the macro level, comparative analysis if finance can be used to compare financial variables of a country, such as GDP, Interest Rate, Inflation, Exchange Rate, Money Supply, Stock Market Index, Balance on Payments, Economic Growth, Employment, Public Expenditures, Overall Taxes, Private Consumption, Savings and Investments, Balance of Payments (Exports and Imports) and many others. A case study represents study of a specific subject, such as a person, group, event, country, place, organization, or phenomenon, and this type of analysis is used for the purposes of the research.

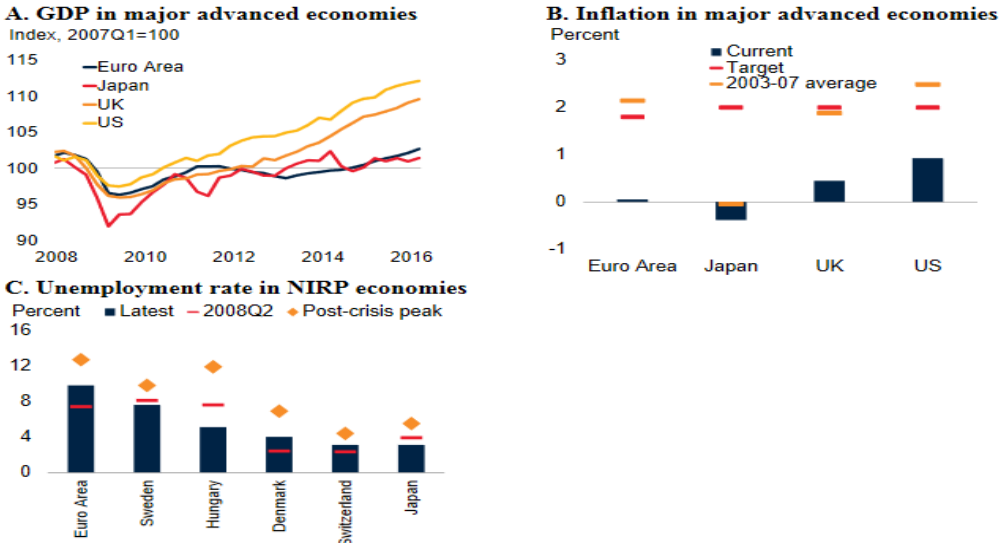
Key domestic financial research variables and its movements before and after NIRP introduction, including ***GDP, unemployment, inflation, the evolution of money market, deposit and lending interest rates,*** and ***bond yields*** will be compared in this section. Another variable relevant for this

research will be ***banking sector performance***. All variables will be provided for five countries that introduced NIRP (Sweden, Switzerland, Denmark, Japan, Hungary), as well as for Euro Area. Therefore, it is important to repeat NIRP introduction years for these introductory countries:

- Denmark: July 2012-April 2014; September 2014
- Hungary: March 23, 2014
- Euro Area: June 11, 2014
- Switzerland: January 15, 2015
- Sweden: February 12, 2015
- Japan: February 16, 2016

An effect of Negative Interest Rates Policy of ***GDP*** of NIRP adopter countries is showing positive growth trends, indicating that professionals have high level of trust in the NIRP, perceived as a new transmission tool of monetary policy, which has stimulating effect on the economy. However, according to findings of Czudaj, NIRP effect on GDP growth has not changed remarkably and is significantly different from zero at the 1% level (Czudaj, 2019). The effects NIRP had on inflation in 2016 are below the target, while the effects of NIRP on unemployment reached their post crisis peaks, and relatively stabilized in 2016, coming slightly above, or slightly under the target in different NIRP adopter countries. Rates substantially below zero for a protracted period of time could lead to greater risks of financial market disruptions. NIRP, as an unconventional monetary policy measures, could be the cause of spillover effects to emerging market and developing economies. These words can be corroborated with the following figure:

FIGURE 4: GDP, unemployment and inflation (Arteta, Kose, Stocker, Taskin, 2016)



