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r*, ELB, and monetary easing effect
—— Japan's case ——

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Why are we seeing r for monetary policy?*

1. Which is the more effective channel, interest rate or money, for economic growth and inflation?

- History indicates that the interest rate channel is more effective → (r* - r) is effective as a guidepost to check the degree of monetary easing / tightening
- When QE or YCC is adopted, both short- and long-term r (or real shadow rate) should be watched, in comparison with r*
- Money and/or financial cycle indicate the sign of boom and bust of the financial side, which the CB should watch separately

2. Does monetary policy affect the natural interest rate (r*)?

- If r* is distorted by the monetary policy, CB should see (r* - r) through taking into account this factor, such as incorporating forward guidance shock and/or ELB for monetary policy rule setting

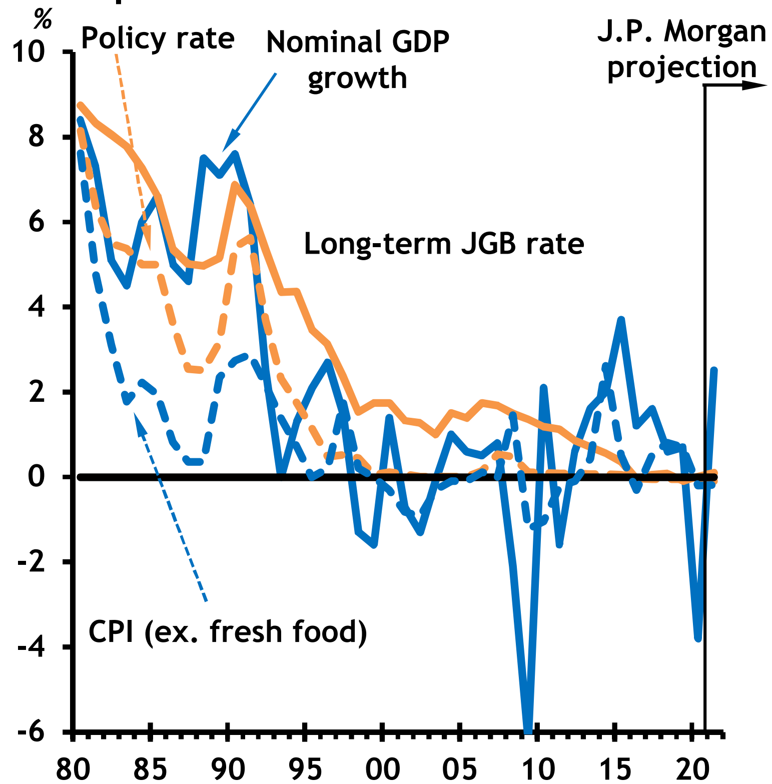
3. Estimation error of r* is large

- Need more improvement, and we should see various estimates

Zero-rate policy, r* - r, inflation expectations, and ELB

- Deflation or disinflation has continued after bubble burst in the early 1990s
- The BoJ adopted almost zero rate policy in 1995, and generally r < r*, but after lifting the zero rate policy in 2000, Japan faced a bursting of the global IT bubble
- But r has not been lower enough than r*, not preventing Japan slipping into deflation in early 2000s
- After the GFC, the BoJ lowered long-term rates through the CE, followed by QQE, which cannot be measured by a simple comparison of r* and r

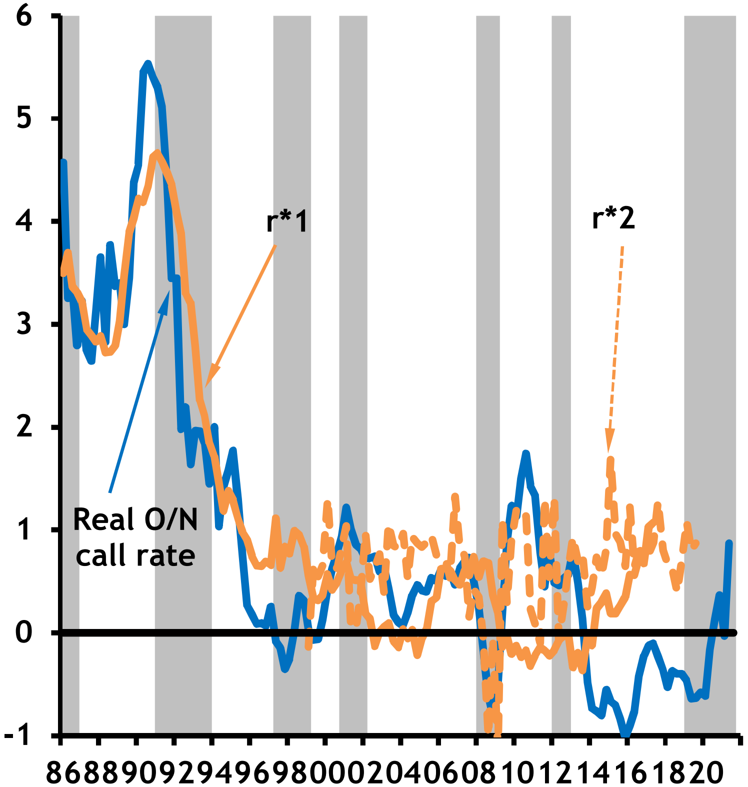
Nominal growth rate and interest rates in Japan



