Negative Interest Rates A Real Possibility

• 1.0% cash rate and weakening growth a precarious starting point
• Further GDP deterioration could mean a negative cash rate sooner rather than later
• OCR floor at -0.5%?
• Unconventional policy not desired but plausible
• QE via the NZD to provide extra stimulus
• Fiscal easing a preferred option

As the RBNZ’s cash rate moves ever lower, the possibility of a negative cash rate, or unconventional monetary policy, gets ever higher. Investors, borrowers and savers alike need to start pondering the implications of this now because, if we are to head into this uncharted territory, the process may evolve much sooner than many expect.

The starting point of a 1.0% cash rate already leaves us precariously close to such a radical departure from the norm. But the real risk, in our opinion, is that economic growth fails to live up to the RBNZ’s expectations. Our central forecast says it won’t and the multitude of leading indicators that we follow suggests that the risk to our view is significantly weighted to the downside. If the RBNZ continues to see the world through the lens it used when it put together its August MPS, these downside risks eventuate, and inflation looks set to fall then a move to negative interest rates becomes close to a done deal.

Note that the RBNZ has strongly expressed a preference for its cash rate to go negative before it contemplates unconventional policy. That’s largely because it believes the normal transmission mechanism between interest rate moves and an economic response is intact.

Of course, the question that is then begged is how low can rates go? In all truth, we are not sure. After all it was not that long ago that negative interest rates were dismissed as being an impossibility. We can say the following though:
- The lowest policy rate implemented overseas to date is -0.75% in Switzerland.
- There will be a point when interest rates are so low that folk hoard cash. At this point lowering interest rates any further loses its effect.

Given what we have seen overseas, it seem to us that the RBNZ might be able to lower the cash rate to around -0.5% under New Zealand’s current framework. We should note that this does not mean that lending and borrowing rates will necessarily fall sub-zero. Banks will still need to attract domestic deposits to meet their funding requirements and they are unlikely to do so with a negative sign as an offering. With funding costs above zero borrowing rates will also be above zero.

Of course, one shouldn’t forget the fact that if any inflation remains in the economy the real returns and costs of financial transactions would still be negative.

Only if cutting interest rates does not have the desired effect would the RBNZ contemplate going down the unconventional track. We believe it is only very early days in terms of the RBNZ’s analysis of these alternative policy measures.

But we would make the point that, in New Zealand’s case, the ultimate impact of unconventional policy is more likely to be felt through the currency channel (i.e a lower New Zealand dollar stimulating exports and increasing domestic inflation) than it would be via the credit channel.

Beyond a negative OCR, quantitative easing would be the first cab off the rank as the central bank purchased a selection of available assets, primarily Government bonds. While this might further lower interest rates the real impact would be the crowding out of offshore investors and the ensuing weakening of the NZD.

We note, however, that there are limitations to this process given that New Zealand fixed interest markets are not exactly the largest on the planet.

What all this points to, of course, is that monetary policy needs friends. In the event that substantial stimulus was required, some form of targeted fiscal easing would appear to us to be a much better approach. In this case the RBNZ could be the backstop in that it could, if deemed appropriate, purchase the extra debt that the Government required to fund its stimulus and, in so doing, stand in the way of any interest rate response.

All this stuff gets very complicated and what we have said so far is simply a gloss over the huge issues that now confront us. For much greater detail and answers to your questions on such matters as:
- what is special about negative interest rates?
- how low could the OCR go?
- quantitative easing explained
- what are the other unconventional options?
- the market implications

read on, as all this is covered in the following interest rate research note by BNZ’s fixed interest strategist Nick Smyth.

stephen_toplis@bnz.co.nz
Negative interest rates and other unconventional policies in NZ

- With the OCR now just 1%, the RBNZ has signalled it is evaluating unconventional policies.
- Recent comments from Governor Orr suggest he has a preference for negative rates over QE.
- We discuss the trade-offs involved with negative rates as a potential policy tool along with the other unconventional options available to the RBNZ, including QE and unsterilised FX intervention.
- Opening up the option of a negative OCR affects the probability distribution of market interest rates. It means short-end NZ swap rates can still rally hard if the global or domestic outlooks worsen.
- Compared to QE, a negative OCR would argue for lower short-end swap rates, a steeper curve and narrower swap spreads.

