Institute
and Faculty
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An Addendum to

A Cashless Society-

Benefits, Risks and Issues

Negative Interest Rate Policies: a 2018 update (Q1/Q2)

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Negative Interest Rate Policies: a 2018 Q1 and Q2 update: Addendum Contents

Table of Contents

Figures

Reading pre-requisites

This paper provides a contextual update to the NIRP section within the Cashless Society Benefits Risks and Issues (Interim Paper), published by the cashless society working party on the Institute and Faculty of Actuaries (IFoA) website in December 2017.

Resource URLs:

- Interim paper: https://www.actuaries.org.uk/documents/cashless-society-benefits-risks-and-issues
- Cashless Society Working party: https://www.actuaries.org.uk/practice-areas/finance-and-investment/finance-and-investment-research-working-parties/cashless-society-working-party

Executive Summary

The Institute and Faculty of Actuaries (IFoA) is the UK's chartered professional body dedicated to educating, developing and regulating actuaries based both in the UK and internationally. The Institute promotes and supports a wide range of research and knowledge exchange activities with members, external stakeholders and international research communities.

A volunteer working party published an interim report in December 2017, sponsored by the Finance & Investment board at the IFoA, focusing on the "Cashless Society- Benefits Risks and Issues". The paper investigated a number of perspectives for a cashless society. It also defined and explored the potential scenarios and constraints for Negative Interest Rate Policies (NIRP).

This addendum focuses on historical developments for NIRP in the first two quarters of 2018, and provides some extracts from key authority reports on the topic.

It seeks to identify the latest list of countries still with a NIRP in place, with some historical context. It then provides a summary of reported developments for the situation in Japan, Switzerland and the Eurozone.

Key takeaways

- Japan, Denmark, Sweden, Switzerland and the Eurozone currently have a NIRP or ZIRP in place.
- Separately, the US Federal Reserve has been raising interest rates from a near zero environment, generating new differential dynamics affecting the Asian region.
- Term renewal at the bank of Japan and existential questions have prompted much commentary on the prospects of NIRP withdrawal in the medium term due to the health of the Japanese economy. Its banks, both mega and regional, have kept in the spotlight for profitability concerns and their resulting lending strategies.
- The Bank of Japan renewed its long-term commitment to a target 2% inflation rate and monetary easing policy on July 31, 2018.
- Switzerland is more optimistic, however decided on keeping the policy in place due to international tensions, to prevent further strengthening of the Franc.
- There is much speculation on earning potential from the Euro in view of forward guidance. The ECB started reducing its bond buying in January 2018, setting expectations that QE will not last forever.
- An ADBI report observed changing behaviours from life insurers to protect profitability.
- An IMF paper, raises questions on the profitability of pensions and life insurance companies, and reminds us of the role of cash in a NIRP perspective.

Keywords

NIRP, Negative Interest Rate Policy, ZIRP, monetary policy, monetary easing, Japan NIRP, Sweden NIRP, Denmark NIRP, Switzerland NIRP and the Eurozone ZIRP.

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Cashless Society – Benefits, Risks and Issues (Interim Paper)

Introduction to Negative Interest Rate Policies August 2018 Addendum

The Cashless Society Working party's interim paper on "Benefits, risks and issues" explored the mechanics of Negative Interest Rate Policies. A number of countries have implemented NIRP, as well as other unconventional monetary policies.

What have we learnt to date? This addendum complements formal studies mostly dating from late 2017, with relevant news reports on 2018 Q1 and Q2 developments and commentaries.

- It defines the list of countries where a NIRP is in place,
- It provides an overview of key developments for the topic in Japan, Switzerland and the Eurozone,
- It introduces some essential messages from key reports on the implementation of NIRP.

Section 1: NIRP geographical status

Global resources cite a number of countries that implemented a NIRP policy. These lists may show discrepancies, due to:

- Evolution of rates and change of policy over time.
- Inaccurate reporting or interpretation of very low vs zero or negative rates.
- Expanded consideration to real interest rates, ie inflation adjusted policy rates.
- Definition of the policy rate per country, which may differ from the generic interest rate, which is often assumed as the transmission mechanism.

This paper focuses on the countries or currency zones with policy rates officially confirmed to the Bank of International settlements (2) by central banks, and its monthly update on current rates (3).