Source: World Bank Group

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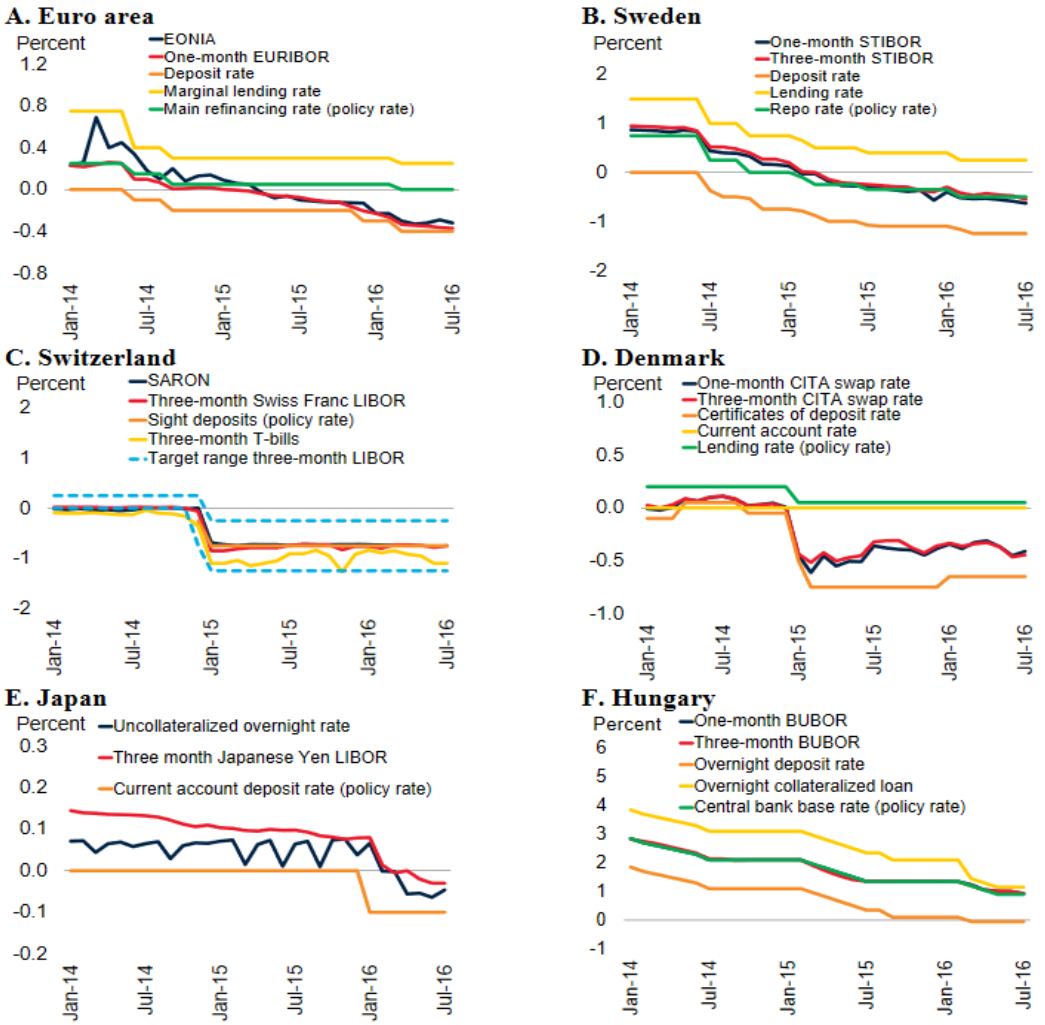
Policy rate cuts are expressed in analogous declines in money market rates. In line with expectations of effects similar to the effects of conventional monetary policy, the overnight, 1-month, and 3-month money market rates reached the level under zero lower bound after NIRP introduction in all economies (except in Hungary: deposit rate reduced to just negative 5 basis points). Short-term funding costs of large corporations, with an access to commercial papers and corporate bonds market, were reduced. Financial variable, ***the evolution of money market***, is shown in the next graph. Observing the overall situation, for the period from 2014 to 2016 (NIRP introduction period), significant decrease in EONIA, STRIBOR, SARON, CITA, LIBOR, BUBOR (the interest rates charged by banks, in a jurisdiction charge by one another, for short-term, interbank loans) can be noticed over years:

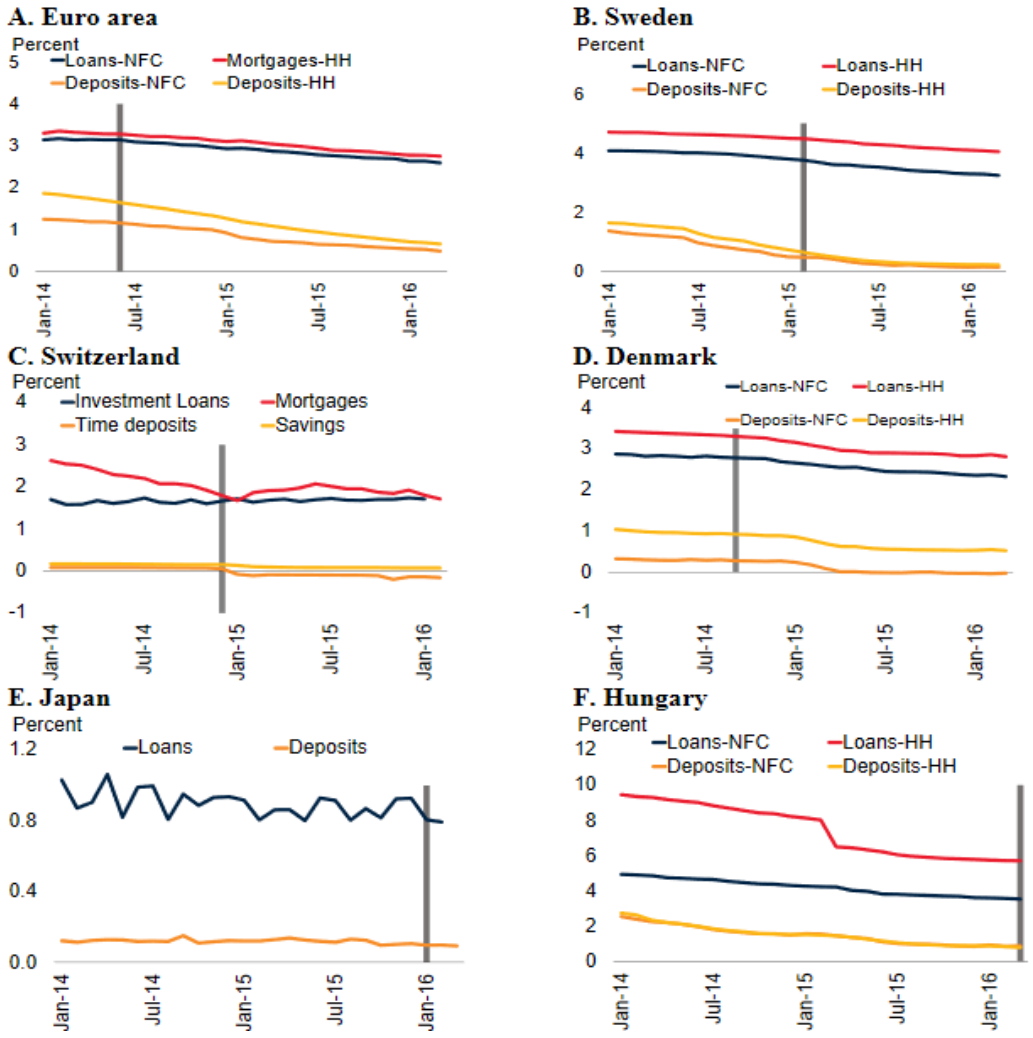
FIGURE 5: Policy and money market rates (Arteta, Kose, Stocker, Taskin, 2016)



Source: World Bank Group

Considering third financial variable, relevant for this research, ***deposit and lending interest rates***, we notice the presence of similar dropping trends. Banks with the higher reliance on retail deposits for funding have lower availability of reducing lending rates to corporations and households. Additionally, they also introduce increased fees in order to compensate for lower margins. However, in the largest number of cases, lending rates were a subject of a decline, as per NIRP. The decline in short-term lending rates exceeded the decline of policy and wholesale funding rates, in the Euro Area.