Note: Long-term JGB rate was 9yr rate from 1980 to 1986 due to data constraints, and 10yr rate from 1987 to 2021. Policy rate was official discount rate until 1995 and O/N uncollateral-ized call rate from 1996. CPI (ex. fresh food) includes the consumption tax hikes.
Source: J.P. Morgan

Real policy rate and r*

%, shading shows recessions



Note: Real O/N call rate is uncollateralized O/N call rate - BoJ core CPI (ex. fresh food & energy and consumption tax rate hike). r*s are estimated by DSGE models incorporating either expected policy rate shock or ZLB constraint. Source: Okazaki and Sudo (2018), Hirose (2020), J.P. Morgan

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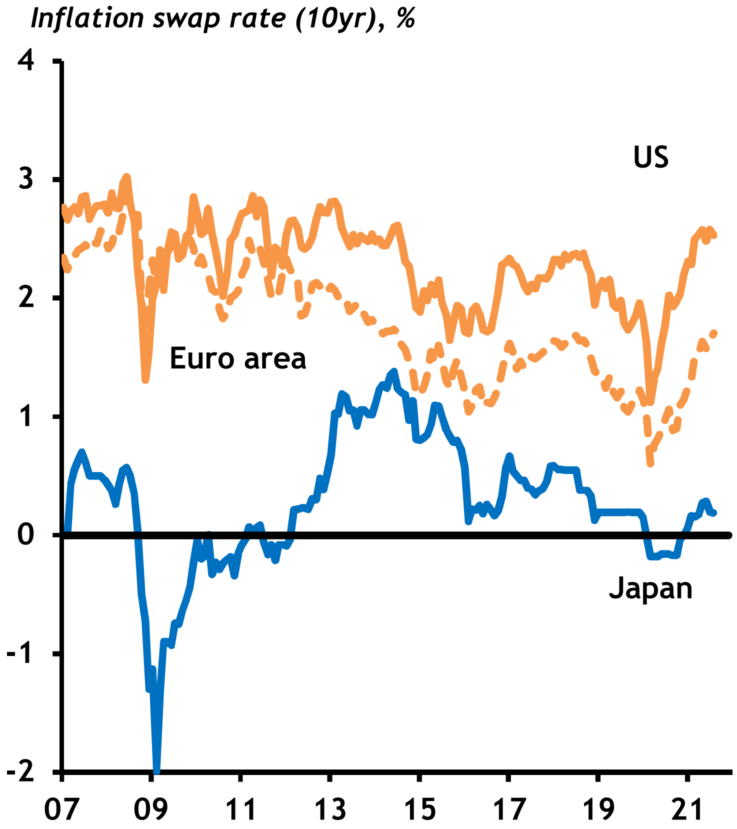
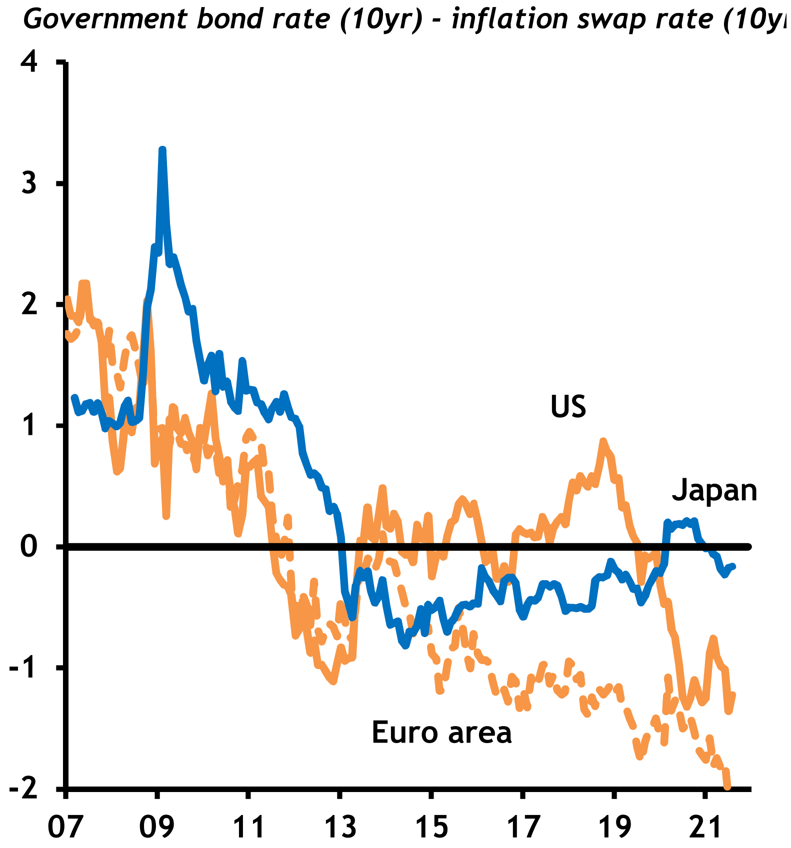
- With QQE (2013-), the BoJ committed to doing whatever it takes to achieve the 2% target in 2 years, but could not respond aggressively to inflation disappointments, given ELB constraints
- The BoJ adopted NIRP and then YCC in 2016 to secure the sustainability of the easing, but didn't ease further
- Inflation expectations didn't rise once it had already been at a low level, and are backward-looking
- The real bond rate has been only slightly negative and not much below the low real return on capital, resulting in limited stimulus