Some other countries, such as Norway or Hungary are sometimes cited as NIRP countries: their policy rate remained positive, however some other rates may have been negative, such as the reserve rate (Norway) (8) or the overnight deposit rate (Hungary). Bulgaria, and some other countries, may align their policy rates to the Euro area, mechanically leading them to NIRP status. Bosnia & Herzegovenia briefly implemented a NIRP in 2010, but since returned into positive territory.

1.1 Negative Policy rates in August 2018

As per the above definition, five countries or currency zones are confirmed as having ZIRP or NIRP in place in August 2018:

Figure 1 Policy Interest Rates in Japan, Eurozone, Denmark, Sweden, Switzerland, last verified on 06/08/2018

Country/ zone	Policy rate definition	Policy rate last positive (>0) date	Last policy rate change (2)	June 2018 Policy rate	Inflation
Japan	The policy rate changed from the uncollateralized overnight call rate to the short-term policy interest rate in 2016 (2)	Q2, 2010 (10)	September 2016	(0.1)% (3)	0.7% (12)
Eurozone	The policy rate reference "Main Refinancing Operations (MRO)" (3). Most commentaries and the IMF (5) refer to the deposit facility rate to define the NIRP policy in the Eurozone) (4)	Policy rate: March 2016. (2) Deposit facility rate: March 2012 (9)	March 2016	MRO- 0% (2) Deposit facility rate: (0.40)% (9)	2.1% (16)
Denmark	Certificates of deposit rate (2)	August 2014 (2)	January 2016	(0.65)% (3)	1.1% (15)
Sweden	Central bank fixed repo/reversed repo rate (2)	September 2014 (2)	February 2016	(0.5)% (3)	2.1% (14)
Switzerland	Mid-point of the SNB target range (2)	November 2014 (2)	January 2015	(0.75)% (3)	1.2% (13)

1.2 IMF comparative table

The IMF policy paper on NIRP experiences and assessments (5) provide useful comparative tables (reproduced in full below) for the key countries with NIRP or ZIRP in place.

Figure 2 IMF summary of country case studies

	Euro area	Japan	Denmark	Sweden	Switzerland
Goal	• Increase inflation	• Increase inflation	• Defend peg	• Increase inflation	• Increase inflation • Support growth
Instruments	• Neg rates • No tiering • Asset purchases • TLTROII	• Neg rates • Tiering • QQE and Yield control	• Neg rates • Tiering • FX interventions	• Neg rates • No tiering • Asset purchases	• Neg rates • Tiering • FX interventions
Assessment relative to goal	• Some evidence of higher & easier credits • Low, though more stable, inflation outlook	• Headline and core inflation has continued to fall • Higher corporate issuance	• Peg defended successfully • Centre bank balance sheet expansion fully reversed by	• Higher inflation and inflation expectations • Closed output gap • Lower unemploym ent	• Peak appreciation partially unwound, though currency remains overvalued • Improved

			• end 2015 • Policy rates were increased slightly	• Solid lending	inflation outlook
Effects on yields	• Full transmission to money market rates • Lower term premia (also due to the Asset Purchase Program)	• Full transmission to money market rates • Lower and flatter yield curve	• Full transmission to money market rates (except when policy rates are their min)	• Lower and steeper yield curve	• Full transmission to money market rates • Entire yield curve turned negative
Effects on exchange rates	• Depreciation over 2016, but mostly due to other factors	• Any potential impact has been overshadowed by other factors	• Appreciation pressure on peg has waned	• Broad stability of krona in 2015-16	• Franc has been relatively stable • Avoided appreciation from safe haven flows
Effects on bank net interest margins	• Somewhat lower, as lending rates have decreased more than deposit rates	• Lower, as lending rates have decreased more than deposit rates	• Broadly unchanged as lending rates have not decreased much • And cheaper wholesale funding	• Broadly unchanged, aided by cheaper wholesale funding	• Slight increase as stable lending rates • While lower average deposit rates
Effects on bank profits	• Lower margins offset by higher lending volumes, fees, cost cuts, capital gains, lower provisioning costs, especially if low share of variable rate loans, and loans with long amortization periods	• Impact has differed across institutions depending on share of deposit funding, long-term fixed rate loan, and increased competition.	• Minimal due to stable net interest margins, higher fees and low loan impairment	• Minimal due to limited reduction in margins	• Minimal as slight increase in margins combined with stable lending and some capital gains on securities
Effects on cash hoarding	• None detected	• None detected	• None detected	• None detected	• None detected
Other effects/ comments	• Concern with longer term profitability of banks if negative rates persisted, or cut further	• Concern with longer term profitability of banks • Money markets less liquid • Repo markets still liquid	• Increase in house prices in some segments due to low mortgage rates		• Concerns about viability of pension funds and life insurance companies if negative rates persist.

