Monetary Policy in a Low Interest-Rate World

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Preamble

This is not a standard conference paper. No "preliminary and incomplete draft" soliciting comments and feedback. In fact, already published in BPEA.

Almost a modern classic in terms of impact. Widely covered in the press. Frequently cited in policy speeches.

Thus, no scope for a traditional discussion today. I'd rather use my time to talk "around" the paper rather than "about" it. Hopefully, will stimulate floor discussion and further analysis.

A R-Star Is Born

Starting point of paper is low estimated levels of equilibrium real interest rate (r^*) amongst backdrop of trend decline in real interest rates.

Concept of r^* tends to change from paper to paper, so need to be careful about what we mean.

In KR, it is the "likely long-run value of the short-term interest rate".

Others define r^* as equilibrium real interest rate that would prevail at any point in time in the absence of nominal rigidities. Kind of interest rate equivalent of potential output concept.

In the long run, the two notions of r^* coincide, but in the short run they may differ.

In situations of distress, short-run r^* may be low (even negative) reflecting high demand for saving and safe assets. But long-run r^* could be (much) higher as agents anticipate distress to dissipate over time and financial conditions to revert back to normal. We'll return on this later.

Working assumption in KR is that (long-run) r^* is low. Perhaps not as low as estimated in the Laubach-Williams tradition, perhaps not as low as estimates for the 2010s (zero or negative), but certainly lower than the 2-3% (and higher) estimates of the late XX century.

What happens then?

R-Star Wars Episode VI: Return of the DSGE

KR consider simulations of FRB/US and DSGE models assuming long-run r^* is in the range of 1 to 3%.

Both models are well known and appreciated in the profession. But no model is perfect.

FRB/US is highly inertial, with limited response of inflation to expected changes in monetary policy (forward guidance).

DSGE model has perhaps opposite problem, like standard rational-expectations optimizing frameworks: all agents promptly incorporate signals about future events into current actions (possibly overstating effectiveness of forward guidance).

Questions for conversation: Which approach provides best answers? What if both frameworks are fatally flawed?

Inflation objective set at $\pi^* = 2\%$ so $i^* \equiv r^* + \pi^*$ assumed to be between 3 and 5%, lower than historical average nominal rate between 1960 and 2007 (above 6%). Sensitivity analysis considers i^* outside this range

Effective lower bound is zero, or ELB $=$ ZLB.

Monetary policy rule described by estimated, *historical rule* that displays considerable inertia. Excluding constants:

$$i_t = .9 i_{t-1} + .2\pi_t + .15 y_t + .25 \Delta y_t \qquad \text{(Historical)}$$

where y is output gap.

Important: note relatively large response to changes in output gap. Accommodation removed as soon as a recovery begins. Agents know this and (especially in DSGE) plan accordingly.

Simulation results when $r^* = 1$:

Average inflation is around 1% (even though the inflation objective is $\pi^* = 2\%$!)

On top of that, mean output gap is -1%.

Frequency of episodes at ELB is between 20% and 30%.

Mean duration of ELB episodes is about 2 years.

If you think this looks bad, replacing "historical" interest rate rule with non-inertial *Taylor (1999) rule* is an even worse idea.

Assume:

$$i_t = r^* + \pi^* + 1.5(\pi_t - \pi^*) + y_t \qquad \text{(Taylor 1999)}$$

Under $r^* = 1$ and $\pi^* = 2$ outcomes in FRB/US are broadly similar as under historical rule, but average inflation as low as 0% in DSGE model.

Also, economy stuck at ELB almost 40% of the time for 3 years on average.

Looks bad. But in fairness, recall that simulations do not consider role for quantitative easing and unconventional monetary policy.

Also fiscal stimulus kicks in only when output gap $<$ -10%.

Questions for conversation: What are reasonable adjustments to simulation outcomes to account for broader policy space? Should we think of simulation results as "worst-case scenarios"?

When You Wish Upon a R-Star: What Should Policymakers Do?

Part of the paper that has captured most headlines is section on a higher inflation target.

Still, KR do not advocate raising π^*. Rather, they consider costs and benefits of higher π^* under alternative specifications of policy loss function (metrics of social welfare).

Without entering into details, under FRB/US "optimal" level of π^* when $r^* = 1$ is "consistent with current inflation targets".

Under DSGE optimal π^* could be "notably higher" than 2% under some specifications of loss function, but "other policy strategies lead to notably better outcomes".

Definitely not a strong endorsement of higher inflation objectives.

Instead, basic policy message of KR is: overshoot. This comes in different variants.

Variant 1

A simple fix: lower rates in good times through a "*risk adjustment*", say:

$$i_t = -adj + Taylor(1999)$$

How much lower?

DSGE: with $r^* = 1$, adj around 1% achieves 2% inflation goal, but output gap is still negative on average (-0.5%)

FRB/US: with $r^* = 1$, adj is smaller, around 0.5%. Achieves 2% inflation goal, but output gap remains negative on average.

We can clearly do better.

Variant 2

Consider a simple *difference rule:*

$$i_t - i_{t-1} = .125\,(\pi_t - \pi^* + y_t)$$

If you are at ELB, don't raise rates until linear combination of inflation and output is at target

Way more accommodative than Taylor rule. Performs better than historical rule, but inflation still short of target and output gap negative on average

To some extent, almost like a Price Level Target (PLT) rule outside of ELB: persistent inflation gap requires increasing accommodation.

