

## Evidence of a macroeconomic reversal rate



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*Our research finds that expansionary monetary policy in the euro area becomes less effective in a low interest rate environment. The usual substitution effect on spending seems then to be weaker relative to the income effect. This points towards the existence of a macroeconomic reversal interest rate and sheds new light on changes in the monetary policy transmission mechanism at the effective lower bound (ELB).*

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## From banking reversal rate to macroeconomic reversal rate

The concept of the reversal rate was coined by Brunnermeier and Koby (2018) and refers to the adverse effects of low interest rates on bank lending. In a low interest rate environment banks' interest rate margins decline and thus, their net worth falls. This can trigger the reversal rate at which a lower central bank policy rate can lead to higher instead of lower lending rates and therefore, actually reduce lending. This effect refers to changes in the monetary policy transmission via the banking channel and depends on the capitalisation of the banking sector (Darracq Pariès et al., 2020).

We follow the idea of Brunnermeier and Koby's (2018) reversal rate to investigate the effect of interest rate changes on the real economy through changes in spending and savings by firms and households (Van den End et al., 2020). This macroeconomic reversal rate relates to the redistributive channel of monetary policy, which is determined by substitution and income effects. The substitution effect refers to the intertemporal shift of spending induced by a change in the interest rate. This is the assumed dominant interest rate effect in New-Keynesian models. The income effect is related to the financial income from deposit savings and financial assets. A low interest rate environment compresses financial income and could reinforce savings, for instance due to nominal savings targets of households.

If interest rates are persistently low, negative income effects may become more prevailing. In these circumstances, households are concerned that low returns on savings render their lifetime savings insufficient for retirement. In addition, worries about the value of pensions or life insurance products raise the need for additional savings. Consequently, the substitution effect may become weaker relative to the income effect at very low or negative interest rate levels. Uncertainty and nominal loss aversion may give rise to nonlinear responses of savers and investors to monetary policy shocks. For instance, a negative nominal interest rate may contribute to uncertainty and precautionary savings, as it may convey disappointing information about the economic outlook and expected asset returns.

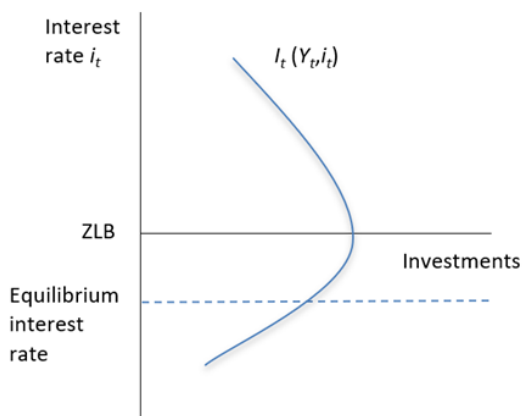
## Economic framework

In the standard representative agent New-Keynesian (RANK) model a negative equilibrium interest rate is the result of a savings surplus and not of monetary policy. If the central bank is not able to reduce the policy rate below the equilibrium rate due to the ELB, a recession is likely to follow. The equilibrium can be restored by reducing the real policy rate via higher inflation expectations or fiscal policy expansion. Recent studies criticize the standard RANK framework and the loanable funds model on which it is based.

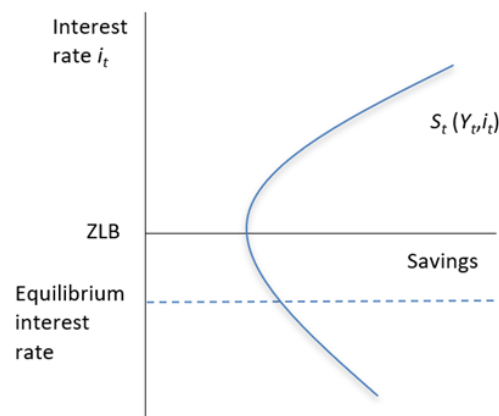
Palley (2019) shows that if the return on capital goods investment is dominated by the returns on non-reproduced assets (i.e. assets that are in short supply, such as cash, commodities, land, and monopoly rents), cutting the policy rate into the negative territory does not provide an additional stimulus but actually drives the economy further away from equilibrium. A negative nominal interest rate functions like a macroeconomic reversal rate, which stimulates savings and discourages capital goods investment. In that state of 'investment saturation', investments are no longer responsive to changes in the monetary policy rate. The investment curve can even become reversely elastic with respect to the interest rate, implying that investment demand falls if the interest rate decreases (Figure 1). The backward-bending part of the demand curve can be associated with negative marginal returns on capital, reflecting a negative natural interest rate. Bofinger and Ries (2017) offer a similar explanation, arguing that a low interest rate stimulates 'financialization' through speculative financial activities, discouraging capital goods investment.

In Palley's framework a negative nominal interest rate is also associated with a rise in savings. This situation is reflected in the negatively sloping savings curve in Figure 2, from the point where the interest rate drops below zero. In these conditions, the negative income effect of a negative interest rate (driven by negative nominal returns on bank accounts or diminishing pension wealth) dominates the usual substitution effect.

**Figure 1. Investment demand**



**Figure 2. Savings supply**



### Estimating the reversal effects

Most models analyse the transmission of monetary policy shocks and the relationship between interest rates and spending in a linear setting. However, spending and savings may respond differently to monetary policy shocks in a low interest rate regime. Our study takes into account such nonlinearities by employing a smooth transition local projections model, estimated for the euro area over the period 1999q2-2019q1. We examine how “low-for-long” interest rates may alter impulse responses of savings and investments to monetary policy shocks. In our model, we include monetary policy shocks identified for the euro area by Jarociński and Karadi (2020).