1.3 US Federal Reserve policy

Figure 3 Policy interest rate in the US

Country/ zone	Policy rate definition	Policy rate last positive (>0) date	Last policy rate change (2)	June 2018 Policy rate	Inflation
US	Federal funds rate (2)	N/A	June 2018	1.875% (3)	2.9% (17)

Although technically not running a NIRP, very low interest rates combined with inflation levels averaging 1.5% from the start of the financial crisis (2009 to 2016), a comprehensive geographical coverage ought to keep in mind the possible spillover effects to and from the US and other geographies with similar policies. Noise from media coverage in 2018 Q1 has been typically critical of the Fed policy, with concerns over effectiveness, weak underlying fundamentals, moral hazard, bubbles forming, incentive to risk, and the impact of withdrawal (18).

> *"In an effort to better position itself for QE4, QE5, and negative interest rate policy (NIRP) for the next recession, the Federal Reserve is attempting to nudge interest rates upward - it is refraining from acting as a net buyer of U.S. Treasury bonds. This reduces the demand for U.S. Treasuries. ... The attempt to unload tens of billions, then hundreds of billions, and eventually trillions of dollars, however, will create recessionary pressure. The higher borrowing costs climb, the less people will be able to spend. In a similar vein, lower credit quality companies will have trouble financing their operations. Asset prices from real estate to stocks might slide. And a reverse wealth effect could mark the end of the current expansion. As it stands, stock market participants already are pondering what higher borrowing costs will mean for everything from the business of real estate to the consumer based economy at large. One needs to look no further than the breakdown of homebuilder stocks. Few seem to ponder the possibility, even a likelihood that the worst is yet to come for assets like stocks and real estate. Assets have skyrocketed with little resistance since 2011 on trillions upon trillions of global central bank liquidity. And now that it is being removed, albeit at a snails pace, we should expect the addiction to ultra low borrowing costs to dissipate without incident?"*

1.4 interest rates differentials

The US Fed Reserve (17) increased its rate several times in 2018, meaning it is now above a number of countries in Asia, including Thailand, Taiwan, New Zealand, South Korea and Australia. Does it matter?

The differential may be compensated by differential in inflation and currency rates. Current account surpluses in Thailand and Taiwan may also compensate, commentators suggest.

Section 2: Japan

To date, Japan has been the country with the most persistent application of NIRP.

Figure 4 Timeline of Japan's unconventional monetary policy (ADBI, 48)

Date	Description		Governor
December 19, 2008	Lowering of the bank's target for the uncollateralized overnight call rate by 20 basis points; it will be encouraged to remain at around 0.1%.		Shirakawa
December 18, 2009	The midpoints of most policy board members' "understanding" are around 1% of the consumer price index inflation rate.		Shirakawa
October 5, 2010	Comprehensive monetary easing		Shirakawa
January 22, 2013	The "2% price stability target" under the framework for the conduct of monetary policy		Shirakawa
April 4, 2013	Introduction of the "quantitative and qualitative monetary easing (QQE)"	QQE1	Kuroda
October 31, 2014	Expansion of the quantitative and qualitative monetary easing	QQE2	Kuroda
January 29, 2016	Introduction of "quantitative and qualitative monetary easing with a negative interest rate"	NIRP1	Kuroda
September 21, 2016	New framework for strengthening monetary easing: "Quantitative and qualitative monetary easing with yield curve control"	NIRP2	Kuroda

2.1 January to July 2018 developments

Media coverage of NIRP in Japan was prolific early 2018, building upon Kuroda's second term as the Bank of Japan (BoJ) governor, followed by deputy governor nominations (19).

NIRP has helped Japan reduce debt issuance (20): The BoJ negative interest rate policy, introduced in February 2016, has proven to be strong aid to the government's effort to reduce bond issuance, bringing in a steady stream of extra income each year. The Ministry of Finance expects such extra funds to total 1.5 trillion yen.

The negative rate has put more money into the real economy, but into real estate deals (21) instead of capital investments. Now, Japan's real estate lending slows amid housing glut (22). Yet, Japan Post Holdings, the largest holders of deposits (51), plan to reinforce their real estate operations (23).

