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A Study on Negative Interest Rate in Monetary Policy: History and Contemporary Scenario

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ABSTRACT

As the unprecedented use of negative interest rate as a means of monetary policy to overcome stagnation of economy by the Central Bank of different countries, this research reviews the history of negative interest rates and briefs about the contemporary scenarios and proposals which grabbed the hype in economic literature and its academies. Negative interest rate proposal, although, termed as unrealistic and unconventional measures of monetary policy, it is now used as an alternative means to stimulate sluggish economy where deflationary forces are too strong. This article provides information about history of economic thought and how negative interest rate impacts on monetary and economic performance..

KEYWORDS: - ***History of Economic Thought, Negative Interest Rate, Tax on Money, Zero Lower Bound, Monetary Policy, Silvio Gesell, Irving Fisher, John Maynard Keynes.***

I. INTRODUCTION

In the aftermath of Financial Crisis 2007/2008, the Great Depression of the 1930s, most of the world central banks applied the policy interest rate near to zero with the widespread consensus that this unconventional monetary policy would be temporary. But the prospect of normalization seems remote in these post years of crisis as the world economic downturn is looming or already in the making. Indeed, the contemporary Euro Zone crisis has unfolded the possibility of further experiment on extreme measures of monetary policy in addition to the previous one in mid-2014. In similar way, at the end of January 2016, the Bank of Japan introduced "Quantitative and Qualitative Monetary Easing with a Negative Interest Rate" to overcome the prolonged deflation and stimulate the economic growth. Most of the policy makers unanimously believe that the conventional monetary policy is constrained by the Zero Lower Bound (ZBL) on nominal interest rates and so it is unable to provide enough stimulus to generate a robust recovery, perhaps for a protracted period. With central banks base rate approaching zero, conventional monetary policy has run out of option concerning the reduction of market interest rate which is necessary to revive the ailing economy. Hence, an experiment is under way by the different central banks to test the boundaries beyond of orthodox tools in monetary policy.

The "Zero Interest Rate Policy" (ZIRP) is ultra low or near to zero target interest rate policy by central bank. The ZIRP is described as an

Volume 2 Issue 7 July 2017
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Page : 829-848

important milestone in monetary policy because the central bank is no longer able to reduce nominal interest rate i.e. the ZBL and conventional monetary policy is at its maximum potential to drive growth. The zero lower bound arises when government issues pieces of paper (or coins) guaranteeing a zero nominal interest, over all horizons, that can be obtained in unlimited quantities in exchange for money in the bank. This acts as an interest rate floor, making people unwilling to lend at significantly lower rates. The zero lower bound has proved to be a serious obstacle for monetary policy, as shown by the recent efforts of central banks to stimulate economic growth in the wake of the Global Financial Crisis. This problem returned to prominence with the Japan's experience during the 90's, and more recently with the subprime crisis.

Policy-makers and researchers are aware that a sharp decline in output and spending does, at least in theory, call for a negative nominal interest rate in order to encourage swift recovery from deflation and recession by spurring demand. Hence, to put it simply, negative nominal interest rate, if they could be implemented without difficulty, constitute a fundamental tool against a serious economic downturn. The zero lower bound on nominal interest rates, however, poses a concrete obstacle to any attempt to make an efficient use of negative nominal interest rates. A central bank is free to set its target rate at a negative level, but that policy decision would have absolutely no impact at all on the interbank market rate. The zero lower bound states that nobody would lend at a negative rate if one could just "stuck cash in the mattress". In fact, the rate of return on currency (banknotes and coins) is zero, and consequently, if the interest rate were to fall below zero, the public would rather hold its saving in the form of currency, and the financial institutions its liquidity as reserves. Accordingly, private banks will never lend their liquidity to each other at a negative nominal interest rate if reserve deposits are costless to store at central banks. Thus, the zero bound on the nominal interest rate is a consequence of the zero rate of return on currency for one, and the zero cost of storing bank reserves at the central bank for the other. This aspect of a floor to nominal interest rates is well illustrated in a paper on the zero bound, published by the ECB[i].

Imagine instead that holding real balances does involve some cost: for example, that the only currency is gold, and storage space and security guards are costly. I would be willing to hold bonds instead of gold, even at a negative interest rate, since by doing so I could avoid paying for stage and security.

The floor to nominal interest rates is therefore given by the cost of holding currency.

The above supposition illustrates circumstances in which negative nominal interest rates on bonds could be put into practice. Indeed, the logic of the argument, the price of storing is the key issue. If it is less lucrative to store money, lending is the next best option, thus having the positive side-effect of stimulating the credit flow.

ZIRP is very closely related to the problem of a liquidity trap, where nominal interest rate cannot adjust downward. A liquidity trap is a situation, described in Keynesian economics[ii], in which injections of cash into the private banking system by a central bank fail to decrease interest rates and hence make monetary policy ineffective. The liquidity trap, zero bound situation and the circumstances under which negative nominal interest rate may be a viable alternative policy is explained in upcoming chapters.

Nominal Interest rates are normally positive, but not always. In contrast, real interest rates can be negative, when nominal interest rates are below inflation. When this is done via government policy, this is deemed financial repression, and

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

was practiced by the countries such as the United States and United Kingdom following World War II, from 1945 until the late 1970s or early 1980s. Negative interest rates have been proposed in the past, notably in the late 19th century by Silvio Gesell. A negative interest rate can be described (as by Gesell) as a "tax on holding money", he proposed it as the *Freigeld* (free money) component of his *Freiwirtschaft* (free-economy movement)[iii] system. To prevent people from holding cash (and thus earning zero percent), Gesell suggested issuing money for a limited duration, after which it must be exchanged for new bills; attempts to hold money thus result in it expiring and becoming worthless. Along similar lines, John Maynard Keynes approvingly cited the idea of a carrying tax on money, in 1936, *The General Theory of Employment, Interest and Money*, but dismissed it due to administrative difficulties. More recently, a carry tax on currency was proposed by a Federal Reserve employee, Marvin Goodfriend[iv] (2000), to be implemented via magnetic strips on bills, deducting the carry tax upon deposit, the tax being based on how long the bill had been held. In similar fashion, papers by Woodford (2003) and Buiter (2003), which envisaged the negative interest rates, had gained some considerable momentum as the financial crisis of 2008 was unfolding. Lately, it has been proposed that a negative interest rate can in principle be levied on existing paper currency via a serial number lottery, such as randomly choosing a number 0 through 9 and declaring that notes whose serial number end in that digit are worthless, yielding an average 10 percent loss of paper cash holdings to hoarders; a drawn two-digit number could match the last two digits on the note for a 1 percent loss. This was proposed by Greg Mankiw[v], though more as a thought experiment than a genuine proposal.