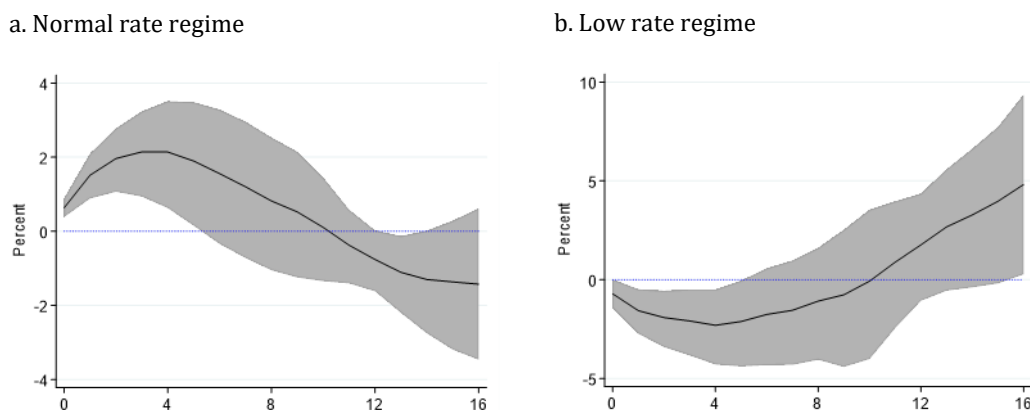
The impulse responses of capital goods investment and gross households savings to an expansionary monetary policy shock are presented in Figures 3-4. The nominal short-term interest rate is used as the state variable in a smooth transition function to determine the interest rate regimes. The responses are significantly different in the normal rate regime compared to the low rate regime. The results indicate that certain channels of the monetary policy transmission may alter once the economy is in a prolonged period of low interest rates.

Investments and savings respond to an expansionary monetary policy shock in opposite directions across the regimes. In the normal rate regime the shock increases investment volume in the euro area, in line with the substitution effect (Figure 3a). However, the responses are reversed in the low rate regime, implying that in a low interest rate environment further monetary easing might not stimulate investment, but actually discourage it (Figure 3b). This result is in line with the theoretical framework, which points towards a reversal of investment behaviour in a low rate environment due to negative marginal returns on capital and/or due to financialization.

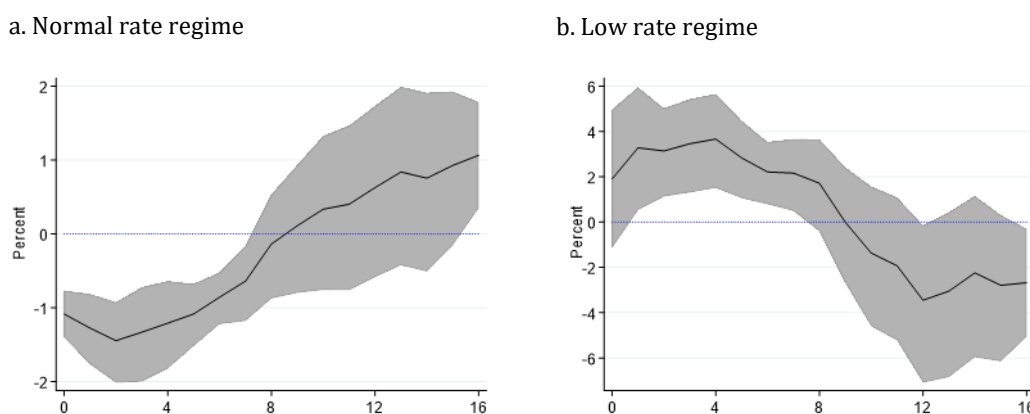
Next, in the low rate regime savings respond differently to a monetary policy shock than in the normal rate regime. The savings volume declines after a monetary easing shock in the normal rate regime (Figure 4a), while it increases in the low rate regime (Figure 4b). This indicates that in a low rate environment further monetary policy easing raises savings, which reflects a dominant income effect. These findings are consistent with Palley's framework and indicate that in a low interest rate environment further monetary policy easing would raise savings due to negative income effects.

Our result holds to varying degrees also for other macroeconomic variables, like consumption and the output gap. It points to the existence of the macroeconomic reversal rate, which could be explained by income effects becoming more dominant than substitution effects at low interest rate levels. This challenges the relationship between aggregate demand and the interest rate in the standard New-Keynesian model.

**Figure 3. Responses of investments in euro area to an expansionary monetary policy shock**



**Figure 4. Responses of savings in euro area to an expansionary monetary policy shock**



Notes: The figures plot the smoothed impulse responses of capital goods investment and gross household savings (both in log-levels) to a one standard deviation expansionary monetary policy shock in the euro area, with a 90% confidence interval around the responses (shaded area).

## Policy implications

Our findings show that monetary policy transmission can change in a persistently low interest rate environment, as indicated by the different responses of macroeconomic aggregates to monetary policy shocks. This is likely associated with changes in the behaviour of economic agents and their expectations due to the interest rate being at a low level for a prolonged period of time. Under such conditions, it is increasingly likely that income effects dominate substitution effects. When interest rates have been low for longer, the costs of further monetary easing, also in terms of financial stability, could outgrow the benefits (Schnabel, 2021).

The existence of such nonlinearities implies that the effectiveness of accommodative monetary policy is limited in certain macroeconomic conditions. This calls for more alignment and coordination between monetary and fiscal policy, as the latter tends to be more effective when the ELB is binding (Bonam et al., 2020). Specifically, government spending can help reduce the probability that the economy gets stuck in a low interest rate regime, in which monetary policy becomes less effective. ■

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