Negative natural interest rates and secular stagnation: much ado about nothing? A note

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Abstract
This note is critical of the concept of a natural interest rate and doubts the relevance of claims about the "natural" interest rates becoming negative recently.

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"There is a certain rate of interest on loans which is neutral in respect to commodity prices, and tends neither to raise nor to lower them. This is necessarily the same as the rate of interest which would be determined by supply and demand if no use were made of money and all lending were effected in the form of real capital goods…" (Knut Wicksell, 1936 [1898], p. 102.

Secular stagnation and the negative natural rates of interest

Like other key variables of mainstream macroeconomics (potential output and output gap) the "natural" (or "neutral") interest rate is unobservable – and thus not subject to measurement.[1] (Actually, the key mainstream "unobservable variables" are intimately related to one another.) Despite its ghostly appearance the natural interest rate (commonly denoted as r*) plays quite a prominent role in the mainstream monetary theories – and, apparently, also for the practice of monetary policy making. The size of r* is often claimed to be an essential benchmark for monetary policy – and the research departments at central banks busy themselves with attempts at "guesstimating" its numerical values.

Not long ago the concept of the natural interest rate was invoked while attempting to rationalise anaemic recovery ("secular stagnation") following the 2009 Great Recession. Specifically, it is claimed that r* must have turned negative (see e.g. Summers, 2014; ECB, 2018) thus activating the "zero lower bound" and hence becoming directly responsible for "secular stagnation".[2]

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[1] NAIRU, another notorious unobservable, belongs to an older version of the mainstream. Its applicability is now questioned (e.g. Blanchard, 2018). In the state of the art macro (epitomised by the DSGE models) there is no place for any unemployment at all (but only for a free, utility-maximising, choice between work/consumption and leisure).

[2] Zero lower bound interest rates have become an issue for multiple reasons in recent months. Many countries central banks are pursuing a negative interest rate policy and several nations have in any case negative real interest rates. In mainstream theory, this tends to be associated with numerous adverse effects, many of which have not yet been observed in recent cases: negative rates imply retail banks are being charged to hold deposits with the central bank causing problems with reserve systems; depositors at commercial banks continue to experience low or no returns on those deposits and the monetary system under an intermediation of loanable funds (ILF) understanding seems to be increasingly dysfunctional. This, of course, brings into question ILF.

The reasons why r* should have at last become negative (following its presumed long-term decline) have not been convincingly explained while its "estimates" are more than problematic.[3] In particular it is not satisfactory to suggest that falling/negative r* follows, one way or another, from "*a significant shift in the natural balance between savings and investment*" (see e.g. Summers, 2014, p. 69).

Are "excessive" savings responsible for falling (negative) r*?

The sums of money invested by any firm augmenting its stock of fixed assets may depend on (or even be determined by) the stock of money savings *accumulated* by that firm (or by its willing lenders) in the past, or even during the investment period. It is however an elementary mistake to suppose that the magnitude of *aggregate* national investment in a given period is determined by the aggregate of sums of money (or some other financial assets) saved *during* that period, or before it.[4]

Rudimentary macroeconomics identifies savings with investment (of course, for simplicity here we are ignoring the foreign balance, a GDP component). At the *macro* level savings and investments are two sides of the same coin. No imbalance between the two items is then possible. With investment identically equal to saving the interest rate (natural or any other) cannot be determined by their equality. In practice it is possible to draw conclusions from the imbalances between saving and investment only when the term "saving" is somehow misinterpreted.

Observe that at the macro level causality runs (logically but not temporarily) from current investments to current savings – with the latter mirroring the former instantaneously.[5] The suggestion that investments may be too low because so are savings is thus doubly absurd (because it suggests a possibility of imbalance between the two and presumes the causality running from savings to investment). The same qualification applies to the idea of the "global saving glut" – income unspent (and yet non-invested) aimlessly "vagabonding" around the globe.

The natural interest rate in the basic DSGE model

The existence of potentially harmful effects of negative r* could be squared with the following form of the Investment–Saving (IS) function featuring in the basic version of the New Keynesian Dynamic Stochastic General Equilibrium (DSGE) model[6]:

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[3] The leading "estimation methodology" (Laubach and Williams, 2003) assumes that r* must stand in a certain relation to the output gap. A logical circularity of this approach would seem quite obvious. The output gap is not only unobservable itself, but also conceptually dependent on r* (see the IS formula below).