Medium-term inflation expectations



Source: Bloomberg Finance L.P.

Real 10-yr government bond yields



Source: Bloomberg Finance L.P., J.P. Morgan

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- Late 2013-early 2015 was exceptional
- The impact of QQE on FX showed a remarkable contrast with bonds, raising inflation expectations
- This asymmetry between JGB markets and FX markets may be explained by the different reactions of domestic and foreign investors toward QQE (asymmetric information), implying that the impact of asset purchases on the currency now fades

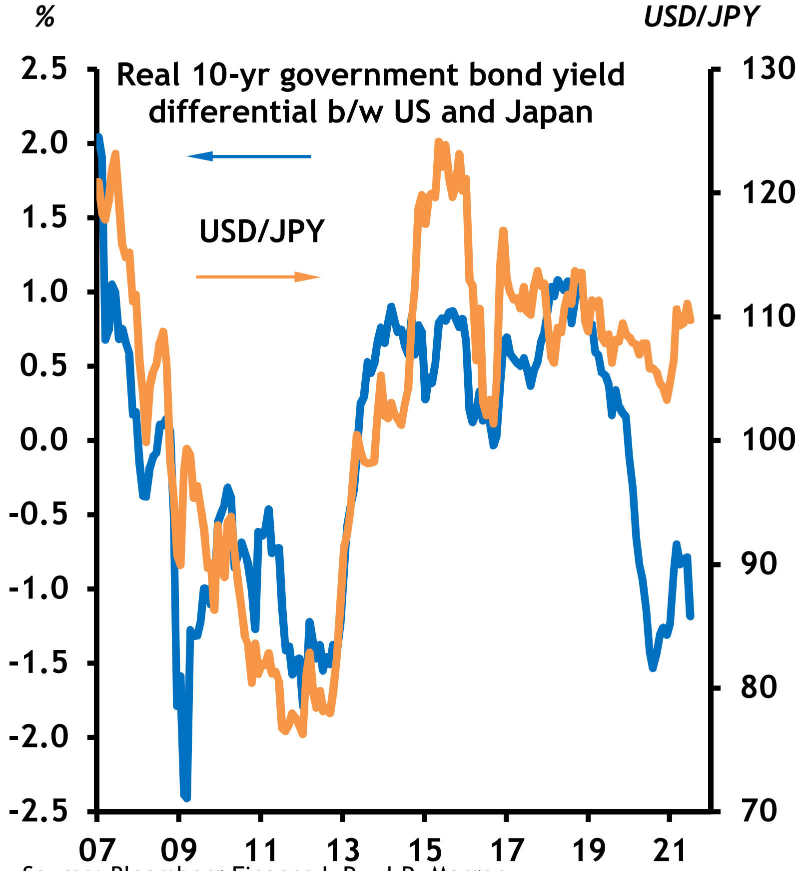
Impact of QE announcements in Japan on JGB yields and USD/JPY

