

Box 3

THE IMPACT OF VERY LOW INTEREST RATES ON MONETARY DYNAMICS

At its meeting on 5 July 2012, the Governing Council decided to reduce the key ECB interest rates to unprecedented low levels. In such an environment, well-established empirical relationships derived from historically observed levels of interest rates might be significantly affected due to potential non-linear phenomena. Concerning monetary analysis, these effects may relate to: (i) money demand, including the implications for the signalling properties of money for economic activity and inflation; and (ii) money market funds and their role in providing funding to banks. This box concludes that non-linearities in a close to zero interest rate environment do exist for money demand, although their significance can be assessed as limited at current interest rate levels.

Money demand at very low interest rates

Theoretical considerations suggest that extrapolating money demand behaviour that has been observed within a range of usual levels of interest rates to the case where interest rates approach zero might not provide reliable information.¹ However, the possibility that money demand may be subject to significant changes as interest rates become very low has important implications for monetary policy. This is because an atypical increase in money holdings as interest rates approach zero may be erroneously interpreted as signalling the transmission of monetary stimulus and therefore the build-up of expansionary pressure, when in fact it may reflect a change in conventional money demand behaviour.

Empirical evidence for the effects of very low policy rates over an extended period of time is scarce, but is for example available for the United States and Japan. For Japan, for instance, there is strong evidence of non-linearities in the demand for M1 at low rates. This pattern is in line with standard theoretical predictions of money demand at low opportunity costs. However, it cannot be ruled out that this observation was affected by the Bank of Japan's explicit quantitative easing policy over the period in which the described pattern was observed. For the United States, by contrast, evidence for the existence of non-linearities in money demand is somewhat weaker. Empirical results also suggest that new funds tend to be placed in longer-term and riskier assets in order to benefit from these assets' yield pick-up. At the same time, there are no empirical indications of large-scale stock adjustments out of monetary liabilities, which could put banks under significant funding stress.

Looking at the link between opportunity costs and income velocity in the euro area reveals a behaviour that is in line with standard theoretical predictions. The regression line between these two factors is broadly upward sloping, as higher interest rates lead to a decline in the holdings of money relative to GDP. However, this linear relationship seems to be far from stable and is less pronounced for M3 (see Chart A) than for M1 (see Chart B). Since early 2009 when policy rates in the euro area were cut to unprecedentedly low levels, velocity in both cases exhibited only minor

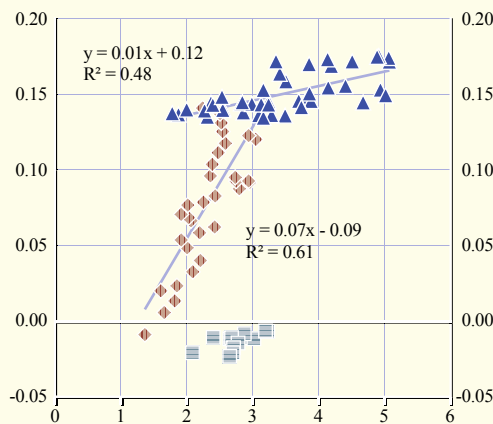
¹ See, among others, Mulligan, C. and Sala-i-Martin, X., "Extensive margins and the demand for money at low interest rates", *Journal of Political Economy*, Vol. 108 (5), October 2000, pp. 961-991; Nagayasu, J., "A re-examination of the Japanese money demand function and structural shifts", *Journal of Policy Modeling*, Vol. 25 (4), June 2003, pp. 359-375; and Nakashima, K., "An extremely-low-interest-rate policy and the shape of the Japanese money demand function", *Macroeconomic Dynamics*, Vol. 13 (5), November 2009, pp. 553-579.

Chart A Euro area M3 income velocity and the opportunity cost of M3

(percentages; logarithmic scale)

x-axis: opportunity cost of M3
y-axis: velocity (log)

- ▲ Q1 1990-Q4 2000
- ◆ Q1 2001-Q4 2008
- Q1 2009-Q1 2012



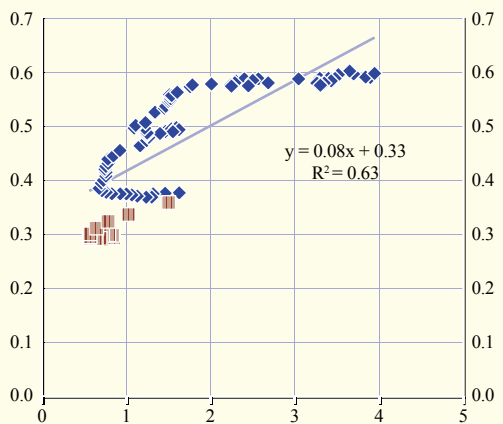
Sources: ECB and ECB calculations.