Background

With the OCR just 1%, global markets pointing to significant downside risks to the economic outlook, and major central banks expected to ease policy further, the prospect of the RBNZ reaching the limits of conventional monetary policy has become much more real. Governor Orr acknowledged in the post-MPS press conference that it was easily in the realms of possibility that “we may have to use negative interest rates in the future”.

We expect the RBNZ to cut the OCR to 0.75% in November, with the risk of a deeper easing cycle. Markets now price the terminal OCR at around 0.6% by mid-2020 (see Chart 1). We acknowledge that if the New Zealand or global outlooks deteriorate, the RBNZ could soon be in a position where it is deliberating on unconventional monetary policy. Governor Orr has outlined a preference for negative interest rates over quantitative easing (QE) in the event unconventional policy is required.

What is special about negative rates?

A negative nominal rate means that an institution pays interest on the funds it lends. For instance, if an institution lent $1m for one year at an interest rate of -1% it would expect to receive $990,000 at the end of the term. However, negative real interest rates are common. The major NZ banks pay an interest rate on retail call accounts barely above 0%.

If inflation were 1%, a person who leaves $1m in their call account for one year would receive the same amount of money back at the end of the term, but this would only buy goods and services worth $990,000 (in today’s money). The person would be in an identical position with a negative interest rate of -1% and an inflation rate of 0%. However, behaviourally, some people may treat negative nominal interest rates differently, as the concept of paying someone to borrow money is unusual.

One of the reasons negative nominal interest rates are special is that people have the option of holding cash. So, in theory, households or businesses could withdraw cash and earn 0%, which is higher than the negative interest rate in their bank accounts. Of course, holding cash presents security risks, so there are costs of storage and insurance if done on scale. That means banks could probably implement modestly negative interest rates before it becomes economic to hold cash instead of leaving money at the bank. The overseas experience, in those countries that have implemented negative policy rates, is that cash rates can be lowered to modestly negative levels without triggering a surge in cash withdrawals. However, banks in these jurisdictions have been reluctant to pass on negative interest rates to retail deposit accounts, with a clustering around 0%, although negative rates have generally been applied to institutional and larger corporate clients.1

The stickiness of retail deposit rates at 0%, related to convertibility of bank deposits to cash, presents some problems for the efficacy of monetary policy at negative policy rates. If there is full pass-through from policy rate

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1 For example, see the ECB’s paper: Negative interest rates, excess liquidity and retail deposits.
cuts to lending rates, but retail deposit rates are floored at zero, then bank net interest margins will fall, which may adversely affect bank profits and possibly their willingness to extend credit to the real economy. If banks attempt to maintain net interest margins at negative interest rates, then the pass-through from policy rate cuts to real economy lending rates will become increasingly less as the central bank rate goes more negative. And at some level of negative interest rates, the cash rate would reach an ‘effective lower bound’. Some central banks have offered various subsidies to banks, for instance in the form of discounted funding or exemptions to negative rates (i.e. the ECB’s TLTR and ‘tiering’ systems of reserves) in an attempt to lessen the impact of negative rates on bank profitability.