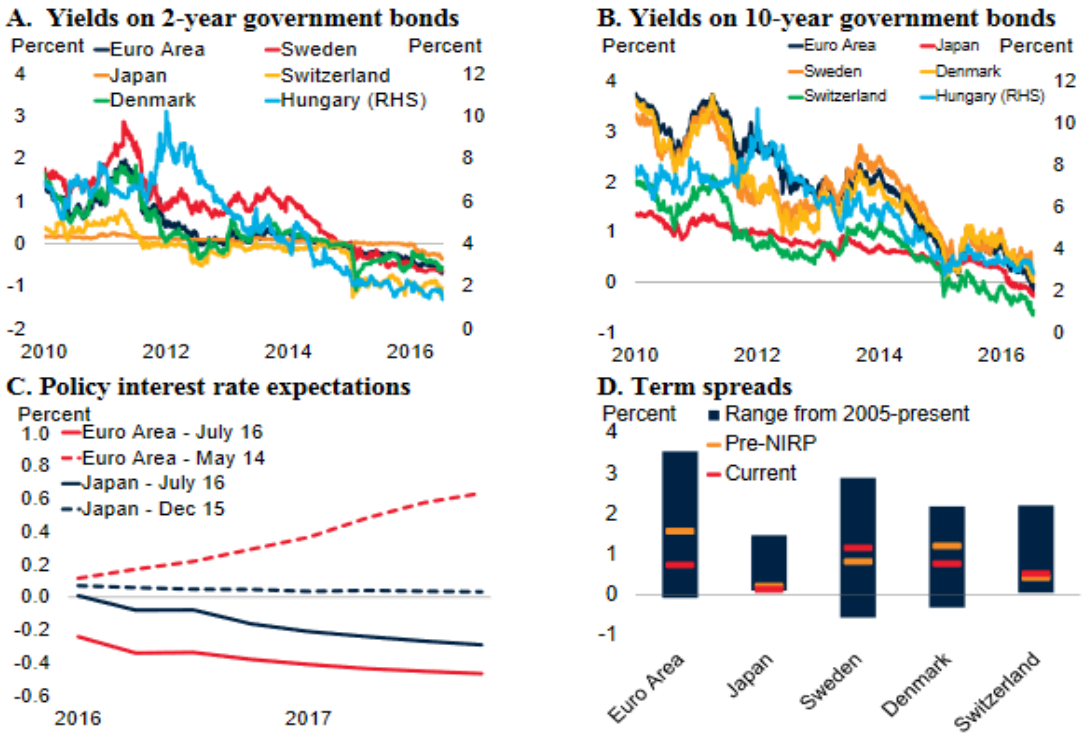
FIGURE 6: Deposit and lending rates (Arteta, Kose, Stocker, Taskin, 2016)



Source: World Bank Group

In overall, NIRP is connected with a downward shift in the yield curve. Considering next financial variable, relevant for this research, ***bond yields***, we can notice that government bond yields on short maturities appeared to be increasingly negative. About 40% of sovereign bonds with one to three-years maturities, had negative yields in June 2016, with the highest fraction of negative yielding bonds in Switzerland, then Japan and Germany. In Switzerland, sovereign debt up to 50-years maturity traded at negative yields in mid-2016, while Germany and Japan issued 10 year sovereign bonds yielding negative returns in 2016:

FIGURE 7: Bond yields, policy rate expectations and inflation (Arteta, Kose, Stocker, Taskin, 2016)



Source: World Bank Group

In terms of describing the last variable of this research, ***banking sector performance***, we can say that the profitability of banking sector depends on the general health of the economy, affecting both the volume of lending, as well as its quality. Reduction in non-performing loans and banks' capital reinforcement should make the yield curve steeper, based upon strengthening of the sector. Net income of large Euro Area banks has not been extremely affected, as a consequence of lower impairments and higher non-interest income, what is graphically shown in the next figure:

FIGURE 8: Banking sector performance (Arteta, Kose, Stocker, Taskin, 2016)

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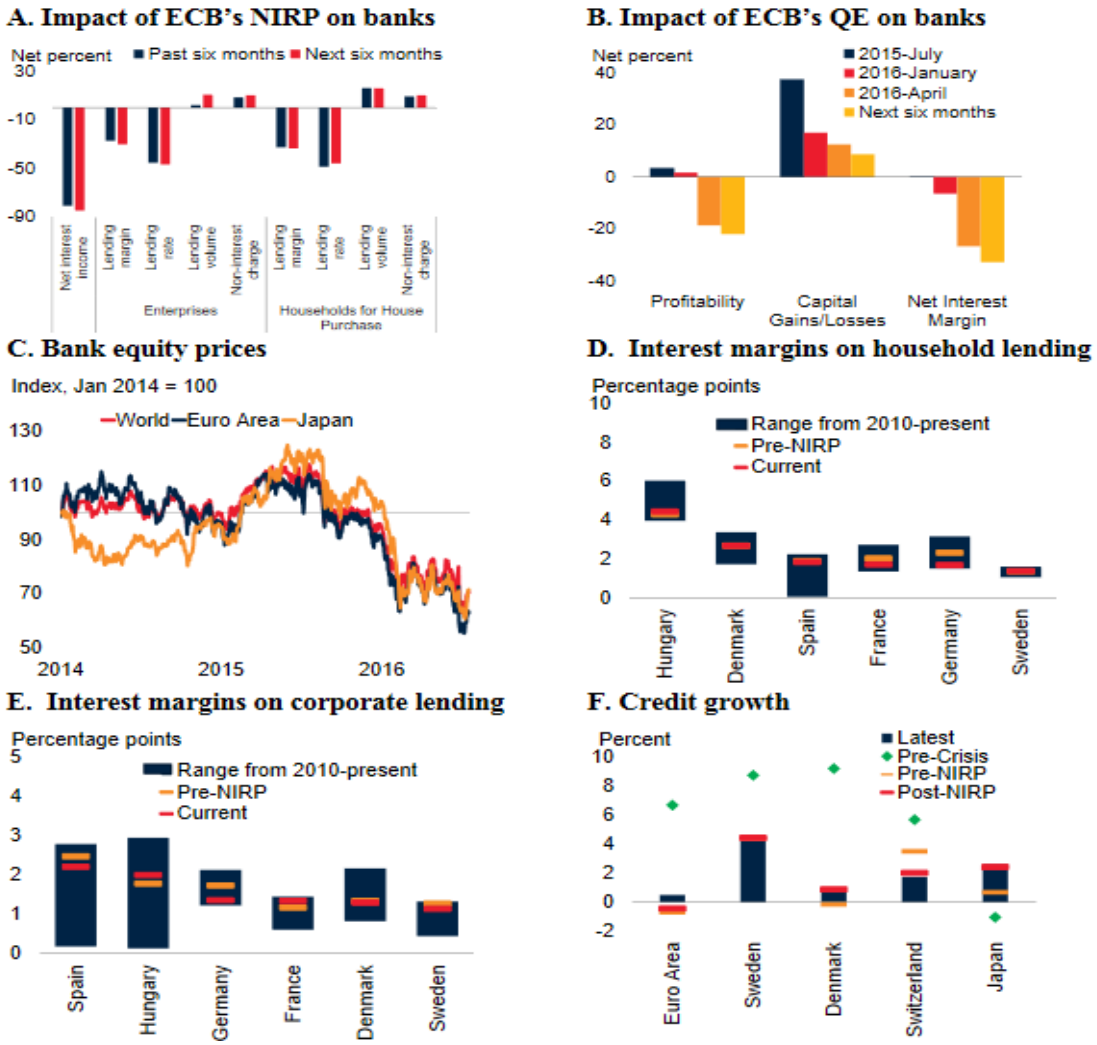