Recently, reasoning the longest experience with low inflation and deflation, Bank of Japan on 2016, introduced negative interest rate, highlighting the Tokyo's lack of options to spur the growth as the global market sputter. The central bank is charging 0.1 percent for parking additional reserves with the BOJ to encourage banks to lend and prompt business and savers to spend and invest. In addition, some European central banks (ECB, Denmark, Sweden, and Switzerland) have pushed policy rates below zero, amid declining inflation expectations in the second half of 2014 and early 2015. Reflecting negative policy rates and increasing purchases of highly-rated sovereign bonds, some bonds now offer negative yields. Bank lending in the Euro Area is increasing, suggesting a supportive role of negative rates. Thus, the aim of this paper is to give a concise review of the various strands of the literature dealing with negative interest rates from past to present.

II. STATEMENT OF PROBLEM

The zero bound is inherent to the emergence of deflation risk and financial as well as economic instability. Preventing deflation spiral is a must for central banks to revive the ailing economy although it may requires transcending conventional boundary of monetary policy. In such emergence, the negative policy rate could be a viable alternative tool when conventional monetary policy is stuck in zero lower bound and deflationary forces are too strong. As an experiment is under way in Japan and in continental Europe to test the boundaries of negative interest rate in monetary policy, a statement of problem of this research is to bridge the theory of negative interest rate policy with its practical experiment reflecting means of execution and potential result thereof. Therefore, the statement of problem on this research focuses on the expected outcomes and implications of the experiment. The article discusses what is designed to achieve with such measures, and how it is

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

supposed to affect short-term growth and further illustrates the possible fallout from this experiment.

III. OBJECTIVES OF STUDY

The objectives of "a Study on Negative Interest in Monetary Policy" are designed goals which the research aims to achieve on its discourse. The major objectives of the study are cited below.

1. To review the school of economic thoughts in negative interest policy.
2. To assess the reasons behind execution of negative interest rate policy and its means of transmission into the financial system.
3. To identify the scope of negative interest rate for the financial stability and growth.
4. To illustrate the precedents of negative interest rate policy.

IV. SCOPE OF STUDY

The study on covers following areas:

- Introduction of Negative Interest Rate Policy.
- Emergence of Zero Lower Bound.
- Alternative monetary policies propounded by Silvio Gesell, John Maynard Keynes and Irving Fisher.
- Stands of economic thoughts by economist, policy-makers, and academies.
- Incidents of negative policy rates in central banks in history and contemporary periods.
- Significance of negative interest rate for financial stability and economic growth.
- Potential consequence and fallouts of negative interest rate phenomenon.

V. LIMITATIONS OF STUDY

The major limitations on the study of "Negative Interest Rate in Monetary Policy" are cited below.

- The strand of negative interest rate is unduly neglected by the economic literature from its inception and hence difficult to find the depth discourse of thoughts.
- The mathematical models and simulation experiments of negative interest rate are confined to certain assumptions and constraints. Therefore, referencing such models in different situational setting and time may not hold same.
- As seen as absurd means of monetary policy, negative interest rate has only few cases of execution in history. Therefore, the prediction of consequence is merely intuition although some of them are substantially backed.
- The envisioned possibility of charging on public deposit has never been in existence although banks are charged for their additional reserve. Hence, the public response on paying charge for deposit is more a black box.
- The execution of negative interest rate policy entails highly developed financial apparatus with innovative jurisdictional infrastructures. Hence, its possibility in developing economy is hypothetical.
- Negative interest rate policy has been experienced as short-term phenomenon but not for long-term.
- Zero Lower Bound conflicts with Keynes liquidity trap scenario in concepts and application, which creates vacuum in understanding contemporary scenario.
- The study is largely based on secondary data, which mills doubts on the reliability and authenticity of input.
- Most of the projections of study are based on analytical judgment reflecting ideas of different proposals. Hence, possibility of failure of such projections cannot rule out.

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

VI. LITERATURE REVIEW

Literature Review on Historical Proposals

The pioneering proposals of negative interest rate by Silvio Gesell and its discourse by John Maynard Keynes and Irving Fisher were reviewed while preparing this paper. Additionally, the kinship among Gesell and Keynes theory of interest developed by Dillard in 1940 is reviewed to understand complete economic thought of interwar period.

Silvio Gesell's Natural Economic Order

The Natural Economic Order (German: *Die natürliche Wirtschaftsordnung durch Freiland und Freigeld*; published in Bern in 1916) is considered Silvio Gesell's most important book. It is a work on monetary and social reform. It attempts to provide a solid basis for economic liberalism in contrast to the twentieth century trend of collectivism and planned economy. In the English version of *The Natural Economic Order*, translated by Philip Pye M. A, provides the original argument of Gesells. For this paper, the proposal of free money is concerned one although whole context of book argues for economic liberalism. Particularly, as of reference, Gesell's states the criticism on money as medium of exchange as:

"Only money that goes out of date like a newspaper, rots like potatoes, rusts like iron, evaporates like ether, is capable of standing the test as an instrument for the exchange of potatoes, newspapers, iron and ether. For such money is not preferred to goods either by the purchaser or the seller. We then part with our goods for money only because we need the money as a means of exchange, not because we expect an advantage from possession of the money"[vi].

In his main work, *The Natural Economic Order*, he also offers an economic theory that justifies and explains his call for taxing money.

John Maynard Keynes on Silvio Gesell along similar lines of Silvio Gesell's periodic tax on money, John Maynard Keynes approvingly cited the idea of a carrying tax on money, (1936, *The General Theory of Employment, Interest and Money*) but dismissed it due to administrative difficulties. Keynes thought the stamp scrip to be 'not feasible' in the way Gesell proposed it, but insisted that 'the idea behind stamped money is sound'[vii]. In fact, Keynes (1936. pp. 353-358) devoted five entire pages to the theory of Gesell whom he characterized as a 'strange, unduly neglected prophet whose work contains flashes of deep insight and who only failed to reach down to the essence of the matter '

Gesell was described by Keynes as 'a successful German merchant in Buenos Aires who was led to the study of monetary problems by the crisis of the late eighties, which was especially violent in the Argentine'. Frequently dismissed by many as no more than a money 'crank', Gesell was rescued from obscurity by the serious attention that Keynes devotes to his ideas and influence in Chapter 23 of *The General Theory*. In fact, Keyne's *General Theroy* is the major English language source of biographical information about Gesell.