The profitability of Japanese banks is an ongoing issue, much commented on early 2018: The aggregate figure for the four banks has shrunk 14% since April-December 2015 (24), before the negative interest rate policy was introduced, to 1.64 trillion yen. Their combined net business profit, a measure of core earnings that excludes certain costs, has also slumped 28% over the last two years. Nomura Research (25) draws more systems development demand from financial institutions.

Default risk surges on BoJ negative rates while watchdog readies contingency plans: Japan's regional banks (26) are under increasing scrutiny from the country's regulators as their earnings deteriorate. Many of these smaller banks have managed to stay in the black thanks to securities trading (27). However, their bond investments have taken a hit, and there are worries these banks could face more trouble ahead ... finance minister Taro Aso told a regular news conference that while some regional banks have incurred capital losses on their foreign bond investments, it has not reached a dangerous level. NIRP squeezes domestic loan margins and saps profitability (28).

NIRP is making it difficult for companies to manage their assets at home (29). Japanese investors found little choice but to send their investments abroad (30) to chase higher yields. Demand for infrastructure financing is growing in Asia and the Middle East (31).

Mizuho CEO sees two more years of Japan Central Bank Easing (32), and breaks tradition in partnership with rival's regional ally (33), for cost savings despite others predicting a change by end of 2018. M Watakabe, one of the government nominees for BoJ deputy governor, said he will propose additional monetary easing if needed (34) to attain the central bank 2 percent inflation target: is it achievable? (35) Some comment that a new inflationary cycle started in 2017 (36) on the back of labor shortage putting pressure on hourly wages. Also positive is that, although he is an advocate of monetary easing, he would be against the negative interest rate policy.

The long gloomy years of deflationary stagnation (37) appear to be ending. In his second term, commentators suggest Kuroda will be responsible for tackling two important tasks (38): ensuring Japan's escape from deflation, and providing an orderly exit from the central bank's extraordinary monetary easing program. Kuroda says the BOJ is likely to consider exiting easing around FY 2019 (39).

Banks profitability was in the spotlight once more in May, as megabanks posted higher profits for strong overseas business in 2017 (40), compared with a 19.4% core banking operations due to slugglish domestic growth. Some also found robust lending opportunities such as the growing airline industry (41), and seized the drive towards a cashless economy to cut costs in ATM and branch services (42) to offset the effects of NIRP. A number of regional banks have returned to profit (43) this past year despite the effect of NIRP, though their trading strategies (44) and risk approaches may be modernized, according to some commentators. There seems no end of NIRP in sight, as growth forecast has been raised (45), but inflation forecasts are still below target. How will the rise of interest rate from the US Federal Reserve (46) impact the Japanese economy?

2.2 July 31 announcements

On July 31, the Bank of Japan [70] noted improvements in the Japanese economy over the past five years. However, it has not yet achieved the 2% inflation rate, mostly due to household and firms' behaviour, entrenched in the experience of prolonged low growth and deflation. In addition, retail competition, dubbed the "Amazon effect", constrained the rise in inflation. Although progress is slower than expected, indicators are positive through the aggregate supply-demand balance: the positive output gap will keep driving the inflationary momentum and resolve the other constraints. The Bank has therefore decided to strengthen the monetary easing policy in place to keep the output gap positive.

However, it adopted some measures to ensure the monetary policy is sustainable for the foreseeable future:

- It committed to the 2% target inflation rate, and to maintain the very low short and long term interest rates for an extended period of time,
- While the target level of 10-year JGB yields remains near zero percent, it might now move up to 0.2% (from 0.1%) [69], or back down to adapt to changing conditions and to ensure the market functions. The bank would respond promptly to rapid yield rises through adapting its purchasing levels accordingly,
- It reduced the size of the policy rate balance to which a negative interest rate is applied, for financial institutions [68].

Despite critical reviews of the announcements [67, 69], private banks and insurance companies are expected to welcome the move. However, the policy rate balance change led to commentators viewing this as a first step away from NIRP policy, and a tapering of stealth effects from the NIRP policy [69].

Are we heading towards the end of a NIRP era (47)? With Jerome Powell taking over the U.S. Federal Reserve and Mario Draghi and Mark Carney moving on next year from the European Central Bank and Bank of England respectively, Kuroda may soon be the only veteran of the "zero-interest-rate-policy" era left heading up a major central bank.