Monetary policy implementation with a negative OCR

For NZ, the OCR is the primary interest rate that the RBNZ sets when implementing monetary policy and is the rate at which banks are remunerated on their settlement account balances held with the central bank. The RBNZ runs a ‘fully cashed up’ system, with total settlement cash in the NZ system having averaged $7.6b in June, and between ~$7.2b and $8.4b over the past two years. Each institution with a settlement account has individual limits, or credit tiers, the balances of which are remunerated at the OCR. If banks hold cash in excess of their individual limits, they are remunerated at a rate 1% below the OCR (this is akin to the ECB’s deposit rate facility). The banks are therefore incentivized to lend amongst themselves to ensure they avoid the penalty rate. The RBNZ has set the levels of the credit tiers and manages the quantum of cash in the system such that short-term interest rates trade at, or near to, the OCR.

In principle, if the RBNZ decided that further stimulus was required, say for instance if there is a major downturn in the global economy, then it could reduce the OCR to a negative rate, like -0.25%. In this case, the penalty rate would be -1.25%, based on the current margin. As the RBNZ wouldn’t be forcing extra liquidity into the banking system, as it would with QE for instance, market rates should continue to trade near to the OCR, in which this example is -0.25%. If the RBNZ decided to add stimulus in such a way that it injected large quantities of reserves into the system, such as via QE or unsterilised intervention, the tiering system and remuneration structure might ultimately need to be revamped. If the credit tiers were not changed, individual banks would, at some point, exceed their limits and money market rates would trade nearer to the RBNZ’s penalty rate (as they do in Europe currently, with the ECB’s -0.4% depo rate than 0% refi rate). This would lower the term structure of the NZ yield curve and likely push the NZD lower. At this point, the RBNZ could switch to targeting the penalty rate as its key policy variable (as the ECB does with its depo rate) and choose whether to calibrate the tiers to an appropriate level to shield the banks from the full cost of the negative interest rate policy. Or, more likely, it could eliminate the tiers entirely, moving to a system more akin to the US Federal Reserve, where required and excess reserves are both remunerated at the same interest rate.

How low could the OCR go?

In a post-MPS interview, Assistant Governor Hawkesby said the RBNZ “has never put a number” on the effective lower bound for the OCR. The lowest policy rate implemented overseas to date has been -0.75% in Switzerland, although the SNB provides exemption amounts to shield banks from the full cost of the negative rate. Taking account of the various exemptions offered by central banks with negative rates, we estimate that the lowest weighted average rate on reserve balances is close to -0.6% in Denmark (see Appendix), a similar level to that previously experienced in Sweden.

While some researchers have questioned the effectiveness of negative rates in these countries, the overseas experience to date would suggest the RBNZ should be able to reduce the OCR to -0.5% under the current framework. If the OCR were lowered to -0.5% for Australia, NZ, and the US, current information would indicate that the RBNZ should be able to lower the OCR to -0.5%

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5 Negative interest rates, then the pass-through from policy rate cuts to real economy lending rates will become increasingly less as the central bank rate goes more negative. At some level of negative interest rates, the cash rate would reach an ‘effective lower bound’. Some central banks have offered various subsidies to banks, for instance in the form of discounted funding or exemptions to negative rates (i.e. the ECB’s TLTR and ‘tiering’ systems of reserves) in an attempt to lessen the impact of negative rates on bank profitability.

6 If demand for settlement cash increased (for whatever reason) such that the RBNZ needed to provide more liquidity to the system, some individual banks could be at risk of breaching their credit tiers. But the RBNZ could always adjust those credit tiers to ensure market rates continued to trade near the OCR.

7 Several overseas central banks have tiering systems, in effect shielding some portion of banks’ reserves from negative rates. These countries generally have much more ‘excess liquidity’ in the banking system as a result of unconventional policies. The RBNZ system was designed to prevent banks hoarding cash, rather than subsidising their exposure to the penalty interest rate.

8 In general, the greater the proportion of reserves that the central bank exposes to the penalty rate, the less scope there is to cut into negative territory (assuming no innovations, such as via QE or unsterilised intervention, the tiering system would remain). The RBNZ could adjust the rate tiers to ensure market rates continued to trade near the OCR.