Irving Fisher on Silvio Gesells

Gesell's proposal for a stamp duty on banknotes was enthusiastically taken up by Professor Irving Fisher of Yale in 1932, as offering the "speediest way out of depression". Stamped tax and theoretical reasoning was taken up by Fischer (1933) and promoted negative interest rates in his book on stamp scrip, but remained overly skeptical of Gesell's theory: 'There is much in Gesell's philosophy to which, as an economist, I cannot subscribe, especially his theory of interest; but Stamp Scrip, I believe, can, in the present emergency, be made at least as useful an invention as Manuel Garcia's [a singer] laryngoscope'

Dillard Doctoral Dissertation in 1940

In his doctoral dissertation in 1940 and two subsequent articles in 1942, Dillard was the first

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

economist to demonstrate the close kinship between the monetary theories of Proudhon, Gesell, and Keynes. Dillard established striking theoretical similarities between Keynes, Gesell and the anarchist Proudhon[viii], with Gesell 'primarily interesting as the link between the other two'[ix] (Dillard, [1940] 1997, p. 6). In a further article on Keynes' political economy, Dillard (1946, p. 149) argued that 'Keynes' judgement of the relative merits of Marx and Gesell, [...], would seem to reveal much more about Keynes than it does about either Marx or Gesell' and in his book on Keynes, Dillard (1948, pp. 322-323) maintained that studying Gesell indeed furthers the understanding of Keynes's theoretical innovations. However, as Gischer (1997, p. 5) pointed out, Dillard's pioneering research concerning link between Proudhon, Gesell and Keynes went mainly unnoticed, probably because academic debate about Keynesian ideas took off considerably later and maybe because it held an inconvenient truth for classical economist.

Literature Review on Current Proposals

In this review, contemporary proposals which are related to discourse of zero lower bound and negative policy rate in monetary policy are briefed.

Friedman (1969):

The Friedman rule is a monetary policy rule proposed by Milton Friedman[x]. Essentially, Friedman advocated setting the nominal interest rate at zero. According to the logic of the Friedman rule, the opportunity cost of holding money faced by private agents should equal the social cost of creating additional fiat money. It is assumed that the marginal cost of creating additional money is zero (or approximated by zero). Therefore, nominal rates of interest should be zero. In practice, this means that the central bank should seek a rate of deflation equal to the real interest rate on government bonds and other safe assets, to make the nominal interest rate zero. The result of this policy is that those who hold money don't suffer any loss in the value of that money due to inflation. The rule is motivated by long-run efficiency considerations.

GoodFriend (1999):

Recently on his paper '*Cash and the 'Carry Tax'', a* carry tax on currency was proposed by a Federal Reserve employee (Marvin Goodfriend) in 1999, to be implemented via magnetic strips on bills, deducting the carry tax upon deposit, the tax being based on how long the bill had been held[xi].

Buiter (2010): Scholars have come up with various schemes for removing the zero bound via negative interest rates. Buiter (2010) proposes three different methods for removing the zero bound[xii]. One very interesting proposal is separating the means of payment function of currency and its unit of account role, which was already suggested by Einaudi (1953) and Gaitskell (1969).

Another proposal, according to Buiter's (2005a; 2010) scheme, the existing currency is withdrawn and replaced by a new government-issued currency. This new currency only serves as legal tender and cannot be used to denominate prices of commodities and hence all prices, wages and contracts are denominated in a different unit of account.

Finally, the most commonly thought method for removing the zero bound is taxing money. To begin with, the easiest way to implement such a scheme was to abolish coin and bank notes altogether. Buiter (2010, pp. 222-226) considers coins and bank notes to be redundant media of exchange, the larger part of it being held abroad for legitimate (store of value in countries with high inflation rates) and illegitimate (underground economy) reasons. In developed countries, its function of providing liquidity could easily be satisfied by bank accounts. Roughly half of Dollar and Euro notes are held abroad and of the remainder only a small fraction is held for

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

transaction purposes. As stated above, without coins and currency, levying the tax on all non-bearer bonds is technically simple. . . If coins and currency are completely replaced by electronic transfers via registered accounts, in theory there is no limit to the domain over which the rate of interest can be set. In addition, there would be the additional advantage of hitting the underground economy as the absence of anonymous bearer bonds would make all economic transactions traceable

Mankiw (2009):

Gregory Mankiw (2009), in an article in the New York Times, reflected on the possibility of negative interest rates via a periodic taxation or partial confiscation of base money[xiii]. Mankiw suggests that central banks should hold a lottery to invalidate cash with serial numbers containing certain digits. The idea of decoupling cash from the numeraire originated with Eisler (1932), who envisioned a floating exchange rate between cash and money in the banking system, with the latter as the numeraire. This floating rate makes it possible to implement negative nominal interest rates in terms of the numeraire, even as cash continues to pay a zero nominal rate in cash terms, by engineering a gradual relative depreciation of cash.

Woodford (2011):In his paper '*Simple Analytics of the Government Expenditure Multiplier'*, Michael Woodford finds that, in a ZIRP situation, the optimal policy for government is to spend enough in stimulus to cover the entire output gap[xiv].

Jackson (2015):

Jackson (2015) provides an overview of recent international experience with negative policy rates[xv].

Jensen and Spange (2015):

Jensen and Spange (2015) discuss the pass-through to financial markets and impact on cash demand from negative rates in Denmark.[xvi]

Humphrey (2015):

Humphrey (2015) evaluates ways to limit cash demand in response to negative rates[xvii].

Literature Review on Policymakers Proposals at Central Banks

Events in the past year, however, have called into question whether zero really is a meaningful barrier. Central banks in Switzerland, Denmark, and Sweden have targeted negative nominal rates with apparent success, and without any major changes to their monetary frameworks. Policymakers at other major central banks, including the Federal

Reserve and the ECB, have recently alluded to the possibility of following suit.

Yellen 2015

In response to a question while testifying before Congress on November 4, 2015, Federal Reserve Chair Janet Yellen stated that if more stimulative policy were needed, "then potentially anything, including negative interest rates, would be on the table."

Draghi 2015

In a press conference on October 22, 2015, ECBPresident Mario Draghi stated: "We've decided a year ago that [the negative rate on the deposit facility] would be the lower bound, then we've seen the experience of countries and now we are thinking about [lowering the deposit rate further]."

By some measures, the ECB has already implemented negative rates, since the Euro system deposit facility (to which Draghi 2015 alluded) pays -0.20%. Excess reserves earn this rate, which has been transmitted to bond markets: as of November 20, 2015, short-term government bond yields are negative in a majority of Euro Area countries.