Basis points

	1 year	5 year	10 year	USD/JPY
Conprehensive easing (October 2010 - December 2012)	0	-16	-17	-430
Quantitative and qualitative easing (April 2013)	2	3	3	475
Quantitative and qualitative easing 2 (October 2014)	0	0	-1	434
Total	2	-13	-21	480

Source: Transmission Channels and Welfare Implications of Unconventional Monetary Easing Policy in Japan, Ugai, 2015, J.P. Morgan

Real yield differential and USD/JPY



Source: Bloomberg Finance L.P., J.P. Morgan

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- Overall, inflation expectations have turned positive under QQE and YCC but have not risen much, and the real rate has not declined much
- This is quite a contrast with the US, where the zero rate policy succeeded in maintaining inflation expectations at over 2%, thereby decreasing the real rate
- ELB constraints its ability to raise inflation (existence of reversal interest rate <around -0.5%> and of the likely threshold for depositors to cash <-0.5% to -1.0% range>)

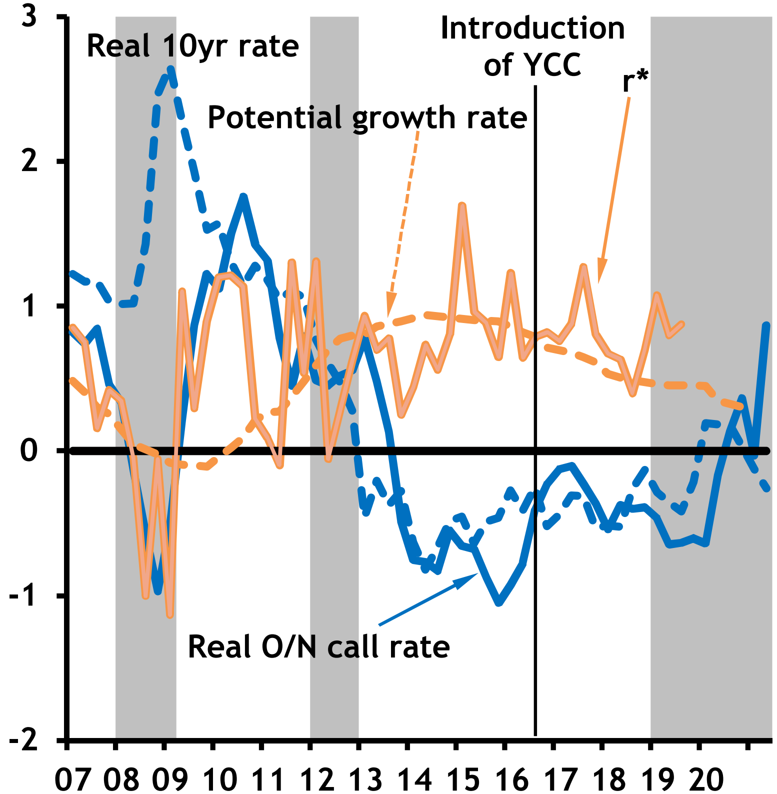
Fisher equation in Japan and the US

%	Nominal 10yr rate	Real 10yr rate	10yr inflation expectations * proxied by actual CPI
(Japan)			
Policy purpose	0.0	-2.0	2.0
Recent	0.1	-0.2	0.3
2013-2019	0.2	-0.4	0.6
1999-2012	1.4	1.6	-0.3*
(US)			
Recent	1.5	-1.0	2.5

Note: Inflation expectations are 10yr inflation swap rate. Actual CPI inflation is core CPI (ex. fresh food and consumption tax hike) growth. Source: Statistics Bureau, Bloomberg Finance L.P., J.P. Morgan

Real yields (r) and r* in Japan

%, shading shows recession



Note: Real O/N rate = O/N uncollateralized call rate - BoJ core CPI (%oya), real 10yr yield = 10yr JGB yield - 10yr inflation swap rate. r* is estimated by a nonlinear DSGE model with ZLB constraint.
Source: Hirose (2020), CAO, Bloomberg Finance L.P., J.P. Morgan