Source: World Bank Group

V. RESULTS

Specific goals of negative interest rates policy in all countries that introduced it were different. The following table lists dates of announcement of negative interest rates, and their goals:

FIGURE 9: Goals of NIRP introduction (Credit Suisse Research Institute, 2017)

Central bank	Date of announcement	Goal
Denmark	04/09/2012	Consequence of the reduction by the ECB of its policy rate by 25 bp.
Eurozone	05/06/2014	Provide additional monetary accommodation and support lending to the real economy.
Denmark	04/09/2014	Consequence of the reduction by the ECB of its policy rate by 10 bp.
Switzerland	18/12/2014	Negative rate makes it less attractive to hold CHF investments.
Sweden	12/02/2015	Support the upturn in underlying inflation.
Japan	29/01/2016	Maintain momentum toward achieving the price stability target of 2 percent.

Source: Credit Suisse Research Institute

Although it was expected to be different, negative interest rate policy left a shockingly restricted impact on exchange rates. Countries in which NIRP was implemented mostly did not succeed in weakening their currencies' value. The exchange rate of Swiss franc and euro was mainly insensitive to the alterations in interest rates spread between these two currencies. The "safe heaven" effect, which represents "a place of security", impacted the lack of change of the exchange rates. The given effect increased the franc value. The franc was highly pegged to the euro, and the exchange rate remained almost the same. Also, large central banks are reaching higher prosperity in achieving the currency targets, using negative interest rates as a main tool, when compared to smaller central banks. For example, the Bank of Japan reached much more advancement in the process of the yen weakening, when compared to the US dollar. How did they do that? They succeeded because of the move to policies that were not based on or conforming to what is generally done or believed. Same refers to the European Central Bank. All together for a NIRP to affect total interest or the conversion scale, the bringing down of a rates from positive into negative should influence the interest rates in monetary business sectors. In fact, the two year market interest rate has shifted into the agreement zone with the particular national bank interest rate, and stayed applied for both positive and negative interest rates.

Various macroeconomic factors exceptionally sensitive to the changes in interest rates, especially credit development, expenditures for construction sector and house costs, have additionally been analysed. There was definitely not a critical contrast in examples between nations with negative interest rate policies, or without them. Additionally, a difference in nations as their strategies

moved from positive financing costs to negative rates, were not highly noticable. For instance, the demand for loans dropped down in Sweden, while it was increased in Denmark in the same period of time, from 2015 to 2016. During the same period, house costs grew up in Sweden, moved powerfully upward in Denmark, too. In Switzerland, they dropped down. Therefore, ***NIRP does not create universal effects of every country its central bank impelemnts it.*** There are specific influences on financial markets in every country, which impelemnts NIRP. As stated in the introduction of this scientific paper, negative interest rates have an economy-stimulating effect, because they induce both individual investors and companies to invest more financial assets, instead of holding it in a bank account. However, there are two main concerns about them.

The first possible problem with negative rates is the ability of having an effect on banks benefit. Banks operate their crucial work by coordinating investment funds to valuable ventures that create a satisfying return rate. They see the benefit in spread which they earn, what represents a difference of charging loans and the amount bank pays depositors. At the point of time when central banks make the rate's value lower, the common propensity is for this spread to be diminished, as generally loaning and longer-term rates tend to drop down. At the point of time when rates go underneath zero, banks may be hesitant to pass on the negative rates to clients by charging expenses on their investment funds. This happens because depositors could withdraw their money, what banks do not want to happen. In case banks abstain from negative rates, the deposit-loan spread diminishes, since the return on a loan would not be enough for covering the cost of holding deposits. This situation could cause lower bank productivity and weaken budgetary framework steadiness.