Lagarde 2016

Speaking ahead of the IMF's Spring meetings in Washington, D.C., IMF Chief Christine Lagarde at the Geothe University in Frankfurt on April 5

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

said economic sentiment had been bolstered by fresh stimulus from the European Central Bank. Ms. Lagarde Said "We see the recent introduction of negative interest rates by the ECB and Bank of Japan__-though not without side effects that warrants vigilance - as net positives in current circumstances". Furthermore, she commended President Darghi and the ECB for such steps to improve confidence and financial condition.

Kuroda 2016

At a meeting held by the Yomiuri International Economic Society in Tokyo, Haruhiko Kuroda, Governor of the Bank of Japan, without denying adverse effect of QQE with a Negative Interest Rate reiterated that the aim of the policy is to benefit household and firms and ultimately to fully overcome deflation. According to him, "use of QQE with a negative interest rate will help to achieve the price stability target of 2 percent and overcome the deflation at earliest possible time".

VII. RESEARCH METHODOLOGY

A. Research Design

As "a Study on Negative Interest Rate in Monetary Policy" is a descriptive and analytical study, it aims to answer queries of who, what, when, where and how it is associated with the stated statement of problem. In analytical parts, it presents the potential projections as consequence of situation. As of descriptive study cannot conclusively ascertain answer to why, the study of negative policy rate reflects information concerning the current status of the phenomena and describes "what exists" with respect to variables or conditions in a situation.

Descriptive studies primarily concerned with finding out "what is", which might be applied to investigate the following questions:

- What requires Negative Interest Rates measure in Monetary Policy?
- Does the policymaker hold favorable attitudes towards employing negative interest policy rate?
- What might be reaction when public pays for their deposit?
- What does negative interest mean for financial stability and growth?
- What are the means of transmission for negative interest rate?
- What could be the short run and long run consequence of negative interest rate?
- How modern economists review the proposals of negative interest rate? and so on.

B. Data Collection Method

Observational methods concerned with naturally occurring behaviors observed in natural contexts or in contexts that are contrived to be realistic. Within observational data collection method, two approaches are there: naturalistic approach and laboratory approach. While former features unstructured observation and later features for structured observation methods.

- **Naturalistic Observation**:
  For the study on negative interest rate policy, naturalistic observation entails for unstructured approach where the use of NIRP as means of monetary tool by central banks in different time period is contrive to natural phenomenon. The purpose of unstructured observation is to furnish an unselective, detailed, and continuous description of behavior. Although, central banks can control the use of interest rate, but its remaining part is beyond the league of control. Using this method, the evaluator records all activities and consequences in unselective and ongoing manner.
- **Case or Proposal Study**
  Case study involves an in-depth study of an individual or group of individuals. Albeit

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

different than the descriptive case study method, the proposal on negative interest rate and its discourse on economic thought have been considered as important input to prepare the research. These proposals are in-depth and rigorous study on negative interest rate since its inception to the contemporary scenario. The reviewed proposals and theories of interest are cited in previous chapters.

C. Sources of Data

This study collects information from different sources which are already in existence and published for public use.

VIII. ANALYSIS AND INTERPRETATION

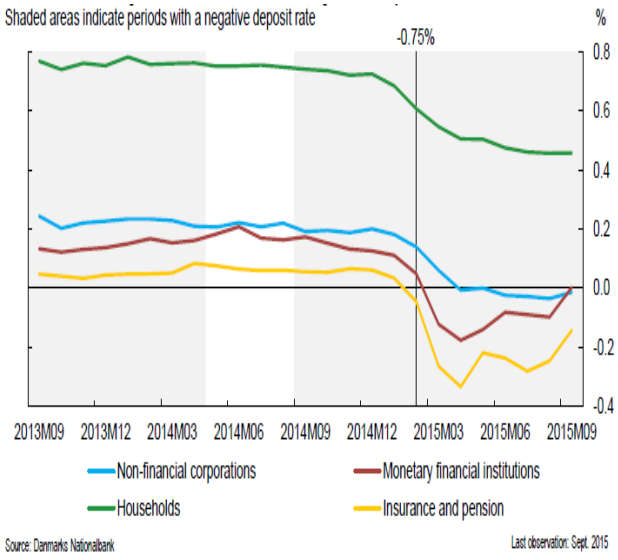
Denmark

In Denmark, there was considerable excess liquidity at the time the negative interest rate on certificates of deposit was introduced in July 2012, and consequently the deposit rate played a greater role in influencing money market rates than did the central bank lending rate.[xviii] Treasury bills were already trading at a slight negative yield before the introduction of the negative deposit rate, and decreased somewhat further after the announcement. The term structure of money market rates up to one year fell. Pass-through to money market rates was immediate, but incomplete, as declines fell short of the reduction in the deposit rate. Volumes declined marginally, but this extended a trend that had begun in 2010. Yields on mortgage bonds also fell, suggesting that banks adjusted their portfolios somewhat to take advantage of other liquid markets.[xix] There was some concern that in order to protect profitability in the face of the negative deposit rate, banks in Denmark might increase lending rates to households and businesses. This did not occur, although loan volumes did decline somewhat. By April 2014, the central bank deposit rate was raised above zero.

In response to further pressures from capital inflows, the central bank again lowered the rate on certificates of deposit below zero in a series of steps beginning in September 2014. Pressure on the krone intensified in the wake of the SNB's decision to remove the euro cap on the franc. On the recommendation of Danmarks Nationalbank, the Danish government announced that it would suspend the issuance of Danish government bonds on 30 January 2015 in an effort to further reduce yields on government bonds. Together, these actions pushed market rates negative, even at longer maturities.

In their latest assessment of the negative deposit rate policy,[xx] Danmarks Nationalbank finds that negative interest rates have not weakened the pass-through to money market rates, but pass-through to bank retail interest rates has declined. Negative rates have not been fully passed on to bank-administered deposit and household lending rates at the retail level, but the large deposits of firms and institutional investors are widely subject to negative interest rates (Chart 1).