9 Read more about the specifics of the RBNZ’s current monetary policy implementation in an RBNZ Bulletin article.
-0.5%, it would imply an annual direct cost to the NZ banking system of around $38m, equivalent to around 0.5% of pre-tax profits for the NZ banking system. 11

Further interest rate cuts might be possible, and indeed a number of offshore central banks with negative policy rates are priced for further rate cuts over the coming twelve months (see Chart 2). We would, however, note that the countries that have implemented negative rates internationally to date have exclusively been current account surplus (i.e. saving) countries. NZ is a current account deficit country and needs to attract capital. This suggests the potential for a greater NZD reaction if the RBNZ were to match the negative levels seen offshore, suggesting a higher effective lower bound in NZ.

The pass-through to retail rates
One of the issues with a negative cash rate is that the pass-through to retail deposit and lending rates might start to weaken. In NZ, the major banks offer retail call accounts (where people can freely access their cash without withdrawal penalties) with interest rates of close to 0%. Retail bonus saver accounts, which offer a ‘bonus’ interest rate subject to a limited number of withdrawals a month, are closer to 1.75%. Term deposits, which have break fees, pay interest rates closer to 3% for terms six months or longer (see Chart 3).

Call accounts, or transaction balances, account for around 22% of NZ banks’ deposits and around 17% of overall funding (Chart 4). The overseas experience to date is that banks will be reluctant to take those call account rates negative for retail customers. This means that OCR rate cuts, even from present levels, could have some impact on banks’ net interest margins, or that there is incomplete pass-through to lending rates, weakening the transmission of monetary policy. While there is notionally a lot of room for term deposit and bonus saving rates to fall in NZ (and, indeed, there has been some move in this direction recently), banks will want to preserve a spread to call accounts, given the regulatory preference given to ‘stickier’ deposit types.

The RBNZ’s bank capital proposal, with final details due in November, is another consideration. The RBNZ proposes that NZ banks should hold significantly more Tier 1 capital, which could add additional pressure to bank profitability and/or further dampen the pass-through to retail lending rates from additional OCR rate cuts. This is one reason to think that the RBNZ might adopt a subsidised funding scheme of some sort if it were to introduce a negative OCR, like the Bank of England’s Funding for Lending scheme.

The possibility of deeply negative rates
In that media interview, Governor Orr referred to the work of Ken Rogoff, who has written on ‘unconstrained negative interest rate policy’ – i.e. taking the central bank policy rate deeply negative. 12 Among Rogoff’s proposals are that central banks eliminate high denomination banknotes, thus increasing the difficulty and costs of storing cash to earn the implicit zero percent rate. 13 There have been other proposals made by academic economists with the intention of effectively passing negative interest rates onto cash, something Orr himself specifically hypothesised about in that interview. 14

The academic appeal of deeply negative rates, if the issue with cash can be overcome, is that it is unconstrained by the quantity of assets available (as QE is), doesn’t introduce P&L volatility to the central bank’s balance sheet (as QE and unsterilised intervention do), can be implemented by an independent central bank with a defined mandate and, in theory, should work in generating sufficient borrowing, spending and inflationary pressure. Proponents of negative interest rates, such as Rogoff, argue that negative interest rates are superior to the central bank’s other policy options when facing a crisis with little, if any, conventional monetary policy ammunition left – i.e. it being the ‘least

11 This assumes $7.6b in settlement cash remunerated at 0.5%. The Appendix also shows a hypothetical scenario where the amount of reserves increased to $30b (say under QE), the RBNZ eliminated the credit tiering system, and cut the OCR to -0.5%. In this case, the implied annual cost to the NZ banking system would rise to around $150m (or approximately 2% of pre-tax profit). $150m equates to around 0.03% of total bank assets, similar to the Euro area and Sweden.