[4] There is also the issue of dynamic changes in money balances created through the activity of retail bank lending; since this activity is not in accordance with ILF (gathering of capital as savings to lend out) it adds complexity to the savings investment identity and also tends to accord with the claim that investment drives savings, so any identity between the two is (as suggested later) the reverse of that assumed by standard mainstream economics.

[5] Most Central European countries emerged from WWII without any financial, or monetary, "savings" whatsoever. And yet very high investments (reconstruction and industrialisation) started right away in most of them. Those investments turned out to represent national savings.

[6] See e.g. Galí (2008, p. 49), or Woodford (2003, p. 243). Woodford invokes Wicksell's characterisation of r* while Galí does not. Of course it is a misnomer to name the DSGE equation relating the output gap

$$y_t = E_t y_{t+1} - \sigma(i_t - E_t \pi_{t+1} - r_t^*) + \text{"shock"}$$

where: y is the output gap, t indexes time, E is the (rational) expectation (of output gap, inflation) by the "representative agent", σ is a parameter (0<σ<1) related to the representative agent's preference for consumption, i is the central bank's nominal policy interest rate, π is the inflation rate, r* is the natural interest rate and "shock" is yet another unobservable (in addition to the output gap and the "expected" items on the right-hand side of the IS equation). It is worth observing that the term $E_t y_{t+1}$ must be interpreted as the "representative agent" (rational) expectation of the future output gap. Thus such an "agent" is endowed not only with a rational foresight, but also with the way of assessing an *unobservable* item.

The term $(i_t - E_t \pi_{t+1})$ should represent the central bank's interest rate (in real terms). Under stable (and predictable) inflation $E_t \pi_{t+1}$ can be approximated by current observed inflation: π_t. Even if i_t is small (as it usually is under low inflation or deflation) a negative r_t^* would result in the whole term $(i_t - \pi_t - r_t^*)$ being positive. Thus this term's impact on y_t may only be negative. If that negative impact is sufficiently large (in absolute terms) it could make much of the right-hand side of the IS formula $(E_t y_{t+1} - \sigma(i_t - E_t \pi_{t+1} - r_t^*))$ negative as well. Absent positive shocks, a perpetually negative output gap ($y_t < 0$) would emerge under such conditions.

Arithmetically, the term $(i_t - \pi_t - r_t^*)$ could here be negative (and thus its impact on y_t positive) only with a sufficiently negative nominal policy rate (i_t). Because (as seems quite obvious) the nominal policy interest rates cannot be pushed too much below zero (the "zero lower bound bites") this is not considered a realistic option for ending a permanently negative output gap (or "secular stagnation"). What remains – if one accepts this version of the IS story – is to "stay patient" – wait for some positive "shocks" (perhaps in the form of a fiscal impulse, or the emergence of some asset bubbles) or some inexplicable (exogenous) changes in expectations.

A digression: isn't the natural interest rate an economic unicorn?

Judging the magnitude of an unobservable variable (such as the natural interest rate) by reference to another unobservable variable (or collection of such variables) is obviously not a very sane approach. Moreover, it may create the impression that such a variable – even if unobservable – does actually exist. But in fact such a variable may be pure fiction, a kind of economic unicorn – or an item with mutually excluding characteristics.

Wicksell's original claim that "***There is** a certain rate of interest on loans which is neutral in respect to commodity prices, and tends neither to raise nor to lower them"* presumes the existence of such an equilibrium rate. But what guarantees the existence of such a rate (and/or its stability and uniqueness)?

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to the interest rate **The Investment-Saving** schedule (or function). The model ignores investment spending. All output produced is consumed momentarily (thus there are no savings). Galí (2008) develops a succession of DSGE models – none of them allows for investment in fixed assets.

The rather curious aspect of the natural interest rate concept is its reference to inflation ("*raising or falling commodity prices*") under "counterfactual" conditions (absence of money, frictions, shocks and other nuisance factors). But, under the absence of money, the price level remains indeterminate – and so is inflation. At best (under a unique barter-exchange general equilibrium) only the *relative* prices are determinate and can rise and fall – but only vs. one another!