2.2 The impact of Japan's NIRP on Asian financial markets

The introduction to a key ADBI paper (48) on the impact of Japan's NIRP on Asian financial market provides useful references to other papers that suggested spillover effects from highly accommodative monetary policies on the rest of the world, esp emerging markets. The paper focuses on quantifying the effects of Japan's policy on Asia's financial markets. It concludes:

> "*In this paper, we explored what spillover effects Japan's negative interest rate policy (NIRP) had on Asian stock markets. Unlike the QQE without a negative interest rate, the QQE with a negative interest rate had limited impact on the Japanese economy. However, the NIRP brought various undesirable consequences to the Japanese economy, especially to its finance sector. It is thus likely that its spillover effects are very different from those of the QQE without a negative interest rate. Our empirical result suggested that spillovers from Japan's financial shocks to Asian stock markets had contrasting features in the NIRP period, which were not observed in the pre-QQE or the QQE periods. In particular, they showed that the NIRP might have benefited Asian economies through a decline of excess returns in Japan's finance sector.*
>
> *One notable consequence of the NIRP was that not only short-term but also long-term interest rates became negative. Under prevailing negative long-term interest rates, most of the Japanese local financial institutions lost their profit opportunities in domestic markets. They thus needed to explore a new profit opportunity outside Japan. Figure 10 shows the amount of net purchases of foreign long-term securities by Japanese life insurance companies from 2005 to 2016. Until January 2016, the monthly amount had usually been less than ¥50 billion and rarely exceeded ¥100 billion. But the amount soared up dramatically in February 2016 and remained high. Such large and persistent net purchases never happened during the last decade. This implies that Japanese life insurance companies that lost investment opportunities in domestic markets expanded their investment to foreign markets after the announcement of the NIRP.*
>
> *When exploring a new profit opportunity outside Japan, financial markets in emerging Asia, rather than those in advanced economies, were their natural choices. They are still risky but potentially highly profitable investment destinations. It is likely that their changed investment behavior benefited Asian economies, especially their finance sector. Our empirical results supported the view.*"

Section 3: Switzerland

In April 2018, the SNB reported positive (49), more optimistic progress for the Swiss economy, attributable, partly, to the weakened value of the Swiss Franc, as well as the upturn in the global economy. However the situation is still fragile:

> "With a view to ensuring appropriate monetary conditions, we are continuing to pursue our expansionary monetary policy. This is based on the negative interest rate that banks and other financial market participants are charged on their sight deposits at the SNB and on our continued willingness to intervene in the foreign exchange market as necessary. Both instruments remain essential, as the situation is still fragile. While the foreign exchange market has largely shrugged off recent equity market turbulence, circumstances in the financial markets – and thus by extension monetary conditions for the economy – could rapidly deteriorate again. Such a development would be undesirable in the current environment. Inflation is now within the range that the SNB equates with price stability, and capacity utilisation in the economy has continued to improve. Nevertheless, inflation remains low and inflationary pressure is modest despite our expansionary monetary policy. Tightening monetary conditions would be premature at this juncture, and would risk unnecessarily jeopardising the positive economic momentum that has been established"

In June 2018, the SNB maintained its direction (50, 51), highlighting political tensions, and a key target of preventing the Swiss Franc from strengthening a the currency remain "highly valued", with an inflation forecast at 0.9% for this year and next.

Section 4: The Euro area

4.1 2018 Q1 NIRP Euro area developments

Speculation about possible unwinding of the NIRP in the Euro area fed much media content early 2018, following statements from ECB's Benoit Coeure (52) and Yves Mersch, amidst concerns for the savings culture.

> "Markets have to understand that QE will not last forever" and Yves Mersch that "the executive board must be 'very careful not to act too timidly and too late and to fall behind the curve",

Markets are expecting forward guidance to change in the coming months, although there isn't sufficient inflationary pressure yet (53).

The ECB announced late 2017 that it would start reducing its asset purchase from €60bn to €30bn (54). Long term interest rates, which had remained low, are now rising, and there is a movement buying euros due to a speculation that there will be more opportunity to make a profit. Some economists are suggesting that the euro will be the most composed currency of 2018.