12 See for instance, The Case for Implementing Effective Negative Interest Rate Policy.

13 Coincidently, the RBNZ is reviewing the future of cash in New Zealand at present.

14 See the IMF working paper Fighting Deep Negative Rates to Fight Recession: A Guide.
worst’ policy option, especially if the zero lower bound on cash can be overcome. We discuss some of the potential costs and side-effects of negative rates at the end of this note.

What about quantitative easing?

Quantitative easing is another policy option available to the RBNZ, if it wished to use unconventional policy to ease at the zero bound. We see government bond QE as having several advantages:

- Central banks now have extensive experience with QE, more so than negative rates. It also shouldn’t impact bank profitability to the same extent as a negative OCR, which may be a consideration in light of the forthcoming RBNZ bank capital review;
- QE works partly through the ‘portfolio balance’ channel, whereby displaced government bond investors purchase other assets like corporate bonds and equities, thereby boosting financial conditions. In contrast, NZ has smaller, less developed capital markets and high foreign ownership of the NZGB market. Provided foreign investors view NZGBs and offshore government bonds as close substitutes, some foreign investors are likely to sell both their bonds and NZD currency holdings, helping to weaken the NZD. With interest rates more constrained near the effective lower bound, and term premia already very low, the currency becomes a more important factor in loosening overall monetary conditions.
- In 2018, the RBNZ estimated it might be able to purchase up to 10% of GDP in NZGBs, which works out to around $30b in NZGBs or roughly 40% of the current market size. There is some scepticism that the RBNZ would be able to achieve these purchase volumes. However, we would point to the fact that the ECB has been able to purchase close to 30% of the German market, a very tightly-held market and in a country with a large domestic saving base. In the NZ context, foreign holdings have been trending lower over the past three years signalling that foreign investors will react to reduced absolute and relative return opportunities. If the RBNZ were to encounter difficulties in purchasing NZGBs in size, yields should fall further, meaning the RBNZ gets more ‘bang for buck’ with its programme – there is (normally) always a price at which investors are willing to sell.
- There are strong arguments for fiscal policy to play a more active role in supporting the economy if it were to experience a downturn. QE should reduce the potential upward pressure on NZGB yields resulting from the greater supply profile, creating more fiscal space for the government.
- While it would introduce greater volatility to the RBNZ balance sheet, at a consolidated Crown balance sheet level, there would be no impact.

Governor Orr has likened government bond QE to the central bank effectively shortening the duration of the Crown balance sheet. That is correct, but via QE both the RBNZ and NZDM can achieve this while working to their own operational objectives.17

While there are obvious limits to how large a QE programme could be in NZ, which means it may not provide enough stimulus to counter a major crisis, it still could provide a legitimate option as a first foray into unconventional policy, if the OCR were to approach 0%. Governor Lowe has said the RBA will consider a package of QE measures if its cash rate were to reach 0.5% and the central bank wanted to ease further.

And the other unconventional options?

We see QE as a superior option, at least initially, to some of the other possible options outlined in the RBNZ’s 2018 Bulletin article: 

Unsterilised FX intervention would involve the RBNZ selling the NZD and buying foreign assets. Beside the direct effect on the NZD, unsterilised FX intervention could effectively deliver a rate cut as well, if the RBNZ did not adjust banks’ credit tiers. But FX intervention would involve the RBNZ taking on significantly more risk onto its balance sheet. And while the NZD is above its long-term real effective exchange rate average, it is not at extreme levels (one of the RBNZ’s previous ‘traffic light’ tests for intervention18). There are complications with how a major FX exposure could be unwound in the future and/or whether doing so might inflict major losses to its capital.

16 Another legitimate objection to QE is that it will reduce liquidity in the government bond market. This would be a consideration in the overall size of the programme and would argue for an incremental approach to purchases.

15 See, for instance, Unconventional Monetary Policy: The Perspective of a Small Open Economy.

16 Banks are another major holder of NZGBs mainly for prudential purposes. However, cash at the RBNZ is an alternative liquid asset, albeit a lower yielding one when the curve is upward sloping.