Usual PLT problem: rates must keep on rising when inflation/output above target, even if either is falling.

Variant 3

Consider a *"sophisticated" difference rule* where i_t is at ELB as long as the appropriately defined "shadow" interest rate is below ELB, and is equal to the shadow rate if the latter is above ELB.

Specifically, choose the shadow rate as

$$i_t^{shadow} - i_{t-1}^{shadow} = .125\left(\pi_t - \pi^* + y_t\right)$$

Looks similar to difference rule before. But now if you are at ELB, don't raise rates until i_t^{shadow} is above ELB. And i_t^{shadow} continues to fall as long as linear combo of inflation/output is below target, so rates remain at ELB until sometime after average of inflation/output is above target

Variant 3 solves the ELB problem entirely in the simulations

Of course, this is yet another version of low for long, PLT-like approach and suffers from usual criticisms of PLT approach.

Works wonders in rational-expectations equilibrium with stable long-term inflation expectations, but can be problematic if it lacks credibility and expectations are not anchored

As long as ELB binds, provides reasonable underpinning of forward guidance approach. Maybe this is what "a highly accommodative stance of monetary policy will remain appropriate for a considerable time after the economic recovery strengthens" was interpreted to mean

But there are scenarios in which inflation may keep moving above objective while interest rate remains at ELB, raising concern about financial stability, or generating impression that policymakers are "behind the curve" on addressing inflation, possibly unmooring inflation expectations.

Questions for conversation: Would a relatively simple adjustment to current inflation targeting regimes that focused instead on targeting "average" inflation over the medium term address the problems associated with low r^*?

R-Star Trek III The Search for Spock (And the Right Story)

KR paper does not really provide an answer to why r^* is (and will be) low.

Presumably related to broadly-speaking "exogenous", slow-moving factors affecting net desired demand for saving such as:

- technological progress and fall in potential growth rate of the economy (as in Laubach and Williams 2003 and subsequent revisitations)

- demographic change (in particular population aging)

- increase in inequality, which concentrates a larger fraction of income to richer households with a higher propensity to save

- institutional developments, financial innovation and regulation, cultural transformations affecting tastes and preferences, globalization trends...

My favorite story so far:

DelNeGiGiTa (BPEA 2017): while all interest rates might have declined since the late 1990s, yields on corporate bonds have not declined all that much and Treasury yields have declined significantly more than those on other assets.

Pattern reflects increase in premium associated with the special safety and liquidity characteristics of US Treasury securities relative to assets with identical pecuniary returns, but no such special attributes.

Krishnamurthy and Vissing-Jorgensen (2012) call this factor a "convenience yield".

Convenience yield has been trending up following Asian crisis in the late 1990s. Acceleration in global financial flows towards safer uses. International savings chasing limited supply of safe and liquid assets worldwide. Realization during global financial crisis that many assets previously considered as good as Treasuries - such as MBS - were not so safe after all.

Safety is probably not whole story. Spreads have increased also for securities that are very safe, such as Aaa corporates, but are not as liquid as Treasuries. This trend suggests important role for liquidity as a source of convenience yield.

DelNeGiGiTa (2017) explore these ideas quantitatively using a VAR model and a medium-scale DSGE model estimated using extended set of macro and financial variables, including Aaa and Baa corporate spreads.

Both approaches lead to similar conclusions regarding extent of secular decline in real interest rates.

Both approaches attribute much of this decline to increase in convenience yield on Treasuries.

Both of them identify steady secular decline in real rates that starts in the late 1990s from about 2.5% at their peak to 1% today.

Anyway, while literature provides different narratives focused on one or more of these slow-moving factors, KR write: "The economic forces behind a possible decline in r^* are outside the scope of our analysis".

Revealing footnote in KR: "Each contribution [in this literature] tends to find that the factors emphasized in their study can completely account for the decline in r^*"!

We may sympathize with the authors' agnosticism, and argue that what matters is only that r^* will be low, not the reason why.

Or we may agree this approach circumvents the problem rather than solving it.

If equilibrium r^* was low in recent past mostly a reflection of "headwinds" from financial crisis and Great Recession, it is hard to predict it will remain low in the long run once these headwinds disappear.

If instead we espouse a secular-stagnation narrative focused on structural high demand for saving and low supply of investment in the global economy, we are more confident in assuming persistently low r^*.

And if we believe inequality is main driver of low r^*, then level of r^* is no longer policy-exogenous as appropriate structural reform including fiscal redistribution may affect equilibrium real rates over time.

(Incidentally, we plan to return on these themes in the context of a forthcoming joint conference between HKMA and NY Fed in May 2019, all focused on the effects and policy implications of heterogeneity... Call for papers will come out soon).

So, final question for conversation: Can any analysis of the *effects* of low r^* afford to overlook the actual *causes* of low r^*?

R-Star Trek V The Final Frontier (That Is, Conclusions)

Great paper with far-reaching impact and long expected shelf-life.

Prompts a number of questions for conversation, here repeated for convenience purposes:

Which simulation approach provides best answers? What if both frameworks are fatally flawed?

What are reasonable adjustments to simulation outcomes to account for broader policy space? Should we think of simulation results as "worst-case scenarios"?

Would a relatively simple adjustment to current inflation targeting regimes that focused instead on targeting "average" inflation over the medium term address the problems associated with low r^*?

Can any analysis of the *effects* of low r^* afford to overlook the actual *causes* of low r^*?