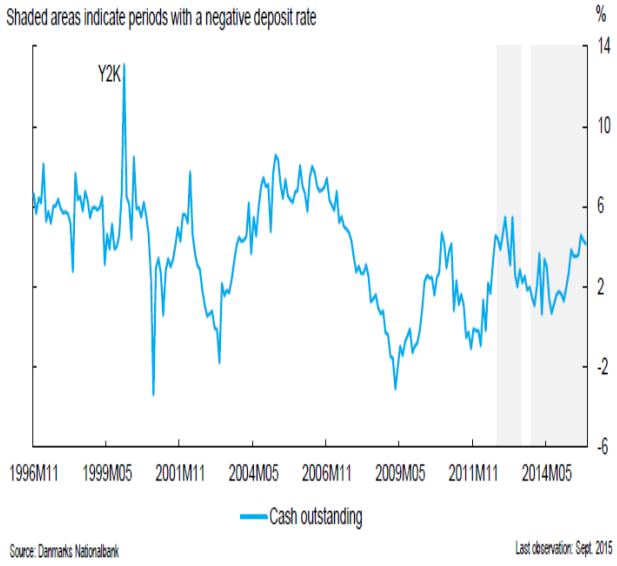
Chart 1: Annualized agreed interest rates on outstanding demand deposits



Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

Demand for cash has not increased materially (Chart 2), which the central bank interprets to mean that the lower bound on interest rates has not yet been reached. Nonetheless, the central bank judges that there is a limit to how much further the deposit rate can be reduced. In particular, the central bank notes that the other side effects of negative interest rates, such as reach for yield, asset price bubbles and pressure on the earnings of credit institutions, are important considerations. To reduce pressure on credit institutions, the central bank has increased the cap on the current account (to which a zero interest rate on deposits at the central bank applies) twice since March 2015.

Chart 2: Denmark cash outstanding (year-over-year percentage change)



There are concerns about the housing market in Denmark. Mortgage rates are very low: adjustable-rate loans with short, fixed interest periods have been negative since February, and the long-term rate (30 years) fell to just over 2 per cent. While house prices are still below the pre-crisis peak in 2006, they are rising very rapidly, especially in pockets of Copenhagen, where there are some concerns of a housing bubble. The central bank has urged the government to use tax laws to limit the growth of house prices.[xxi] Negative mortgage rates have created some technical and legal challenges, although these appear to have been largely addressed.[xxii]

Euro Area

In the euro area, following the June and September 2014 decisions that took the deposit facility rate negative, lower rates transmitted well to money market rates in both unsecured and secured markets, although in the latter it was faster and more pronounced. Liquidity and volatility were broadly unchanged. The policy action was also transmitted to longer market rates and other market segments: the Euro Interbank Offered Rate (EURIBOR), 3-month EURIBOR futures, and yields on euro area Treasury bills generally declined, although rates for Italy and Spain rose after the September cut, extending a trend that began in August (Charts 3 and 4).[xxiii] Money market trading volumes were broadly stable, or increased marginally. There have been no significant outflows or dislocations in money market funds. There were some concerns that borrowing from the central bank would decline in response to the negative deposit rate, which would put upward pressure on rates in the interbank market and offset the policy action, but this has not occurred. Lower rates may also have reduced fragmentation, particularly in the secured market.[xxiv]

Transmission through the exchange rate channel is thought to be pronounced, contributing to a roughly 20 per cent depreciation in the euro since May 2014, although it is difficult to disentangle the impact of negative rates from other policy actions and economic developments in the United States (Chart 3).

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

Chart 3: EURIBOR rates and three-month EURIBOR future implied rates

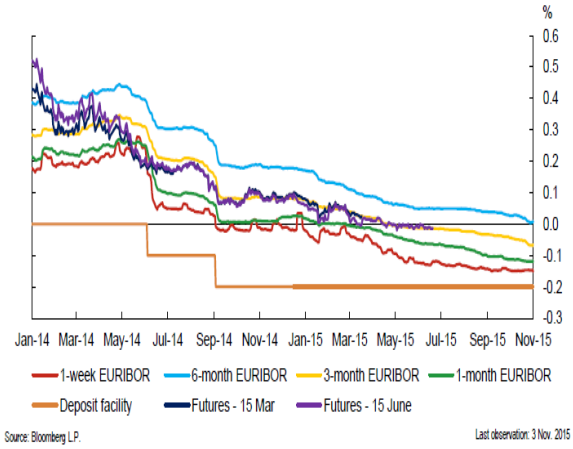


Chart 4: EURIBOR rates and three-month EURIBOR future implied rates

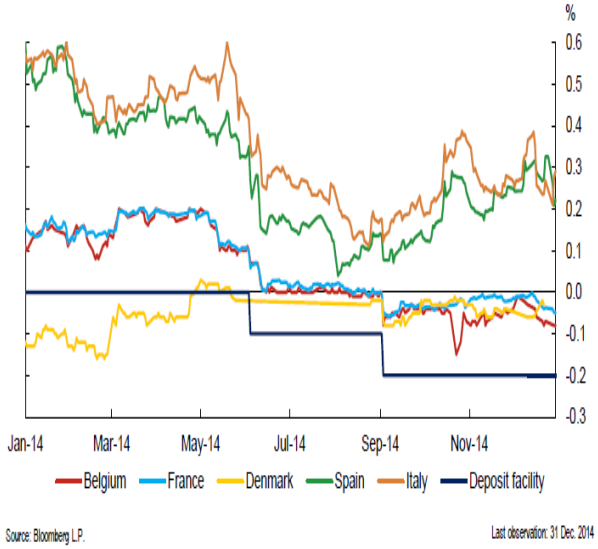
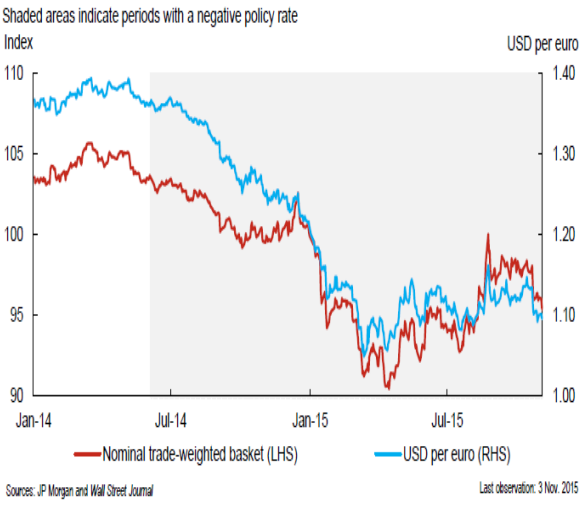