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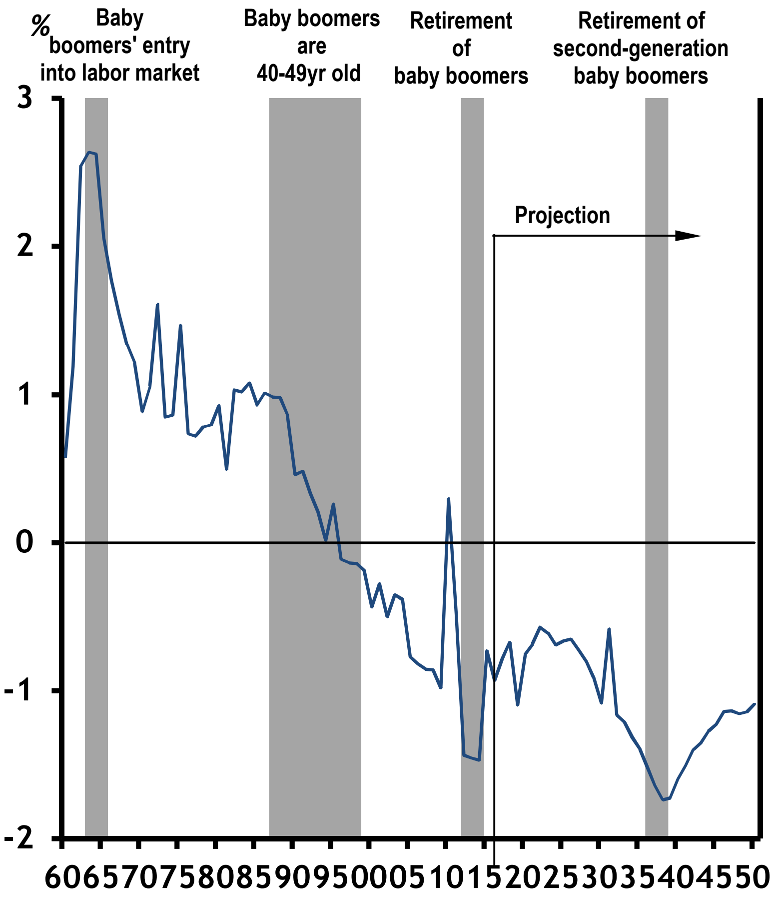
r* could not rise unless…, thereby ELB may not be eased in the long run

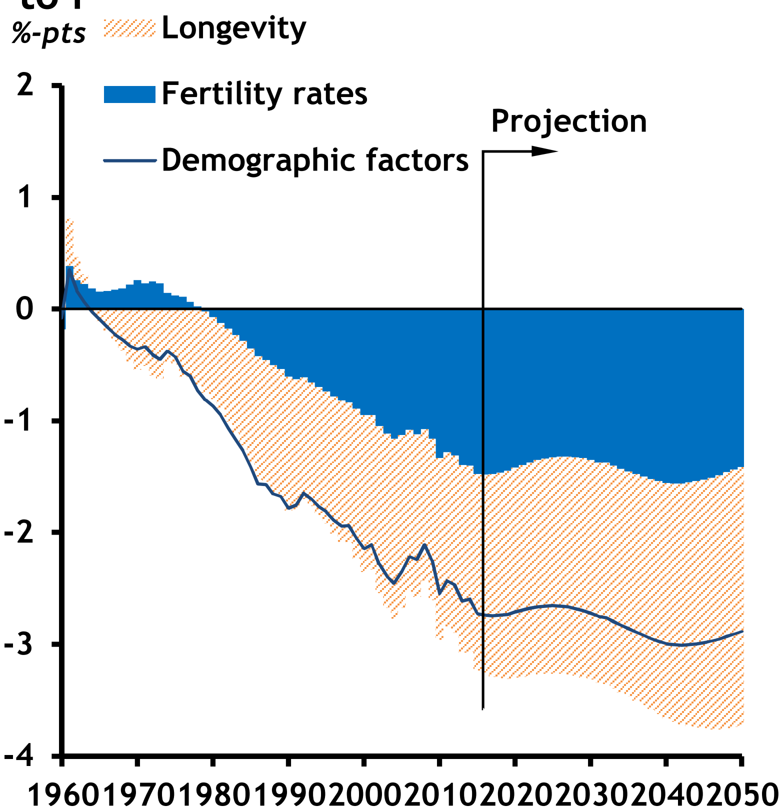
- Population decline and aging of baby boomers lowered r* in the long-term through higher capital accumulation (less labor and more savings)
- r* decline will slowly over the next 10 years reflecting demographic factors
- But r* could not rise unless firms can be incentivized to reduce their excess savings and invest aggressively