Wicksell's logical error (making reference to inflation in a moneyless economy) has not been corrected by the Neo-Wicksellians. Actually, Woodford (2003, pp. 62-4) dodges the problem. On the one hand it is claimed that the "price level in a cashless economy is in principle determinate". But then money is introduced through the back door – in the form of "central bank liability which may or may not have any physical existence".[7]

That the DSGE models lack realism (e.g. by ruling out involuntary unemployment or introducing a "representative agent" amalgamating workers with their employers) and are failing miserably as forecasting tools does not seem to trouble their proponents. But at least they should try to get rid of ambiguous concepts and self-contradictory definitions behind their key variables.

Real short-term interest rates have followed declining trends

Perhaps it may be more acceptable to try to gauge the trends in the natural interest rates (assuming they exist, though not necessarily reflecting the conditions obtaining under "counterfactual conditions") by direct reference to the observed tendencies with respect to observed inflation and real-interest rates.

Inflation (at least in the leading industrial countries) has been downwards trending since at least the early 1990s. This is an aspect of the "great moderation" which ended in 2009 (and was then followed, as far as price levels go, by deflationary tendencies).

Under generally low and fairly stable inflation prevailing since 2009, real interest rates (long since following declining trends) have eventually turned negative (see Figure 1 showing short-term interest rates in major industrial countries since 1961). This seems to support the conviction that the "natural" interest rates must have followed similarly declining trajectories and ended up in negative territory.

Of course this conviction is not literally consistent with Wicksell's original (or Woodford's newer) definition which required that the economy in question is not only perfectly competitive, but also moneyless. Neither condition is satisfied in the really existing industrial (and almost all other) countries.[8]

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[7] Arguably, Wicksell might have assumed that all prices were relative – with gold being the (then) obvious (and immutable) numeraire. Perhaps it was unimaginable to express prices of any commodity (rising or falling) in relation to anything else but gold – without clearly realising the fact that gold was then money after all – as well as yet another commodity.
[8] The *models* of perfectly competitive and moneyless (barter) economies (e.g. in the Walrasian tradition) can work excellently (in the learned treatises). But could one really imagine a moneyless (barter-based) developed market economy to function competitively – or at all?

Figure 1 *Real short-term real interest rates (deflator GDP), 1961–2017*
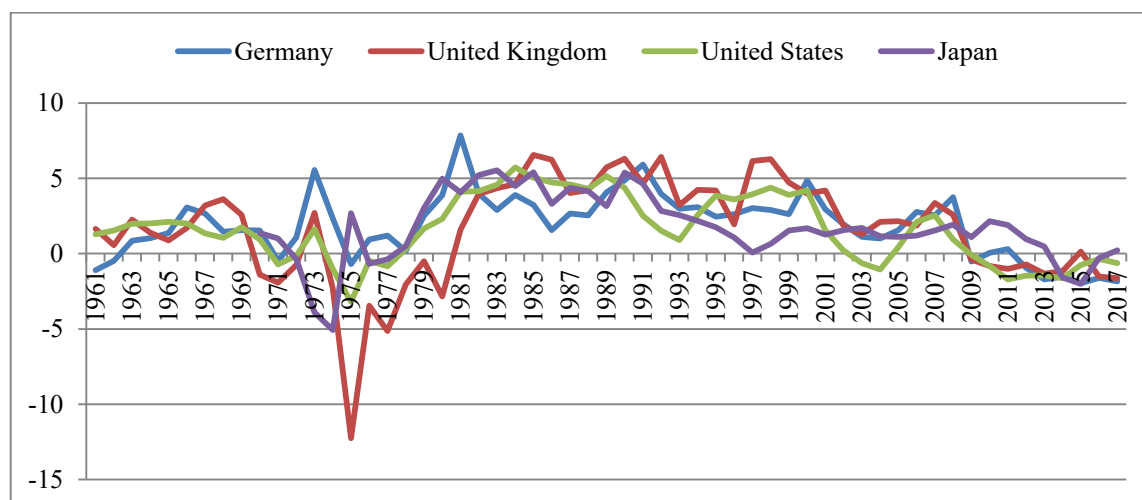
Source: AMECO. "Real short-term interest rate" (AMECO item ISRV) is, essentially, the nominal 3-month money market rate divided by the GDP price deflator.