Chart 5: Euro area exchange rates

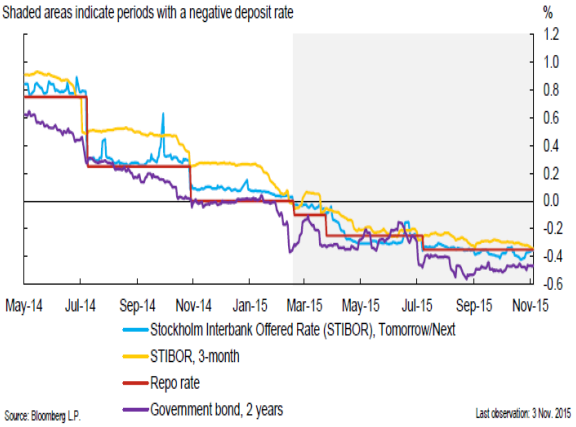


Sweden

The Sveriges Riksbank cut its repo rate in three steps to -0.35 per cent and has stated that it expects the rate to remain negative until at least the end of 2016. Deposits at the Riksbank are charged a penalty rate of -1.1 per cent. Transmission through short-term interest rates and the exchange rate has generally been normal, and there have been few technical issues.23[xxv] Market rates, including treasury bills, a number of government and mortgage bonds, interest rate derivatives, and certificates, have traded at negative rates (Chart 6). Reductions in the policy rate, however, have not been fully passed through to deposit and lending rates. The Riksbank notes that market functioning so far seems fine, although there are some areas of concern, notably the market for bonds with variable coupons.

There is little evidence of strain among credit institutions from the negative deposit rate. There are, however, concerns over risks in the housing market amid high household indebtedness, and the Riksbank has been encouraging the government to introduce measures to address these risks.[xxvi]

Chart 6: Sweden market rates



The Riksbank is of the view that "the lower bound for policy rates is soft," but while additional reductions in the repo rate are possible, transmission through the interest rate channel may weaken further and technical problems could increase.[xxvi]

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

Switzerland

In Switzerland, negative policy interest rates were transmitted swiftly to the entire spectrum of money and capital market interest rates, and markets are generally functioning without incident. Rates became negative on Swiss government bonds with maturities out to 10 years, although it is difficult to disentangle the impact of negative policy rates from other policy actions undertaken by the SNB and the economic environment. According to the 2015 International Monetary Fund (IMF) Article IV report on Switzerland, "the initial effects from negative interest rates and the exit from the exchange rate floor on the financial sector appear to have been fairly limited," although the IMF notes that it is still too early for a full assessment.[xxvii] The impact on bank profits has been mitigated by the fact that the threshold at which reserves are charged the negative deposit rate by the SNB is quite high. In response to the negative policy rate, a number of Swiss banks have introduced charges on some cash accounts (Chart 7). While the year-over-year growth of currency in circulation has picked up following the lows of last year, cash hoarding per se has not been observed (Chart 8). There have, however, been a number of highly publicized attempts to avoid negative interest rates, including a Swiss pension fund that tried to withdraw cash and store it in a vault, saving 25,000 francs per 10 million francs after storage and handling costs (implying that these costs run about 0.5 per cent per year).

Chart 7: Retail deposit interest rates

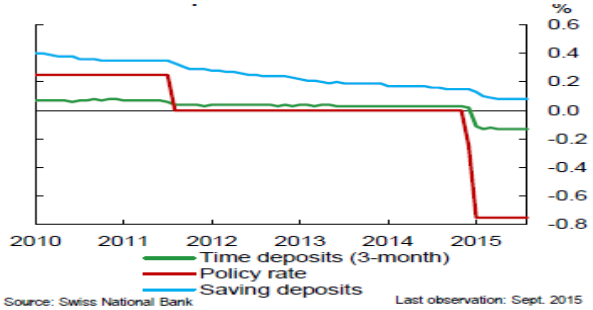
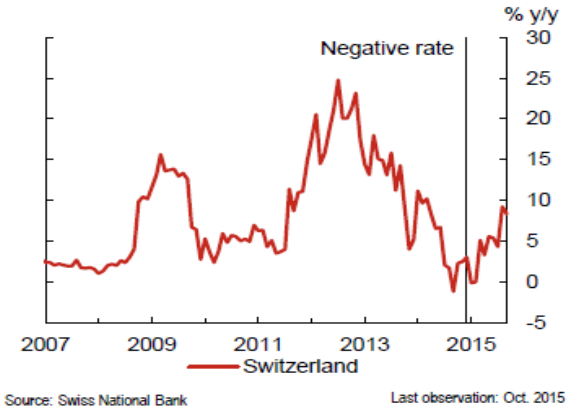


Chart 8: Currency in circulation



Japan

At the end of January 2016, the Bank of Japan decided to introduce "Quantitative and Qualitative Monetary Easing (QQE) with a Negative Interest Rate," which added the new dimension of "a negative interest rate" to the existing policy of QQE. Specifically, the Bank applies a negative interest rate of minus 0.1 percent to current accounts that financial institutions hold at the Bank. This measure enables the Bank to now pursue additional monetary easing by providing the new option of "a negative interest rate" in addition to the "quantitative" and "qualitative" measures used so far. Some market participants had voiced doubts that a further expansion of QQE would be possible, arguing that QQE had reached its limit, and its implication is yet to observe.

Chart 9: Japan's Interest rate

The Bank of Japan kept its pledge to increase the monetary base at an annual pace of about 80 trillion yen at its March 2016 meeting, as expected. Policymakers also said they left unchanged a 0.1 percent negative interest rate. Interest Rate in Japan averaged 2.99 percent from 1972 until 2016, reaching an all time high of 9 percent in December of 1973 and a record low of -0.10 percent in January of 2016. Interest Rate in Japan is reported by the Bank of Japan.

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

Is the concept of negative interest rate is paradox? Not really as it is similar with concept of negative number, which the early mathematician thought as absurd. When Gregory Mankiw in 2009 stated in the New York Times that "it may be time […] to go negative", he revived an idea that may seem odd at first. If lowering interest rates stimulates the economy and policy rates are already very low or even zero, then why not keep cutting rates and have negative interest rates?

The claim that the nominal interest rate cannot be negative assumes that holding currency is costless. In the real world, however, holding cash is risky and costly. Like any valuable, cash can be lost, stolen or destroyed. Just as people pay depositories a fee for safekeeping other valuables, individuals are willing to pay a fee on deposits rather than bear the risk associated with holding cash. In addition, there are costs associated with moving and storing cash. While these costs are trivial for a small amount of currency, they are not for large amounts. Consequently, individuals may prefer to maintain deposits at banks or hold Treasury bills rather than transport and store cash, even when these assets have negative rates of return. In effect, the negative nominal return represents a fee that individuals pay to hold deposits or Treasury bills rather than bear the risks and costs of holding cash. Just how negative the nominal interest rate can become depends on the willingness of individuals to pay for the risks and the costs associated with holding cash.