Chart 5: Foreign investors have been net sellers of NZGBs

<table>
<thead>
<tr>
<th>Year</th>
<th>Resident</th>
<th>Non-resident</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2007</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>0</td>
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<tr>
<td>2015</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2019</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: RBNZ. Survey.
Intervention in the interest rate swap market would involve the RBNZ receiving fixed in NZD swaps, in an attempt to drive down longer-term wholesale rates. Given the derivative nature of swaps, there are fewer constraints on the size of such a programme compared to government bond QE. While there could be an indirect impact on the exchange rate through lowering the term structure and reinforcing the lower-for-longer stance of monetary policy, government bond QE offers a more direct channel (via foreign selling of cash bond holdings).

Credit easing, i.e. buying corporate or mortgage bonds directly, is difficult in a NZ context given the lack of large, liquid alternative markets to NZGBs. In time, the development of a market for Residential Mortgage Obligations (RMOs) might provide a suitable alternative to NZGBs, but the market is yet to get off the ground. The RBNZ is trying to incentivize the phasing out of the incumbent iRMBS securities. There are also distributional implications with purchasing private sector assets outright, with those companies or sectors which have listed bonds or equities benefiting more directly from purchases than those which don’t have access. Finally, it entails greater risk on the RBNZ/Crown balance sheet.

Targeted term lending seems quite possible as a useful way to ease financing conditions for banks, especially if undertaken in conjunction with a negative OCR, to encourage pass-through to real economy borrowing rates. The BoE and ECB’s respective term lending schemes (the FLS and TLTRO) have been structured in such a way as to incentivize banks to lend to the real economy in order to reduce their funding costs. Such a scheme could be helpful in a NZ context given the potential for the RBNZ’s bank capital review to impact the price and/or quantity of credit that banks are willing to provide to the real economy.

Market implications
With the OCR getting closer to 0%, the market is starting to consider what the RBNZ’s first move might be, if it were to go down the route of unconventional policy. The potential impact on rates at various tenors, curve shape and swap spreads depends on what particular measure, or measures, the RBNZ adopts.

Negative rates:
Based on Governor Orr’s comments, we are working on the basis, at this stage, that the RBNZ would reduce the OCR to negative levels if easing was required at the zero bound. The possibility of negative rates opens up the sub-zero tail of the probability distribution and means the front-end of the NZ curve can still rally hard if the global or domestic outlooks worsen. We expect the front-end of the NZ curve to remain capped, unless the global outlook changes materially. We outlined some possible trade expressions in a recent note.

We favour receiving the short-end of the NZ curve on pull-backs and versus Australia. We have an existing receive NZ/pay Australia 1y1y position outstanding and given the RBNZ’s apparent openness to negative rates as an unconventional policy tool and the RBA’s reluctance, we think this could trade below zero if cash rate policy between the two central banks diverged. The NZ curve should steepen relative to global peers whose central banks prefer QE to negative rates, and highlight NZD steepeners boxed with AUD flatteners as one possible expression of that idea.

We continue to think owning inflation-indexed bonds outright provides an excellent risk-reward way to position for a dovish RBNZ and the possibility of negative rates. Not only do linkers provide cheap protection against a correction higher in global rates, but were the RBNZ ever to contemplate going down the path of deeply negative rates, there is scope for BEIs to widen substantially and real yields to fall to very negative levels. All the NZ inflation-indexed bonds provide positive real yields, with the exception of the 2025s.

We would expect swap-bond spreads to narrow (i.e. NZGBs cheaper to swaps). A negative OCR should lower NZGB yields, likely leading to further selling from offshore investors. In addition, if the government were to consider more expansionary fiscal policy, the higher NZGB supply profile would argue for cheapening vs swap.