Chart B Euro area M1 income velocity and the opportunity cost of M1

(percentages; logarithmic scale)

x-axis: opportunity cost of M1
y-axis: velocity (log)

- ◆ Q1 2001-Q4 2008
- Q1 2009-Q1 2012



Sources: ECB and ECB calculations.

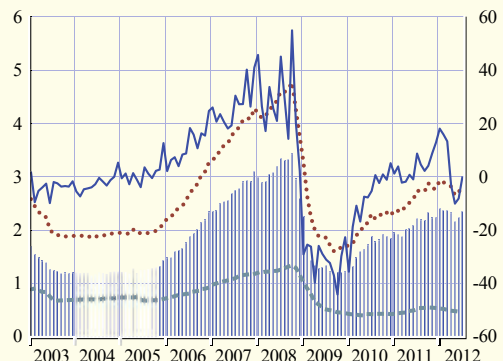
movements. However, despite the decline of policy rates to historical lows, opportunity costs, after having sharply declined in late 2008, have in fact increased in the euro area over the last three years, reflecting the impact of the sovereign debt crisis on the government bond yields of a number of euro area countries (see Chart C). Overall, therefore, the euro area experience does not point to a rapid decline in M1 velocity as opportunity costs fall, although the slope of the regression line has clearly flattened as opportunity costs became rather low.²

The issue of a higher preference for narrow money in times of low interest rates also touches upon the question of whether overnight deposits or banknotes are preferred. So far, portfolio shifts from other types of assets into liquid deposits rather than banknotes have predominantly been observed. This is not least

Chart C Remuneration of short-term time and overnight deposits and flows into short-term time deposits in the euro area

(percentages per annum; flows in EUR billions)

- spread between short-term time and overnight deposits, i.e. opportunity cost (left-hand scale)
- interest rate on deposits with agreed maturity of up to one year (left-hand scale)
- interest rate on overnight deposits (left-hand scale)
- monthly change in holdings of short-term time deposits by households (right-hand scale)



Sources: ECB and ECB calculations.

2 Opportunity costs in the euro area have, as yet, never dropped to the very low levels where non-linear effects would be expected to manifest themselves. In the United States, where declining long-term yields resulted in opportunity costs close to zero, the demand for money has indeed increased, resulting in a decline in velocity.

because deposits and banknotes are not perfect substitutes, since banknotes can be less readily mobilised and – beyond a certain threshold – entail significant logistical costs associated with transport, storage, security and insurance issues. Experience at very low interest rates observed so far in large currency areas does not point to a large substitution into banknotes.

The consequences of low interest rates for banks' market-based funding

As a consequence of historically low policy rates in the euro area, net returns on short-term financial instruments have been meagre for quite some time. In such an environment, money market funds (MMFs), for instance, experienced withdrawals in recent quarters. Against the backdrop of declining assets under management at MMFs, the amount of liquidity available for MMFs' purchases of banks' debt securities faded as well. Such a situation could thus lead to further constraints on credit institutions' access to funding. As a consequence, the Governing Council's decision to cut the interest rate on the ECB's deposit facility to zero on 5 July triggered some concerns that further declining money market yields might cause intensifying pressure on MMFs with potential negative consequences for banks' funding situation. Besides this, forthcoming regulatory requirements regarding banks' funding strategies tend to favour retail funding sources over market-based funding. These developments might thus weigh on banks' security-based funding efforts.

The banking industry in the euro area already seems to have anticipated these progressions, for example by attracting and maintaining retail deposits held by the non-financial private sector. For instance, to the extent that the increase in overnight deposits stems from money-holding sector entities' selling of risky non-bank assets to non-euro area residents, the respective flows ultimately mirror an improvement in banks' funding position. At the same time, insofar as the expansion in M1 deposits reflects portfolio shifts at the expense of other bank liabilities, banks' funding position is concerned mainly with respect to its maturity.