In this context, this chapter analyses the practical consideration of taxing money, its means of transmission if it exits, related concerns on banks and markets, and finally its potential consequence in long-run.

Practical Consideration of Taxing Money

Altering the existing monetary regime is always controversial. However, from a historical perspective, the world's monetary system has been changing constantly. Although people tend to believe that the existing order is the only imaginable one, history teaches us that the institutional design of money is subject to rapid changes, even if the underlying purpose of facilitating exchange remains the idiosyncratic reason of money. For example, the last one hundred years saw the widespread advent of fiat money during the First World War, followed by a period of hyperinflation in many nations and a disastrous return to the gold standard that contributed to the worldwide spread of the Great Depression. After the Second World War, the Bretton Woods Dollar standard was the basis for the miraculous post war recovery, but run into trouble at the beginning of the 1970s. In fact, our modern monetary system of free floating fiat money is less than forty years old and is the outcome not of careful institutional design but rather of trial and error. Moreover, China and other nations are still pegging their currencies to the Dollar, thereby contributing to the gigantic trade imbalances of today. Thus, today's monetary regime is neither a natural system nor a carefully designed one. It is rather the path dependent outcome of political and economic events, which should be altered if the incentive to do so is compelling.

The transmission of Negative Policy Rates

In theory, the transmission of negative policy interest rates to economic activity should be similar to a standard rate cut that leaves policy rates positive. Negative central bank policy rates will discourage banks from holding excess reserves at the central bank and increase incentives to lend, pushing down market interest rates as well as feeding through to asset prices via portfolio rebalancing effects and expectations about future earnings growth.

More accommodative monetary policy will also affect the outlook for the economy, influencing

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

confidence. These changes will in turn affect the investment and saving decisions of businesses and households, which should raise demand for domestically produced goods and services. By discouraging capital inflows, there will be downward pressure on the exchange rate, which should support external demand.

Taken together, these developments would help close the output gap and put upward pressure on domestic inflation. It is important to note, however, that the effect on lending will depend on investment opportunities, confidence and the health of domestic balance sheets, without which banks will continue to be reluctant to lend and/or consumers to borrow, despite negative interest rates.

Transmission may, however, be less powerful when policy rates fall below zero. In particular, banks may be less likely to fully pass through declines in the policy rate to lending and deposit rates in order to protect profits. To the extent that banks cannot fully pass on the cost of negative rates to depositors, a reduction in bank profitability may reduce the supply of credit.

As well, the impact on consumption will depend on household behavior. If savings behavior were unchanged, the impact should be no different from a similar-sized cut when rates are positive. If, however, consumers materially switch out of deposits and into cash in order to avoid negative deposit rates (or higher fees/charges for accounts), a reduction in deposits would reduce the availability of loanable funds, pushing up borrowing costs and dampening the stimulative effect of negative rates. In this context, whether there are disincentives to switch deposits to cash, as well as the ease and cost of storing cash, will influence depositor behavior. Expectations about the ultimate level and persistence of negative policy interest rates will also influence the demand for cash.

Implication of Negative Interest rate

Broadly speaking, central banks use policy interest rates to achieve, over the medium term, a level of real interest rates that is consistent with a rate of inflation in line with policy objectives and a level of economic activity close to its full potential. Such levels of real interest rates might be negative in an environment of weak domestic demand.[xxviii] With inflation remaining below target, they could require maintaining nominal policy rates at or below zero, along with the implementation of unconventional measures to bring longer-term rates further down, including asset purchase programs.

Thus, some of the effects of negative rates are qualitatively analogous to those of very low but non-negative rates. First, insofar as negative nominal rates help keep real interest rates below the neutral level, they can boost consumption and investment. Second, the positive cash flow effects of low or negative nominal rates permits increases in spending by liquidity-constrained firms and households. Third, low or negative policy rates may help stimulate lending, as evidenced by the recent pickup in credit in the Euro Area. Fourth, declines in domestic interest rates from any level can trigger a depreciation of the currency, which boosts exports. Fifth, in countries concerned about capital flow-driven appreciation pressures (e.g. Switzerland and Denmark), they discourage capital inflows.

In addition to these effects that are largely intended by policy makers, negative nominal interest rates may have undesirable side effects on financial stability and capital market functioning.[xxix]

- **Erosion of Banking Profitability:**
  Negative rates may erode bank profitability by narrowing banks' net interest margins (the gap between commercial banks' lending and deposit rates), since banks may be unwilling to pass through negative deposit

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

rates to their customers to avoid the erosion of their customer base (Genay and Podjasek 2014, Hannoun 2015). This unwillingness is due to the fact that, for retail depositors, the costs of avoiding negative rates by substituting currency for deposits is probably lower than for larger, business, and institutional investors (McAndrews 2015). Compressed long term interest rates also reduce profit margins on the standard banking maturity transformation of funding short-term and lending at a somewhat longer term. However, banks can realize capital prudential requirements, hence contributing to the demand glut and downward pressure on yields.

- **Anomalies in the valuation of returns and payments streams:**
  As interest rates approach zero, the calculation of present values of streams of cash flows becomes increasingly sensitive to the discount rate.[xxx] Indeed, the present value of any stream can be made arbitrarily large by choosing a low enough discount rate. This becomes a contentious issue in the negotiation of fair value in legal settlements. As discount rates of zero or less have no economic meaning, a prolonged period of negative interest rates would create large ambiguities for the valuation of assets and liabilities.
- **Effects on money market funds:**
  Money market funds make conservative investments in cash equivalent assets, such as highly-rated short-term corporate or government debt, to provide investors liquidity and capital preservation by paying a modest return. While these funds aim to avoid reductions in net asset values, this objective would not be attainable if rates in the market were negative for a substantial period.[xxxi] Disruptive reactions by disappointed investors would best be avoided by clear understanding of the nature of these funds. That said, the Danish experience suggests that money market funds can pass through the negative rates without massive disruptions in the market (Huttl 2014).
- **Excessive risk-taking:**
  Bank and non-bank investors may be encouraged by negative rates to take excessive risk in their search for positive yield (Hannoun 2015). This is consistent with various studies that find a negative relation between short term interest rates and bank risk-taking (e.g. Altunbas, Gambacorta, and Marqués-Ibáñez 2010; De Nicolò, Dell'Ariccia, Laeven, and Valen Valencia 2010; Dell'Ariccia, Laeven, and Suarez 2013). Greater risk-taking could contribute to the formation of asset bubbles, particularly in higher dividend paying stocks which may already have excessive valuations.
- **Potential need to redesign the functioning of financial transactions:**
  The issuance of interest bearing securities at negative yields may face design problems (Garbade and McAndrews 2015). Contractual language surrounding the operation of money and capital markets may not envision the possibility of negative rates; thus, the latter may create both legal and operational challenges. More generally, if negative rates were to prevail for long, they may entail the need to redesign debt securities, certain operations of financial institutions, the recalculation of payment of interest among financial agents, and other operational innovations, whose costs may offset the benefits of negative rates (McAndrews 2015).