Figure 2 *Net returns on net capital stock, 1961– 2018 (2010=100)*
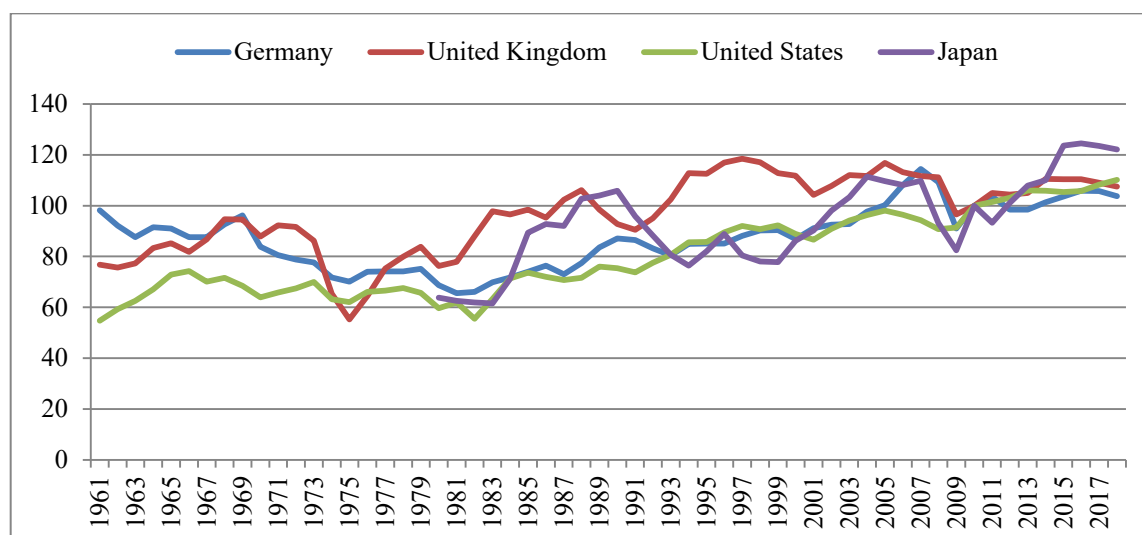
Source: AMECO. "Net returns on net capital stock" (AMECO item APNDK) is the ratio of net domestic income less employees compensation over net capital stock (at current prices).

The natural interest rates radically divorced from capital profitability?

> *"… It comes to much the same thing to describe it [the natural interest rate] as the current value of the natural rate of interest on capital"* (Wicksell, 1936 (1898), p. 102).

Under Wicksell's alternative characterisation of the natural interest rate (as the rate of return on capital[9]) the factual developments observed since the late 1970s through early 2000s (and

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[9] Again, let us gloss over the issue of existence/uniqueness of the *natural rate of interest on capital* and of its measurability under "counterfactual" conditions (absence of money etc.).

then again since 2009) could suggest that the natural interest rate has been *increasing* (see Figure 2).

As can be seen, two apparently equivalent definitions of the natural interest rate suggest qualitatively divergent interpretations of the factual developments. The first suggests that the natural interest rate may have been falling while the second that it may have been rising. The conclusion to be drawn from this is that one does not really know. The natural interest rate may have become negative recently – but it is equally legitimate to claim that it has become pretty large – and positive. Perhaps the most important conclusion would be that its eventual sign and size may not matter at all.

The irrelevance of interest rates (natural or otherwise)

It is not a problem to "derive" a simpler "approximate" formula for IS. Actually such an IS form *not* featuring r* comes first while developing the canonical log-linearized New Keynesian DSGE model (see e.g. Galí, 2008, p. 46). To arrive at the form featuring r* some semantic effort is required (to redefine the variables and parameters of the resulting benchmark DSGE model[10]).