Market volatility rose at the start of February (55) against a backdrop of strong economic data, causing many investors to question whether the bullrun for the stock market was over. Many sources referred to the end of a 9-year cycle. Is the reversal sustainable without assistance? In Germany, consumers were in a spending mood (56), while the Bundesbank profits rose by €1bn in 2017 (57) as a result of the ECB's NIRP policy.

Where is the money? There appears to be a large gap between the level of liquidities and bank deposits: some argue that depositors have bought assets in the US (58) and elsewhere, plus having used the liquidities to pay down debt (59).

4.2 NIRP lessons from the Euro area

A paper written by two ECB members (60) appears to be a draft, as per missing conclusion and seemingly unofficial formatting. Its abstract states:

> *"This paper reviews the recent literature on the effects of negative interest rates. It documents the pass-through of negative policy rates on bank deposit and lending rates and loan volumes in the euro area. It first shows that the zero lower constraint is binding for interest rates on household deposits held at banks. Nevertheless, the passthrough on loan rates is more than complete, even at banks with high deposit shares. The negative effect on the interest rate margin and profitability is generally offset by the positive impact of lower market rates on asset values and loan loss provisions."*

The technical paper provides insightful literature review of policy-controlled interest rates in a negative rate environment. Within the specific context of the Cashless Society Working party, the following elements that focus on the role of cash are noteworthy:

> *"Overall, the available evidence suggests that the most relevant friction connected with NIRP is a complete lack of pass-through to interest rates paid on banks' household deposits. Naturally, the question arises why banks' are reluctant to pass-on the negative rates to their household deposit base, particularly in light of the different treatment of NFC deposits. The most obvious explanation is the availability of cash as an alternative to a bank deposit. Storage costs of cash (e.g. rent for vault space) and the inconvenience arising if cash needs to be used for (large) transactions are factors potentially driving a wedge between the zero remuneration offered by cash and the remuneration of the alternative bank deposit. The costs*

of holding (and having to use) cash are likely increasing in the size of the bank deposits that need to be replaced by cash. Household deposits are normally smaller than NFC deposits and this difference is very likely a key driver of the difference in pass-through. In the same vein, the inconvenience cost of having to process payments in cash is much higher for NFCs than for households. If banks are unable to charge households negative rates on their deposits, why wouldn't banks simply reduce their household deposit funding? One answer lies in the observation that banks' funding models are strategic decisions which incur fixed costs (e.g. setting up offices to attract and serve customers) and from an intertemporal perspective a short spell of negative rates may not be enough to change the overall business logic of the banks' funding model.
Another reason, possibly more fundamental, is that household deposits are widely seen by banks as a (cheap) source of stable and longer-term funding that receive favourable treatment under the new liquidity regulation (e.g. NFSR). Arguably, the overall attractiveness of household deposits as a source of funding to banks has increased since the start of the great financial crisis, manifesting itself in a secular increase of the share of household deposits in euro area banks balance sheets."

It continues by stating: "*The theoretical analysis shows that important determinants of whether a NIRP may have contractionary bank lending effects are the bank's reliance on household deposits versus wholesale funding on the liability side and the interest rate sensitivity of the bank's assets on the asset side."*

Section 5: NIRP policy reviews

5.1 NIRP: Initial experiences and assessments, IMF

The IMF delivered a review of the experience with NIRP to date (61), as implemented in seven countries. The review was completed in March 2017, and published in August in the same year. The paper first discusses theoretical and operational aspects of NIRP, esp on bank profitability and compares NIRP vs QE.

> *"As with low but positive rates, NIRPs may reduce the profitability of pension and insurance companies. The key vulnerability for pension and insurance companies arises when returns from assets come down below the companies guaranteed returns on their liabilities. NIRPs thus simply exacerbate effects of low (but positive) policy rates and QE. But as rates go from positive to negative territory, there should be no discontinuity in profits of non-bank financial companies. In this context, it is worth noting that some safe haven government bonds—more relevant to nonbank profits than reserves at the central bank—exhibited negative yields even before central banks implemented NIRPs."*

It concludes that to date, NIRPs have facilitated some easing of financial conditions, with limited side effects. On balance, the limits to NIRP point to the need to rely more on fiscal policy, structural reforms and financial sector policies.