The second possible problem related to negative interest rates on bank deposits is that they could motivate depositors to turn their banking deposits into physical holding of cash. Therefore, reducing face value of cash is impossible, although there are some proposals of putting cash on bank accounts, with an incentive of getting rid of it, what happens in order to make negative interest tares attainable when banks need it, at the point of time admissible for them.

Consequently, there is a public worry that negative rates could come to a tipping point, past which depositors could surge out of banks and withdraw their cash, in order to obtain a "physical money-keeping framework". Therefore, an acceptable and economy-favourable effective lower bound on interest rates cannot be strictly determined. Going underneath this lower bound may weaken monetary framework liquidity and soundness, in some economies. Practically, banks can bill other expenses to recover costs, and rates usually do not get sufficiently negative for banks to pass them on small depositors. On the other hand, scenario with larger depositors is different: once in a while, they can accept negative interest rates to obtain the pertinence of having bank deposited funds. However, the problem stays related to the limits to negative interest rate arrangements, as long as cash exists as an elective. In addition, a neutral rate suggests that short-term rates might reach the zero lower bound more often and stay there for prolonged periods. As this happens, central banks may progressively ought to resort to what were already thought of as offbeat arrangements, counting negative approach, when it comes to interest rates.

Since market stress in Eurozone was increased, capital flowed into Denmark, Switzerland and Sweden, so their currencies appreciated fast, their export goods showed up as less competitive, import prices dropped off. That caused deflationary pressures. Inflation pressures were brought under control and economic growth bounced back. Prices of real estate, corporate and government bonds, and equities increased, while, on the other hand, banks' profitability decreased. In Japan, The Bank of Japan (BOJ) combined NIRP with quantitative easing and larger government expenditure. None of these created a significant effect, with Japan's macroeconomic dynamics remaining almost unchanged. Considering to the fact that banks were reluctant in passing costs onto retail depositors, NIRP was not fully effective. The yen depreciation was followed by an increase in asset prices. To conclude, as a consequence pf NIRP, Japanese and European policymakers noticed varied economic effects and results (Krisch, Zhiang, 2021).

VI. DISCUSSION AND CONCLUSION

- The introduction of NIRP has been an integral element of a smartly tailored strategy adopted by the central banks of introductory countries, with an aim of lowering unprecedented disinflationary effects, that came up as a consequence of global financial crisis of 2008-2009.

- Zero lower bound has not end up being an actually restricting lower limit for interest rates. In any case, there is an extraordinary vulnerability about the conduct of people and organizations if rates happened to decrease further into a contrary area or stay under zero, for a longer period of time.

- NIRP motivates individuals or companies to invest, encourages banks to lend more openly, leads to increases in expenditures and in investments, as well as a decrease in savings.

- The implementation of negative interest rates through banks could cause a large-scale shifts in the amount of cash, as well as a reduction of banking sector profitability.

- Actions executed by banks, with the goal of adjusting their business models and cut their operating costs will positively affect their capacity to recover quickly from lower interest rates (Cœuré, 2016).

- Monetary policy of a country needs to be supported by structural and fiscal policies which are capable of upholding aggregate demand.