QE:
QE would be a bullish impulse for the long-end of the curve, given the duration absorption from QE bond purchases, and would argue for curve flattening pressure. The impact on bond yields, the curve and swap spreads would depend on whether QE was accompanied by new fiscal spending and coordination with the government. Swap-bond spreads could potentially widen sharply (i.e. NZGBs richening to swaps) if there were not a fiscal response from the government, as net supply of NZGBs, taking into account QE purchases, would likely go highly negative (depending on the size of the programme). NZDM forecasts $8.7b of net NZGB supply in the coming four fiscal years compared to the RBNZ’s previous
estimates that it might be able to ultimately purchase up to $30b of NZGBs.

Possible costs and side-effects of negative interest rates

The OCR is a blunt tool and interest rate changes always have a redistributive effect (in favour of borrowers and at the expense of savers), even at higher interest rate levels. That is no different when the central bank rate is negative, but the broader public perception of negative interest rates, especially if retail bank accounts were to be widely impacted, is likely to be unfavourable. In the extreme, it could lead to political pressure to change the central bank’s mandate, or reduce its independence. For this reason, academic researchers have supported providing certain exemptions to negative rates or subsidies to banks to shield most small retail depositors.

Some people have an inherent dislike of negative nominal interest rates and may seek investments in riskier, but less appropriate investments, to avoid these. NZ finance companies, which offer higher interest rates but are generally riskier than banks, would be expected to be a beneficiary. There is also the potential for money to flow into other areas such as housing, potentially leading to higher house prices and exacerbating affordability issues.

More generally, if investors and people have a strong desire to avoid negative rates, the risk of speculative flows leading to an asset price bubble will increase.

As mentioned in the text, there is the potential for negative interest rates to adversely affect bank profitability and/or impact the transmission of monetary policy to real economy rates. In the NZ context, the RBNZ’s proposed increase in bank capital will work in the same direction, although the final details are still to be announced.

Proponents of negative interest rates, such as Rogoff, argue that negative interest rates are still superior to the other policy options for a central bank facing a crisis with little, if any, remaining conventional monetary policy ammunition left, and that financial stability concerns can be addressed with macro or microprudential policy.
Table 1: Central bank rates in countries with negative rates, the US and NZ. Hypothetical example for NZ shown also.

<table>
<thead>
<tr>
<th>Total reserves</th>
<th>Euro area</th>
<th>Swiss</th>
<th>Sweden</th>
<th>Denmark</th>
<th>Japan</th>
<th>US</th>
<th>NZ</th>
<th>NZ (-0.5%)</th>
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<tbody>
<tr>
<td></td>
<td>local currency, billions</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- below threshold</td>
<td>128</td>
<td>291</td>
<td>0</td>
<td>31</td>
<td>3,603,550</td>
<td>200</td>
<td>7.6</td>
<td>30</td>
</tr>
<tr>
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<td>269</td>
<td>455</td>
<td>187</td>
<td>179,640</td>
<td>1,374</td>
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<tr>
<td>Remuneration</td>
<td>basis points</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- below threshold</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
<td>0</td>
<td>10 / 0</td>
<td>210</td>
<td>100</td>
<td>-50</td>
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<tr>
<td>- above threshold</td>
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<td>-75</td>
<td>-50 / -60</td>
<td>-65</td>
<td>-10</td>
<td>210</td>
<td>0</td>
<td>-50</td>
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<tr>
<td>Weighted average rate</td>
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<td>-36</td>
<td>-52</td>
<td>-56</td>
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<td>-39</td>
<td>-8</td>
<td>-9</td>
<td>-15</td>
<td>0</td>
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</tr>
</tbody>
</table>

**Banking system assets (b)**
- Total reserves: 25,416, 3,225, 9,272, 8,863, 11,256,514, 17,367
- Negative yielding reserves (% bank assets): 7%, 8%, 5%, 2%, 2%, n/a, n/a
- Implied annual cost of negative rates (b): -7.3, -2.0, -2.4, -1.2, -179.6
- Implied annual cost (% bank assets): -0.03%, -0.06%, -0.03%, -0.01%, 0.00%, -0.03%