The ease with which one can manipulate, in the DSGE models, the attributes of the mythical "representative worker-employer" (or of the monetary authority, "firms", "technology", "shocks", etc.) is as disquieting as the arbitrariness in "calibrating" the models' parameters. It may seem advisable to consider as irrelevant and *unfortunately useless "*most state of the art academic monetary economics" (Buiter, 2009). The same applies not only to the concept of a natural micro-founded interest rate but also to the old (Hicks') idea of a negatively-sloping IS schedule. Of course this is not to claim that the IS must be positively-sloping - though this eventuality cannot be ruled out in some circumstances (Podkaminer, 1997). Instead, it would seem legitimate to take it for granted that the impacts of moderately[11] changing interest rates on output tend to be rather unsystematic, dependent also on the real developments, and actually too difficult to model.[12] In any case, in the real world the effects of moderate interest rate variations seem to be of the second order of importance – in contrast to fiscal and other aggregate demand-side impulses which the current mainstream tends to treat as "exogenous shocks".

Understanding "secular stagnation" may require the study of real forces behind historically evolving global consumption and investment trajectories. One of these forces was the overall economic paradigm change of the late 1970s and early 1980s – the rise of neoliberalism as the ruling principle behind economic and social policy making (see e.g. Podkaminer, 2015; Palley, 2018).

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[10] The benchmark 3-equation DSGE model has – in addition to an IS formula – the equations for the "new" Phillips curve and the Taylor Rule.

[11] Because the DSGE models work with *local* (log-linearized) approximations around the presumed steady state trajectories, they cannot say anything about the effects of larger changes, or shocks, to the variables or parameters considered.

[12] There are multiple issues here. For example, activity according to the ambiguities of Keynes's marginal efficiency of capital, and the balance in a modern economy between ownership and production and trading of financial assets and productive investment (since a financialized economy may have more activity at higher interest rates, since this benefits rentiers, though it harms debtors – in any case, the relation to interest rates may contrast with that for productive investment, even if it is expected return that matters – as such the outcome of interest rate movements is conditional and complex though not arbitrary).

Economic "science" played a role in the paradigm change. It is perhaps not a sheer coincidence that the rise of neoliberalism as the basis of policy practice coincided with the emergence and then a long era of absolute dominance of the "micro-founded equilibrium" macroeconomics obligingly refuting the ("old") Keynesian ideas on which the practical economic policies during the golden era of capitalism (1950–70) had been founded.[13]

References

Blanchard, O. (2018) "Should We Reject the Natural Rate Hypothesis?" *Journal of Economic Perspectives*, 32(1), pp. 57-120.

Buiter, W. H. (2009) "The unfortunate uselessness of most 'state of the art' academic monetary economics." *VoxEU*, March.

ECB (2018) "The natural rate of interest: estimates, drivers, and challenges to monetary policy." *ECB Occasional Paper Series,* No 217.

Galí, J. (2008) *Monetary Policy, Inflation and the Business Cycle. An Introduction to the New Keynesian Framework*. Princeton University Press.

Goodfriend, M. (2007) "How the World Achieved Consensus on Monetary Policy." *Journal of Economic Perspectives*, 21(4), pp. 47-68.

Laubach, T. and Williams, J. C. (2003) "Measuring the Natural Rate of Interest." *The Review of Economics and Statistics*, 85(4), pp. 1063–70.

Palley, T. I. (2018) Three globalizations, not two: rethinking the history and economics of trade and globalization. *European Journal of Economics and Economic Policies: Intervention*, 15(2), pp. 174-92.

Podkaminer, L. (1997) "Upward-Sloping Aggregate Demand Functions, Downward-Sloping Aggregate Supply Functions." *Journal of Post Keynesian Economics,* 20(2), pp. 301-8.

Podkaminer, L. (2015) "The euro area's secular stagnation and what can be done about it. A post-Keynesian perspective." *Real-World Economics Review*, 70, pp. 2-16.

Summers, L. H. (2014) "U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound." *Business Economics*, 49(2), pp. 65-73.

Wicksell, K. (1936 [1898]) *Interest and Prices. A Study of the Causes Regulating the Value of Money.* Translated by R. Kahn (1962 reprint, A. Kelley, New York).

Woodford, M. (2003) *Interest and Prices. Foundations of a Theory of Monetary Policy*. Princeton University Press.

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[13] Shortly before the outbreak of the global financial crisis it could be claimed that "The worldwide progress in monetary policy is a great achievement that, especially when viewed from the perspective of 30 years ago, is a remarkable success story. Today, academics, central bank economists, and policymakers around the world work together on monetary policy as never before" (Goodfriend, 2007, p. 65).