> *"There is some evidence of a decline in loan and bond rates following the implementation of NIRPs. Banks' profit margins have remained mostly unchanged. And there have not been significant shifts to physical cash. That said, deeper cuts are likely to entail diminishing returns, as interest rates reach their "true" lower bound (at which point agents shift into cash holdings). And pressure on banks may prove greater; especially in systems with larger shares of indexed loans and where banks compete more directly with bond markets and non-bank credit providers."*

Overall, this study concludes that the success of NIRPs to achieve the stated goals (of raising inflation or decreasing appreciation pressures) has been mixed so far: transmission seems to have worked well, with some reduction on lending rates, but the impact on exchange rates is mixed. Banks net interest margins seem to have been resilient. Profitability seems to have remained unchanged, though the paper acknowledges that the whole picture may not yet have emerged. In particular, impact on money markets needs monitoring.

> *"The main difference between policy interest rate cuts above and below zero, from both a theoretical and operational perspective, hinges on the role of cash. It is generally agreed that policy rate cuts in positive territory reduce market interest rates, as well as bank lending and deposit rates. Policy-rate cuts will reduce lending margins to the extent they flatten the yield curve and lower term and risk premia. But they will support profitability to the extent they stimulate aggregate demand, improve the creditworthiness of borrowers, and lower provisioning needs. Further, banks benefit from capital gains from the repricing of assets on their portfolio (although this is a transitional effect). These same effects would hold, in principle, for NIRPs in a cashless economy. However, the possibility that agents can switch to cash if returns on other financial assets become sufficiently negative (to offset the cost of holding cash, which may vary across economic agents and jurisdiction), establishes an "effective" lower bound for interest rates which further cuts are ineffective (and possibly counterproductive)."*

5.2 The implementation of NIRP in Europe and Japan, Asian Development Bank Institute

The Asian Development Bank Institute's working paper (62) is a key read in its objective of addressing key aspects that have received little attention in the literature to date, and provides in depth geographical perspectives. It brings forward three key arguments:

1. *"The first argument is that negative policy rates and negative money market rates are not entirely new. Monetary authorities have experimented with negative policy rates before and money market rates have occasionally turned negative in several economies in the past. What is new is the explicit nature of recent negative interest rate policies, central banks' communication of these policies, and the coordination of different policy levers to simultaneously lower policy rates and money market rates more significantly and more permanently below zero.*
2. *The second argument is that the purpose, design and operational specificities of NIRPs and related policies differ substantially around the world, which affects the ultimate impact these policies have on a country's economy. Motivations for adopting negative rates and their technical implementation have differed considerably among countries depending on central banking traditions and macroeconomic conditions, leading to substantial divergence of money market rates and effective average rates. These differences matter for how wholesale rates translate into retail rates, how expectations and private sector funding conditions are affected, and how a country's economy ultimately reacts.*
3. *Finally, the changes taking place in international finance since the Global Financial Crisis have substantially changed the context in which monetary policy is being applied. Restrictions on banks' balance sheet space and profitability pressures have challenged traditional business models and limited arbitrage across asset classes and markets. This affects the transmission of monetary policy across interest rates and exchange rates, as the breakdown of the Covered Interest Parity Condition forcefully demonstrates (Borio, McCauley, McGuire, and Sushko, 2016). Greater attention to the interaction between regulatory and monetary policies is thus warranted."*

5.3 Further technical reports

A JCER paper (63) re-assesses the outcome of QQE, vital economics of Japan, and considers the conditions for the BoJ to exit QQE and NIRP smoothly.

A paper from the Bank for International settlements (64) "proposes a new model to extract the impact of negative interest rates on the yield curve which fits the data much better than alternative models. This new model introduces two latent state variables that capture the immediate and longer horizon monetary policy stances, respectively, in order to describe the rich dynamics playing out at the short end of the yield curve."

An academic paper (65) investigates the influence of NIRP on bank margins and profitability. Using a dataset comprising 16,675 banks from 33 OECD member countries over 2012-2016 and a difference-in-differences methodology.

Conclusion: NIRP in early 2018

Negative (and Zero) interest rate policies have now been entrenched in Japan, Denmark, Sweden, Switzerland and the Euro area as a key measure to recover from the 2008 financial crisis.

2018 indicates a crossroads: some countries are planning to pull away from the policy as economic fundamentals have improved and inflation levels appear to return to target thresholds.

- Will Japan be able to retract the policy if its economic fundamentals don't improve?
- In the context of rising trade protectionism and other international risks, will Switzerland have to continue with the policy to prevent its Franc from gaining further safe haven value?

As some signs converge to the end of QE towards early 2019, how smooth can the transition be? What opportunities and threats will arise?

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