**NB. Reference period**
- Jun-19: June 2019 and total banking system assets from end-March. The current OCR of 1% is shown.
- Dec-18: December 2018, pre the Riksbank’s rate hike.
- May-19: May 2019
- Jul-19: July 19
- Jun-19: June 2019

1. BoJ has three tiers: the Basic Balance is remunerated at +10bps, the Macro Add-on Balance at 0%, and the Policy Rate Balance at -0.1%.
2. Sweden data are for December-18, pre the Riksbank’s rate hike. In Dec-18, the Riksbank issued one week certificates of deposits to banks at the policy interest rate of -0.5% and used fine-tuning operations to drain the remaining liquidity in the system using repos at -0.6%. In December 2018, there were, on average, 370b of CDs outstanding and around 85b of fine-tuning operations.
3. NZ shows average settlement cash from June 2019 and total banking system assets from end-March. The current OCR of 1% is shown.
4. This shows a hypothetical example where settlement cash is $30b, the RBNZ scraps the existing credit tiers for individual banks, and the OCR is lowered to -0.5%.

Table 2: Potential RBNZ unconventional policy options – with high-level (but not exhaustive) pros and cons

<table>
<thead>
<tr>
<th>Unconventional policy tool</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative OCR</td>
<td>Impact on NZD and wholesale rates via the conventional interest rate channel. No P&amp;L risk on RBNZ balance sheet.</td>
<td>Potential negative impact on bank profitability and/or reduced pass-through to real economy rates, unless banks are subsidised or the zero bound with cash addressed. RBNZ bank capital review may exacerbate these issues.</td>
</tr>
<tr>
<td>Government bond QE</td>
<td>In a small open economy, expected to work partly through a weaker NZD. May lower longer-term interest rates by reinforcing commitment to lower-for-longer OCR and lowering term premia. No impact on consolidated Crown P&amp;L.</td>
<td>Debatable how much impact it will have on longer term rates, given these are already very low and term premia mainly offshore driven. May negatively impact liquidity of government bonds and could be difficult implementing in large enough size, absent a significant fiscal stimulus.</td>
</tr>
<tr>
<td>Interest rate swap intervention</td>
<td>Aims to directly lower term premia and reinforces lower-for-longer OCR. Swap rates are one benchmark for mortgage rates and other wholesale borrowing rates.</td>
<td>Term premia influenced mainly by global rather than domestic forces. A less direct effect on the NZD than QE.</td>
</tr>
<tr>
<td>Targeted term lending</td>
<td>Can encourage lending to real economy, may be helpful to counteract impact of RBNZ bank capital review or a negative OCR.</td>
<td>Capital, rather than funding, may be the binding constraint, so uncertain how much impact it would have.</td>
</tr>
<tr>
<td>Credit easing - i.e. buying corporate or mortgage bonds</td>
<td>Closer link to real economy financial conditions.</td>
<td>Balance sheet risk for the RBNZ. Could have distributional effects on different sectors. Limited available assets to purchase.</td>
</tr>
<tr>
<td>Unsterilised FX intervention</td>
<td>Directly impacts NZD to ease monetary conditions. Unsterilised FX intervention has higher chance of success than sterilised. NZD REER is above long run average, suggesting it is expensive and intervention would be pushing it closer to fair value.</td>
<td>Significantly more balance sheet risk for RBNZ. The NZD is not at extreme levels, which may reduce effectiveness. May be difficult to unwind, depending on the size of the open FX position.</td>
</tr>
<tr>
<td>State contingent forward guidance</td>
<td>Aligned with RBNZ's goals and simple to implement. May lower wholesale rates if credible.</td>
<td>Key NZ data is quarterly and employment data prone to revision. May have limited effect with rates already low.</td>
</tr>
</tbody>
</table>