The situation with the introduction of negative interest rate policies on deposits was examined in real-life examples. However, it was not the best solution for economy acceleration and financial

recovery, the world has ever seen. Various questions remain unsolved, when it comes to NIRP. For example, the incapacitating effect of perseveringly negative rates on the benefit of the financial area has arisen as a significant thought. Such rates can debilitate the benefit and additionally support the adequacy of establishments with long-length liabilities, for example, insurance agencies and annuity reserves, truly testing their operations. In addition, an appraisal of their quality would fundamentally require an assessment of their viability in accomplishing the goals of national banks, just as their wider effect on monetary balance. NIRP could help give extra money related strategy improvement in complicated macroeconomic circumstances, as long as strategy loan fees are just unobtrusively negative and they don't remain negative for a really long time in order to avoid unfavourable consequences for the monetary area. NIRP meaningfully reduces expectations related to short-term money market interest rates and also long-term government bond yields (Czudaj, 2019). Consequently, these arrangements have a spot in the policymaker's strategies, however, they should be maneuvered carefully to make sure about their advantages while avoiding risks.

REFERENCES

1. J.m. Keynes, 1937, "alternative theories of the rate of interest", ej. (1937). Economic journal. Https://www.hetwebsite.net/het/texts/keynes/keynes1937alternative.htm

2. Corporate finance institute. (2020, june 13). Negative interest rate policy (nirp). Https://corporatefinanceinstitute.com/resources/knowledge/economics/negative-interest-rate-policy-nirp/

3. Oecd ilibrary | interest rates. (2021). Oecd ilibrary. Https://www.oecd-ilibrary.org/finance-and-investment/interest-rates/indicator-group/english_86b91cb3-en

4. Jobst, a., & lin, h. (2016). Negative interest rate policy (nirp): implications for monetary transmission and bank profitability in the euro area. Imf working papers, 16(172), 1. Https://doi.org/10.5089/9781475524475.001

5. Eisenschmidt, smets, j. E. F. S. (2018). Negative interest rates: lessons from the euro area. Bcentral. Http://si2.bcentral.cl/public/pdf/banca-central/pdf/v26/sbcv26pp013-042.pdf

6. Basten, c. (2018, february 21). How banks respond to negative interest rates: evidence from the swiss exemption threshold. Cesifo working papers. Https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3164780

7. Scholten, r. (2020, october 26). Interest rates – don't be so negative. Pure play asset management | robeco.com. Https://www.robeco.com/en/insights/2020/10/interest-rates-dont-be-so-negative.html

8. Carlos arteta, m. Ayhan kose, marc stocker, temel taskin. (2016). Negative interest rate policies: sources and implications. World bank group. Http://documents1.worldbank.org/curated/en/235551470834953672/pdf/wps7791.pdf

9. EUROPEAN CENTRAL BANK. (2020). ECONOMIC BULLETIN (NO. 03/2020). HTTPS://WWW.ECB.EUROPA.EU/PUB/PDF/ECBU/EB202003.EN.PDF

10. HOW HAVE CENTRAL BANKS IMPLEMENTED NEGATIVE POLICY RATES? (BECH, MALKHOZOV, 2016). BIS QUARTERLY REVIEW, 31–44. HTTPS://WWW.BIS.ORG/PUBL/QTRPDF/R_QT1603E.PDF

11. Credit suisse research institute. (2017, march 1). The effects of negative interest rate policies. Credit suisse. Https://www.credit-suisse.com/about-us-news/en/articles/news-and-expertise/the-effects-of-negative-interest-rate-policies-201703.html

12. Is the negative interest rate policy effective? (czudaj, 2019). Chemnitz economic papers, no. 034. Published. Https://www.econstor.eu/bitstream/10419/213081/1/1687399336.pdf

13. Altavilla, burlon, giannetti, holton, c. A. L. B. M. G. S. H. (2019). The impact of negative interest rates on banks and firms. Vox, cepr policy portal. Https://voxeu.org/article/impact-negative-interest-rates-banks-and-firms

14. Krisch, zhiang, d. K. J. Z. (2021). Do negative interest rate policies actually work? (and at what cost?). Office of the comptroller of the currency. Published. Https://www.occ.gov/publications-and-resources/publications/economics/on-point/on-point-negative-interest-rate-policies.html

15. Cœuré, b. C. (2016). Assessing the implications of negative interest rates. European central bank. Https://www.ecb.europa.eu/press/key/date/2016/html/sp160728_slides.en.pdf