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

One key question is how deep negative rates must be for these kinds of distortions to become quantitatively important. According to some observers, in an economy like the United States, market rates (not to be confused with deposit rates on excess reserves) staying below –50 basis points on a sustained basis might spawn various financial innovations to circumvent negative rates (Garbade and McAndrews 2012). Such adaptations would, in themselves impose an eventual floor, albeit somewhere below zero, on the extent to which rates could fall (Svensson 2015). However, these kinds of innovations, which uses valuable scarce resources, may impose a net loss in terms of economy wide social value.

If they were to emerge, such financial innovations could include new services, such as the creation of new institutions to handle and store cash on behalf of others. It could also include new behavioral responses, such as making excessive tax payments to the government and earn a zero return until a refund is received from the government, thus avoiding negative rates (McAndrews 2015). At the extreme, if central banks pushed rates too far into negative territory, there is a risk that large sectors of the economy could become cash-based. Under these circumstances, there could even be discussions about the feasibility of a tax on money, a topic that has long been subject to debate in academic circles as a way to overcome the zero bound on interest rates (Buiter and Panigirtzoglou 2003, Ilgmann and Menner, 2011).[xxxii]

The bottom line of all these factors is that, while the benefits of negative rates are broadly similar to those of very low but positive rates, they posit unique risks for financial stability.

Summary and Conclusion

Summary

The research, "a Study of Negative Interest Rate in Monetary Policy: History and Contemporary Scenario in World Economy", composed of different six chapters reflecting coherent and logical study of negative policy rate. Each chapter of the study is constructed on guidance of suitable research plan and research design methodologies. As the study is descriptive and analytical in nature, it grasps ideas from the myriad strand of economic thought and substantiates those gathered ideas with global experience on negative policy rate.

Moreover, the study steps in context with its definition chapter, introduction, which comprises specific aims of study, reason behind the study, its problem statement, scope and limitations. To enhance the subject matter, chapter two, an overview on monetary theory of interest, provides genesis on theory of interest with its debate and discourse. Highlighting the Gesell's tax on money, Keynes' liquidity preference theory and endorsement of Gesell's ideas, and Fisher's time preference theory are the major strength of chapter two. Similarly, chapter three provides the current proposals on negative interest rate and zero lower bound, which are most significant to comprehend modern economic of thought. This chapter is presented as literature review for the study.

In addition, research methodologies are articulated in chapter four where the research plan and research design of the study presents basic outlook and conduct of the study. This chapter also illustrates various experiments of negative interest rate in central banks with their desired objectives. Finally, the remainder two chapters, chapter five and chapter six, are analytical part of the study in which the former analyses and interprets the data of study, and the later gives concluding remarks as summary, findings and conclusion. Hence, the study is presented in conventional and logical manner.

In nutshell, "a Study of Negative Interest Rate in Monetary Policy" effectively accomplishes the stated objectives and addresses the stated problem

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

of study by conducting rigorous and in-depth probe of subject matter.

IX. FINDINGS

Recent experience of a number of central banks - the European Central Bank (ECB), Danmarks Nationalbank, Sveriges Riksbank and the Swiss National Bank (SNB) and lately joined by Bank of Japan (BOJ) – which have introduced negative policy interest rates, by lowering the target for the overnight rate to below zero and/or introducing a negative interest rate on deposits at the central bank to achieve an effective inflation target raised concern about effective lower bound (ELB). There is considerable evidence that unconventional monetary policy can provide additional monetary easing at the ELB, but it may not be a perfect substitute for conventional policy. Moreover, there are many potential costs from the prolonged use of such measures.[xxxiii]

Based on recent experience, some observations can be made about negative interest rates in these economies:

- There is growing consensus that the true ELB is negative. Rough estimates suggest that the ELB could be as low as about -2 per cent, although this is subject to considerable uncertainty, and, in practice, the ELB may be closer to about -1 per cent.
- Transmission of negative policy rates works, although pass-through to bank deposit and lending rates has generally been partial.
- There is little evidence to suggest that negative policy interest rates create excessive financial market volatility, although more time is needed for a full assessment of market reaction. Financial markets have continued to function without significant disruption (so far) in the presence of negative interest rates.
- From an operational perspective, market infrastructure in those jurisdictions that have introduced negative policy rates appears to be working well, although concerns have been raised over challenges in some submarkets.
- The impact on the real economy of a small move to negative rates is likely more modest than a similar-sized move that leaves the policy rate above zero.
- Expectations of the persistence of negative interest rates and disincentives associated with shifting deposits to cash will influence the effectiveness of negative policy rates, as well as how low they can go.
- A number of unintended consequences associated with negative policy interest rates have been envisaged, including the possibility of economic distortions as agents attempt to avoid negative interest rates.

X. CONCLUSION

The aim of this research is to study the negative interest rate in monetary policy as a means to overcome economic stagnation. In doing so, it provides a concise review of the various theoretical origins of negative interest rates in economic literature and substantiates those proposals with citation of experience of negative interest rate in monetary policy. Evidently, negative interest rates have come a long way from anarchistic to modern economic theory. Even if their origins are to be found in a rather simplistic economic theory, which nevertheless Keynes vividly embraced as being prophetic, various prominent economists have picked up the proposal and have shown its value as an additional monetary policy tool. Instead of being the fantasy of a monetary crank, negative interest rates draw on a variety of different modern theoretical backgrounds.

The review of the various strands of research and experience of negative policy rate by central banks suggests that a moderate tax on money may

Volume 2 Issue 7 July 2017
DOI: 10.18535/afmj/v2i7.04
Page : 829-848

be efficiency enhancing and implementing the infrastructure for setting negative nominal interest rates may give central banks an additional valuable policy tool in case of a large deflationary shock. A beneficial side effect could be that the velocity of circulation of coins and notes and probably demand deposits might be considerably more stable if subjected to the Gesell tax and this could render monetary control more efficient. Given that many developed economies have reached the lower zero bound, with central banks unable to combat unemployment and depression, it requires that there is a need for further extensive research, especially in models with more relevant specifications of production, investment, banking, and asset markets, and where money plays an essential role in exchange.

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Page : 829-848

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Page : 829-848