Growth of working-age population



Source: MIAC, NIPSSR, J.P. Morgan

Contribution of demographic factor to r*



Note: The impact of demographic factors on the decline in the natural rate of interest is measured by the discrepancy between the model-generated variable based on the baseline simulation and that based on the counterfactual simulations, where the fertility rate and longevity are held constant at the values of the actual data in the 1960s.
Source: Sudo and Takizuka (2018)

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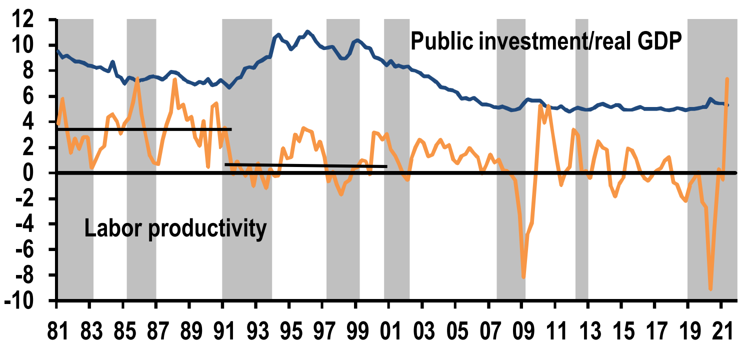
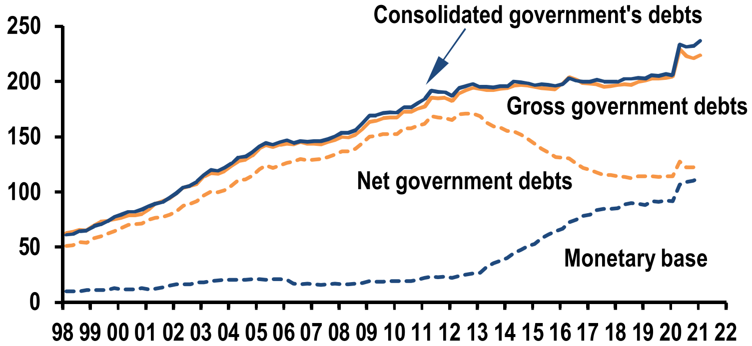
How to raise r* in Japan?

1. **Will large scale fiscal spending raise r*?**: Transitory

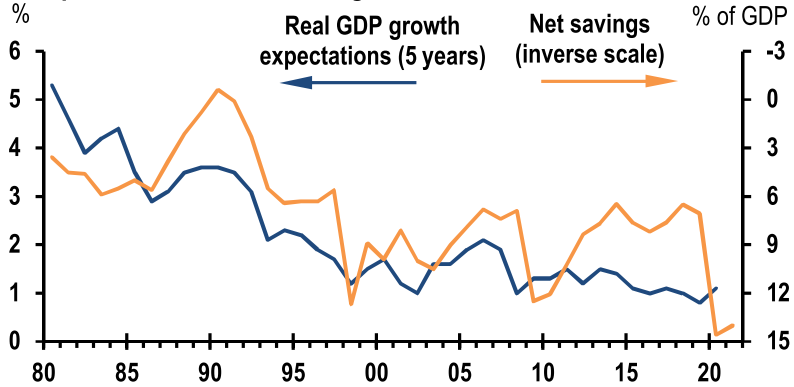


Source: Cabinet Office, MHLW, Statistics Bureau, J.P. Morgan



Source: BoJ, Cabinet Office, J.P. Morgan

2. **Rising Japan's growth expectations and reducing the excess savings**: expansion of green growth strategy, promotion of DX, and reforming labor markets (increase in foreign workers, increase in mobility of workers and worker access to education)



Source: Cabinet Office

Conclusion

- r* is effective as a yardstick to see the monetary easing / tightening, though estimation of r* needs more improvement

- Since the BoJ started zero-rate policy in mid-1990s, on average r has been lower than r*, but was higher in some cases. Overall, the BoJ has failed to lower real rates enough through raising inflation expectations

- Once inflation expectations have declined to a very low level, it is hart to raise them given ELB constraints

- Low-for-ultra-long rate yield policy unlikely to succeed in a few years in Japan

- r* will need to rise, which is also beneficial for monetary policy to be more effective

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